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PRIVATE EQUITY IN TIMES OF POLICY UNCERTAINTY: A GLOBAL STUDY OF THE EFFECTS ON INVESTMENT ACTIVITY, RETURNS, AND OPPORTUNITIES

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Abstract

Using two novel samples of private equity (PE) investment and exits, the study reveals that economic policy uncertainty (EPU) has a small negative impact on PE investment activity. This finding indicates a lower sensitivity compared to venture capitalists. Further results show that EPU is associated with lower entry and exit multiples, implying that PE firms can seize opportunities by investing in high EPU and exiting in low EPU. Additionally, mature PE firms demonstrate higher deal-making activity than their counterparts in these periods, suggesting that they capitalize on these opportunities. However, evidence for superior returns in high EPU periods remains limited.

Keywords: Private Equity, Economic Policy Uncertainty, Investment Activity, Returns

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1 Introduction

Private equity (PE) firms have repeatedly demonstrated remarkable resilience and outperformance of other asset classes in turbulent times (e.g., Jordaan 2018). In an era marked by geopolitical and economic unpredictability, a critical question arises: how do these firms react and thrive in the face of economic policy uncertainty (EPU)? A large body of literature has investigated the impact of EPU on public markets (e.g., Bonaime, Gulen, and Ion 2018) and corporate investment (e.g., Gulen and Ion 2015). However, the PE buyout sector, which manages over $3 trillion in assets (Preqin 2023), remains largely unexplored. Given the sector's significant contributions to the global economy, such as fostering growth in their portfolio companies and revitalizing distressed companies (Gudiškis and Urbšienė 2015), understanding this relationship is imperative.

This study aims to fill this gap by examining the impact of EPU on PE investment activity and returns. Furthermore, it seeks to uncover whether EPU presents potential opportunities for PE firms and whether responses to EPU vary based on the maturity of these firms. By doing so, the study adds value to both academic literature and real-world applications by providing practical insights for PE firms and policymakers to navigate periods of uncertainty more effectively.

The theoretical foundation of this study is grounded on theories explaining investment behaviour under uncertainty and empirical evidence of the determinants of PE investment activity. The real options theory posits investors tend to postpone investment decisions until uncertainty resolves (e.g., Dixit, Dixit, and Pindyck 1994). Similarly, the literature on the theory of information asymmetries in the context of PE suggests that an increase in such asymmetries leads to a decrease in PE investment activity (Sommer 2012). Given that EPU exacerbates information asymmetries (Nagar, Schoenfeld, and Wellman 2019), it is plausible to infer that EPU negatively affects PE investment activity. However, the impressive performance of PE firms in turbulent times (Gianfrate and Loewenthal 2015), coupled with their ability to actively

manage and control their portfolio companies (e.g., Hellmann and Puri 2002), adds a layer of complexity to the relationship between EPU and PE investment activity and returns.

To empirically examine this complex relationship, I constructed two novel datasets of 65,843 investments and 21,680 exits. These samples cover the period from 2000 to 2021 and include 15 countries with the most prominent PE activity to ensure a global representative study. For the empirical analysis, I employ a linear panel regression model with multiple levels of fixed effects to control for unobserved heterogeneity across PE firms, countries, and years. Furthermore, I use a carefully selected set of control variables identified in the literature as factors that affect PE investment activity (e.g., Lerner, Sorensen, and Strömberg 2009).

Designing the study presented two major challenges: identifying a suitable measure of policy uncertainty and dealing with the data limitations inherent to an asset class known for its limited disclosure practices. To address the first challenge, I refer to the EPU index developed by Baker, Bloom, and Davis (2016), which allows me to capture country-specific policy uncertainty over an extended timeframe. To overcome the second challenge, I follow the methodology of Hammer et al. (2023) by using Heckman's two-stage imputation model to estimate missing deal values and create subsamples for missing values of dependent variables.

The baseline results reveal a negative impact of EPU on PE investment activity. Specifically, a one-standard-deviation higher EPU score (92.2 points) results in a reduction of about 0.1 investments for an average PE firm in a respective year and country, corresponding to a 2.8% decrease relative to the unconditional mean of 2.0 investments. The estimates for deal volume suggest that a one-standard-deviation higher EPU score is associated with a reduction of roughly $6.0 million for the average PE firm, which translates to a 1.0% decrease relative to the unconditional mean of $597 million. The relatively weak effect implies that PE firms are less sensitive to EPU compared to venture capital (VC) firms, which reduce their investments

on average by 4.3% (Litov, Liu, and Sitorus 2021). Examining whether EPU is associated with potential opportunities, I find that periods of high EPU are characterized by reduced entry and exit multiples. This suggests that PE firms can take advantage of periods of high EPU to acquire target firms at lower prices and strategically time their exits during periods of low EPU to benefit from higher exit prices. A deeper analysis of the effects of EPU uncovers significant variations in responses to EPU among PE firms. I observe that more mature PE firms engage more in deal-making than their less experienced counterparts in these periods. A supplementary analysis, segmented by firm age, shows that the subgroup with an age above the median age (>11 years) engages in deals in periods that are on average 13 EPU points higher than the subgroup with an age below or equal to the median (<= 11 years). These results lend support to the theory that mature PE firms can leverage their information advantages (Smit and van den Berg 2006), enabling them to capitalize on these opportunities arising from EPU. Addressing the bottom-line question of whether deals conducted during periods of high EPU are associated with superior exit outcomes, the model incorporating fixed effect fails to find statistical evidence, whereas the model without does. These inconclusive results pave the way for future research. The findings continue to hold in several robustness tests that incorporate alternative measures for dependent variables and additional fixed effects.

These findings hold significant implications for PE firms and policymakers alike. PE firms should integrate EPU into their investment and exit decisions and recognize its potential opportunities. Adopting a counter-cyclical investment strategy, particularly for experienced PE firms, could effectively address the prevailing challenges of elevated entry multiples and intensified competition. Policymakers are encouraged to consider measures to minimize policy uncertainty to ensure the crucial economic contributions of PE investments.

This study contributes to the existing literature in three significant ways. First, it expands the literature on policy uncertainty by shedding light on an overlooked yet crucial asset class. In

addition, unlike a body of literature that highlights the negative implications of EPU (e.g., Istiak and Serletis 2018), my study offers a fresh perspective by demonstrating that EPU can also present opportunities for investors. Second, it provides novel insights into the literature on PE investment activity (e.g., Lerner, Sorensen, and Strömberg 2009), by identifying policy uncertainty as an influencing factor of PE investment activity. Third, it adds to the literature on PE investment timing (Sommer 2012) by demonstrating that PE firms can not only exploit market cycles for investment timing but also for exit timing. Further, it extends this concept to EPU cycles.

The remainder of this thesis is organized as follows. Section 2 reviews the literature and develops hypotheses. Section 3 describes the methodology, the sample construction, and the summary statistics. Section 4 presents the empirical results. Section 5 discusses the results and presents their implications. Section 6 concludes by providing a summary and recommendation.

2 Literature Review and Hypotheses

This section provides a concise overview of PE investments and their characteristics. Subsequently, the relevant literature is critically discussed to build well-founded hypotheses.

2.1 Background

PE investments are long-term, non-publicly traded equity investments that primarily target privately held companies (Cendrowski et al. 2012, p.4). PE funds, structured as limited partnerships, pool capital from limited partners (LPs), and are managed by PE firms acting as general partners (GPs). The PE fund model grants GPs extensive freedom in investment decisions and allows them to strategically time investments (Jenkinson et al. 2022).

The PE industry can be divided into VC firms and buyout firms (Vasvari and Talmor 2011, p.4). This study focuses on the buyout firms and uses the terms buyout and PE interchangeably. In contrast to VC firms, PE buyout firms typically acquire controlling stakes in mature,

profitable companies and often employ high leverage (Gorman and Sahlman 1989; Cassel 2020). A notable distinction of PE buyout firms is the active role of the PE firm and significant control over their portfolio companies (Hellmann and Puri 2002). PE firms have been shown to consistently outperform other asset classes (e.g., Harris, Jenkinson, and Kaplan 2014), particularly in times of crises (e.g., Gianfrate and Loewenthal 2015). As a result of the lucrative returns, the PE sector has experienced significant growth, with global PE buyout funds' AUM surpassing $3 trillion in December 2021 (Preqin 2023), nearly tripling within a decade. However, this growth has also resulted in a scarcity of quality targets and increased entry multiples. This dynamic resulted in a decline in PE performance, as evidenced by a recent study (G. W. Brown and Kaplan 2019).

2.2 Related Literature

This section critically examines the following three main strands of literature that are relevant for this study and identifies research gaps.

2.2.1 PE Investment Activity and its Cyclicality: Determinants and Performance

The existing literature documents that PE deal activity occurs in waves, which exhibit pro-cyclical tendencies (e.g., Smit and van den Berg 2006). A widely accepted explanation for these waves is Kaplan's market timing theory of PE “boom and bust cycles” (e.g., Steven N. Kaplan and Schoar 2005). This theory suggests that cycles begin when investors observe high returns, leading to an inflow of capital. This influx of capital stimulates investment activity and intensifies competition (Steven N. Kaplan and Schoar 2005). As high-quality targets become scarce, PE firms tend to overpay for target companies (Jensen 1991), leading to diminishing fund returns and a decline in deal activity (S. N. Kaplan and Stein 1993). Although the literature documents PE investment activity and its determinants, the effect of policy uncertainty on PE investment activity remains unexplored.

Research on the relationship between PE cycles and performance indicates that investments undertaken during periods of high competition negatively affect PE firms' returns due to overpayment and poor target company choices (Gompers and Lerner 2000; Sommer 2012). Despite the emphasis of the literature on market timing based on market cycles, the evidence on optimal phases for investment and exits is limited.

2.2.2 PE Firms' Heterogeneity

The literature typically distinguishes PE firms by age and experience, given their significant differences in behavior and performance. Studies show that more mature PE firms outperform their less experienced counterparts (e.g., Steven N. Kaplan and Schoar 2005; Phalippou and Gottschalg 2008), particularly in times of crises (Gianfrate and Loewenthal 2015; Jordaan 2018). Factors such as their superior pre-screening and due diligence abilities, larger networks, and information advantages help explain this outperformance (Gohil and Vyas 2016). Smit and van den Berg (2006) explain this by demonstrating that the information advantage held by established agents allows them to invest first in the wave, which is often linked with favourable conditions for high returns.

However, the relationship between PE firms' experience and risk-taking behaviour, remains unclear. While Aigner, Albrecht, and Beyschlag (2008) suggest that more experienced PE firms are more likely to invest in riskier deals, Buchner and Wagner (2015) argue that less experienced PE firms pursue excessive risk-taking to establish a track record.

Although the literature provides clear evidence of the relationship between PE firm experience and performance, it remains inconclusive regarding how PE firms based on their maturity respond to risks, particularly in the context of systematic risks such as policy uncertainty.

2.2.3 EPU and Theoretical Foundation on Investment Behavior in Uncertainty

EPU is defined as the economic risk caused by undefined future government policies and regulatory frameworks (Al-Thaqeb and Algharabali 2019). The EPU index, developed by Baker, Bloom, and Davis (2016), has been widely used in academia due to its reliability in measuring EPU (see Section 3.1.2 for more details).

The surge in academic research of EPU can be attributed to its significant implications for both the macro- and microeconomic environments. Macro-level research indicates that EPU negatively affects economic growth, thereby underscoring its countercyclical nature (e.g., Istiak and Serletis 2018). Micro-level studies reveal that increased EPU contributes to a reduction in capital expenditures, postponement of major financial decisions (e.g., Gulen and Ion 2015), and elevated costs of capital for firms (e.g., Pham 2019). Research also demonstrates that increased EPU negatively affects mergers and acquisition (M&A) activity (e.g., Bonaime, Gulen, and Ion 2018). In the context of private markets, Litov, Liu, and Sitorus (2021) found that VC firms reduce their investments in startups during periods of high policy uncertainty, but with a less persistent impact than for M&A activity (Tian, Wang, and Ye 2018). However, the impact on PE buyout firms remains underexplored, except by the study of Hammer et al. (2023), which focuses solely on management buyouts (MBOs), representing only a fraction of the PE sector.

Given the extensive literature on public markets and the emphasis on the negative effects of EPU on investments, this research seeks to fill this gap by examining the impact on the PE sector while also considering potential opportunities arising from EPU.

This study draws on two predominant theories used to explain investment behavior under uncertainty: the options theory and the information asymmetry theory. The real options theory suggests that the presence of uncertainty increases the value of waiting for new information, which incentivizes delaying investments until uncertainty partially resolves (e.g., Bernanke

1983; Dixit, Dixit, and Pindyck 1994). This “wait-and-see” behavior (Bachmann, Elstner, and Sims 2013) applies particularly to irreversible investments and demonstrates the “bad news” effect of EPU (Yi, Liao, and Zhang 2022). An alternative response to uncertainty is presented by the growth option effect, which suggests that uncertainty can stimulate investments when it enhances “the size of the potential prize” (Bloom 2014, p.166). This theory illustrates the “good news” effect of the EPU.

Arrow’s (1959) pioneering work on information asymmetries highlights the importance of information as a distinguishing factor between certainty and uncertainty. In the PE industry, information asymmetries exist primarily between the PE firm and the target companies. Sommer (2012) built upon the adverse selection cost view theory, which suggests that transaction costs fluctuate with changing levels of information asymmetries. This view suggests that target firm owners possess superior knowledge of their firms' prospects and will only accept offers meeting their price expectations. As greater uncertainty causes PE bidders to lower their offers, they will potentially fail to meet target-firm owners' expectations, which results in reduced investment activity.

In conclusion, this study aims to fill the highlighted gaps in research, thereby shedding light on the underexplored effect of policy uncertainty on PE investments and exits.

2.3 Hypothesis Development

Based on the literature review and the identified gaps, this study presents five hypotheses:

The first hypothesis explores the effect of EPU on PE investment activity from three distinct angles. First, the real options theory posits that investors tend to postpone investment decisions until uncertainty resolves, particularly when investments are not fully reversible (Dixit, Dixit, and Pindyck, 1994). Given the less reversible nature of PE investments, it is reasonable to apply this theory. Second, EPU has been found to exacerbate information asymmetries (Nagar,

Schoenfeld, and Wellman 2019). Sommer (2012) argues that increased information asymmetries lead to reduced buyout deal activity, as explained by the adverse selection cost view (see Section 2.2.1). Third, buyout activity is closely related to the dynamics of the credit market (Ljungqvist, Richardson, and Wolfenzon 2020). During periods of high EPU, credit markets are likely to contract (C. P. Nguyen, Le, and Su 2020), which may hinder PE firms from securing necessary debt financing. Taken together, these considerations lead to the first hypothesis:

H1: During periods of heightened EPU, PE investment activity is likely to decline.

Assuming the validity of the first hypothesis, Kaplan's market timing theory implies that reduced deal activity results in decreased competition among PE firms. Consequently, a less aggressive bidding environment and, thus, potentially lower acquisition prices can be expected. Furthermore, the increased information asymmetries resulting from increased EPU (Nagar, Schoenfeld, and Wellman 2019) make it more difficult for PE firms to accurately assess the true value of the target firms. Therefore, PE firms may exhibit a reduced willingness to pay. This gives rise to the second hypothesis:

H2: During periods of heightened EPU, entry revenue multiples are expected to decrease.

Following the rationale applied to H2, periods of reduced EPU are characterized by reduced information asymmetries, greater market stability, and increased competition among acquirers. These factors are likely to drive up acquisition prices. Consequently, PE firms may benefit from exiting their investments at periods of lower EPU, as stated in the following hypothesis:

H3: During periods of reduced EPU, PE firms are more likely to exit their investments at higher exit multiples.

Based on the empirical findings outlined in Section 2.2.2 it can be expected that the responses of PE firms to EPU will vary based on their maturity. The literature indicates that more mature

PE firms are better equipped to navigate uncertain environments due to several factors: (i) their ability to raise capital and obtain debt during periods of tightened credit markets (Hochberg, Ljungqvist, and Lu 2007); (ii) their capacity to better support portfolio companies during challenging times (Alperovych, Amess, and Wright 2013); and (iii) their superior target selection abilities and advanced pre-screening techniques that mitigate information asymmetries (Meuleman et al. 2009). Consequently, mature PE firms should be more confident in managing risks associated with policy uncertainty and may even perceive increased EPU as a "growth option" if the second hypothesis holds, as expressed in the fourth hypothesis:

H4: During periods of increased EPU, more established PE firms are more likely than their counterparts to engage in deals.

Lastly, based on the previous hypotheses that increased EPU leads to decreased investment activity and reduced entry multiples, one can infer that heightened EPU presents opportunities for PE firms. This theory is supported by prior research, which shows that investments made during periods of high competition can adversely impact PE firms' returns (Gompers and Lerner 2000; Sommer 2012). Conversely, periods of lower competition, characterized by heightened EPU, should provide more favorable conditions for higher returns, as it is easier to sell high when buying at low valuations. This reasoning leads to the final hypothesis:

H5: PE firms are more likely to generate superior ROI for investments in periods of high EPU.

3 Methodology and Data

This section provides an overview of the general methodology used in this study, along with a detailed depiction of the empirical models derived from the formulated hypotheses. Moreover, it describes the process of sample construction and relevant summary statistics.

3.1 Methodology

This study employs a linear panel regression model with multiple levels of fixed effects, such as PE firm, country, and year. These fixed effects serve to control for unobserved heterogeneity across these dimensions to accurately determine the effect of EPU on PE investment activity. The panel data model is designed to handle large datasets with both cross-sectional and time-series dimensions, making it suitable for this analysis (Moon and Weidner 2015).

The initial model, designed to reveal the effect of EPU on PE investment activity, incorporates PE firms, country, and year fixed effects. The subsequent models, designed for more in-depth analyses, incorporate country and year fixed effects.

Given the constraints of data availability for certain variables, the study employs approximation techniques and creates subsamples. These approaches ensure a representative and accurate analysis based on the availability of specific variables. I follow Hammer et al. (2023) and use Heckman's two-stage imputation model to estimate missing deal values.[1] Additional approximation techniques and subsamples are specified in Section 3.1.1.

To mitigate the impact of extreme values, continuous variables are winsorized at the 1st and 99th percentiles. Furthermore, I perform a variance inflation test that shows scores below 10 for all variables, thereby confirming the absence of multicollinearity problems. To ensure the robustness of the findings, I incorporate several additional tests as specified in the next section.

3.1.1 Empirical Models and Dependent Variables

The first model explores the impact of EPU on the investment activity of PE firms, as outlined in the following equation:

[1] To avoid any potential biases resulting from this approximation, the estimation has been restricted to the models in which the dependent variable is not deal size.

$$Investment\ Activity_{ikt} = \alpha_{ikt} + \beta_1 EPU_{kt} + \beta_2 Controls_{kt} + \varepsilon_{ikt} \quad (3.1)$$

where i indexes PE firms, k indexes countries, and t indexes years. Observations are aggregated to the PE firm–country–year level. Investment activity is measured using four metrics: *deal volume, deal size, deal count*, and *investment count*. These metrics allow me to examine whether PE firms react to policy uncertainty by shifting to smaller or larger deals or by conducting more or fewer deals. *deal volume* quantifies the total value of deals conducted by a PE firm within a given country and year, while *deal size* represents the average deal size of a PE firm. *Deal count* quantifies the number of unique deals, while *investment count* accounts for the total number of investments from a PE firm's perspective.[2] For *deal size* and *deal volume*, to avoid any potential biases, missing deal values have not been estimated; instead, I use a subsample with deals that contain deal values. The metrics of *deal count*, *deal volume,* and *deal size* implied important assumptions. First, I removed duplicate Deal IDs, and allocated unique Deal IDs to the lead PE firm.[3] Second, following a similar approach to the related literature (e.g., Litov, Liu, and Sitorus 2021), the model approximates the lead PE firm by allocating the deal to the oldest PE firm.

The second model investigates the effect of policy uncertainty on the entry revenue multiple, using the following equation:

$$(In)\ Entry\ Revenue\ Multiple_i = \alpha_{kt} + \beta_1 EPU_{kt} + \beta_2 Controls_{kt} + \varepsilon_{kt} \quad (3.2)$$

where i indexes deals, k indexes countries, and t indexes years.

[2] A deal is defined as the acquisition of a target company by one or multiple PE firms. Therefore, it has to be differentiated between Deal Count and Investment Count. As an illustration, the acquisition of target company A by PE firm 1 and PE firm 2 counts as one deal. However, from a perspective of a PE firm, both PE firms made an investment in target company A.

[3] This attribution is solely undertaken when the actual deal count is investigated, and not in any analysis that examines the heterogeneity of PE firms.

The unit of observation is at the deal level.[4] The dependent variable, *(ln) entry revenue multiple,* measures the acquisition price of a target company relative to its revenue. This metric enables one to compare the acquisition prices of different target companies. A lower entry multiple at the time of the investment is preferable from the perspective of a PE firm. For added robustness, the regression is re-run using the entry *EBITDA multiple* as an alternative measure. A second robustness test incorporates additional fixed effects such as investment type and industry classification, as these factors could also influence variations in multiples.

The third model examines the effect of EPU on the exit multiple, using the second sample and the following equation:

$$(In)\ Exit\ Multiple_i = \alpha_{kt} + \beta_1\ EPU_{kt} + \beta_2 Controls_{kt} + \varepsilon_{kt} \qquad (3.3)$$

where i indexes deals, k indexes countries, and t indexes years. The unit of observation is at the deal level. The dependent variable, *(ln) exit multiple,* allows for a comparison of exit prices. A higher exit multiple is more favorable for PE firms, as it suggests a higher sale price. Identical to the previous model, the robustness test incorporates additional fixed effects such as exit type and industry classification.

The fourth model explores the varied responses of PE firms to EPU based on their age. This empirical model follows the approach of Litov, Liu, and Sitorus (2021), and is specified as:

$$Investment\ Count_{ikt} = \alpha_{kt} + \beta_1\ EPU_{kt} + \beta_2\ EPU_{kt}\ x\ \ Age_i + \beta_3\ \ Age_i + \beta_4\ Controls_{kt} + \varepsilon_{kt} \qquad (3.4)$$

where i indexes PE firms, k indexes countries, and t indexes years. Observations are aggregated on the PE firm-PE firm's country-year level. The interaction term, *EPU x Age*, is the variable

[4] Note that the observation unit is at deal level for the following reasons: (i) the entry multiple is only provided on the deal level and not for individual investment stakes; (ii) aggregating would result in comparing average multiples; (iii) to account for the problem that there may be multiple PEs per deal involved at the deal level.

of interest, which indicates whether the investment activity of younger or older PE firms is more sensitive to policy uncertainty. The age of a PE firm serves as a proxy for the maturity of the PE firm. For added robustness, the regression is re-run with *deal volume* as an alternative measure of investment activity. Furthermore, the study conducts a sample split by age to examine the mean EPU of investments made by age subgroups.

The final analysis evaluates how the returns of PE investments are affected by EPU. This model uses the second sample; the equation is specified as follows:

$$ROI_i = \alpha_{kt} + \beta_1 \ EPU_{kt} + \beta_2 Controls_{kt} + \varepsilon_{kt} \qquad (3.5)$$

where i indexes deals, k indexes countries, and t indexes years. The unit of observation is at the deal level. The dependent variable, *ROI*, signifies the return on investment for a given deal, with higher values indicating more successful deals. This study calculates the ROI by subtracting the entry value from the exit value and dividing the result by the entry value. This model solely considers single PE firm deals for the sake of accuracy, as entry values are disclosed only at the deal level, whereas exit values are disclosed at the investment stake level. For enhanced robustness, the model is re-run using the multiple of invested capital (MOIC) as an alternative measure of returns.

3.1.2 Main explanatory variable and control variables

The primary explanatory variable is the *EPU index* developed by Baker, Bloom, and Davis (2016). The EPU index measures policy uncertainty by the frequency of specific keywords or word combinations in newspaper articles. Spikes in the EPU index are typically observed around events such as presidential elections, wars, and significant fiscal policy disputes. The EPU index serves as a suitable measure for two key reasons: (i) its country-specific scores that enable cross-country comparisons, and (ii) its monthly scores dating back to 1997 that allow

the analysis of variations over time. Following the methodology of Hammer et al. (2023), the study computes yearly averages of the monthly EPU scores. Appendix 3 graphically presents these yearly mean EPU of the sample and marks events that caused EPU spikes.

To account for potential confounding factors that may affect PE investment activity, this study employs a carefully selected set of control variables. Specifically, the study controls for relevant cross-country variations, as the existing literature indicates that country-specific factors can affect PE investment activity (e.g., Groh and Liechtenstein 2012; Hammer, Hinrichs, and Schwetzler 2018). The study employs *GDP growth,* as it has been found to be an important determinant of PE activity (Lerner, Sorensen, and Strömberg 2009). Furthermore, it incorporates the *Credit to GDP ratio*, as PE activity is closely linked to the credit market (Ljungqvist, Richardson, and Wolfenzon 2020). Additionally, the *World Governance Index (WGI)* is employed as a measure of the institutional quality of a country, which has been shown to impact PE investments (Groh and Liechtenstein 2012). Lastly, it uses the *natural logarithm of deal size* to control for differences in the size and attractiveness of portfolio companies. Appendix 2 presents a comprehensive summary of all variables and their sources.

3.2 Data and Sample Construction

This study constructs two comprehensive samples of PE buyout investments and exits that cover the period from 2000 to 2021. The samples include data from 15 countries[5] with the highest PE activity (Statista 2023) for which national EPU scores are obtainable. These countries account for 85% of the total deals listed in Preqin during the given period, thus ensuring a globally representative sample. I retrieve all PE-related data from the Preqin database.[6]

[5] These countries are Australia, Brazil, Canada, China, France, Germany, Hong Kong, India, Italy, Japan, the Netherlands, South Korea, Spain, the United Kingdom, and the United States.
[6] Preqin is a commercial database that is a widely used source in the PE literature (e.g., G. Brown et al. 2021; Jenkinson et al. 2022).

The data collection process adheres to the following criteria: (i) the type of transaction is reported as “buyout”, “add on”, “public to private”; (ii) the type of investor is “PE fund manager”; (iii) the transaction does not classify as a minority stake. Following these steps, the study augments the datasets with additional PE firm data to determine the age of PE firms at the time of investment. It then incorporates the EPU variable and control variables.

This process results in 65,842 PE firm–deal level observations for the first sample, which comprises only investment data. The second sample, which includes exit data, contains 21,680 PE firms–exit observations. However, data limitations restrict unique deal observations for the dependent variables ROI and exit multiples to 2,088 and 1,598, respectively. Both samples follow the same construction method, ensuring a consistent and reliable analysis.

3.3 Descriptive Statistics

Table 1 reports the summary statistics at different levels of aggregation.

Table 1: Summary Statistics

Panel A: Aggregation on PE firm-country-year level						
	N	Mean	SD	Min	Median	Max
Investment Count	32415	1.9973	2.0172	1.0000	1.0000	13.0000
EPU	32415	167.4161	92.1601	53.3663	145.1282	542.7656
GDP Growth	32415	.0195	0.0270	-.0904	.0224	.0811
Credit to GDP	32415	87.8109	41.2291	48.9749	73.0495	190.0188
Governance	32415	1.2189	0.4087	-.4058	1.2908	1.7041
(ln) Deal Size	32412	1.9422	1.5115	.1209	1.5617	7.0316
Panel B: Aggregation on country-year level						
Investment Count	328	198.7652	466.0577	2.0000	56.0000	2804.0000
EPU	328	141.0191	79.1949	47.8444	123.6113	475.8440
GDP Growth	328	.0257	0.0329	-.0778	.0233	.1064
Credit to GDP	328	106.7612	41.9509	29.004	106.1507	223.3719
Governance	328	.9691	0.6901	-.5633	1.2338	1.7238
(ln) Deal Size	328	2.3671	0.8083	.7497	2.3767	4.1228

Panel A presents the summary statistics at the PE firm-country-year level. These statistics reveal that, on average, a PE firm makes annually about two investments within a particular country, with an observed maximum of 13 investments. The standard deviation of 2.02 in investment

count indicates a relatively wide range of yearly investment activity across different PE firms, suggesting a varied investment activity among PE firms. The EPU score, with a mean of 167.42 and a substantial standard deviation of 92.16, underscores the varied degrees of EPU that PE firms encounter depending on their geographic and temporal investment activities. The higher standard deviation of deal size at this level, compared to the country level, indicates that PE firms strongly differ in their target size preference.

Panel B provides a country-year perspective. On average, a country experiences 199 PE investments, with the highest annual investment activity reaching 2804 investments. The wide range of investment activity, reflected in the high standard deviation, underscores the significant differences in investment climates among countries and across years.

Appendix 2 presents an expanded view of the summary statistics. Panel A therein provides an overview of the distribution across all 15 countries. The United States accounts for the largest share at 57.86%, highlighting that my sample is primarily based on US investments. Panel B provides a yearly breakdown of PE deals. The year 2021 marks the peak in deal activity, which reflects the growth of the PE sector in recent years. Panels C to I display summary statistics for each empirical model, arranged in the order of the equations. These serve as the basis for the calculation of the magnitude of the results presented in Section 4.1.

4 Empirical Results

This section presents the findings of this study, beginning with the baseline results of the effects of EPU on PE investment activity, and moving on with the results of the more in-depth models.

4.1 The Effect of Policy Uncertainty on PE Investment Activity

Table 2 presents the regression results for Equation (3.1).

Table 2: EPU and Investment Activity

	(1) Investment Count	(2) Deal Count	(3) Deal Volume	(4) Deal Size
EPU	-0.0006**	-0.0003*	-0.0003**	-0.0003
	(0.00)	(0.00)	(0.00)	(0.00)
GDP Growth	3.4958***	1.6231**	0.4887	2.6627
	(0.74)	(0.55)	(0.33)	(1.61)
Credit to GDP	-0.0023*	-0.0017*	0.0004	0.0015
	(0.00)	(0.00)	(0.00)	(0.00)
Governance Index	-1.2341***	-0.3684**	-0.0366	0.0782
	(0.20)	(0.12)	(0.07)	(0.27)
(ln) Deal Size	-0.0590***	-0.0353***	1.0325***	
	(0.01)	(0.01)	(0.00)	
N	30415	26780	6676	6676
R^2	0.347	0.343	0.965	0.589
PE firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes

Standard errors are clustered on the PE firm level.
*, **, and *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

The baseline results reveal a statistically significant negative relationship between the EPU score and three measures of PE investment activity, suggesting that PE firms tend to engage in fewer transactions and reduce their overall deal volume as EPU increases. Column (1) reports a -0.0006 coefficient, implying that each one-point EPU increase results in 0.0006 fewer investments for the average PE firm in a respective year. A one-standard-deviation increase in the EPU score (92.2 points) results in a reduction of about 0.1 investments, corresponding to a 2.8% decrease relative to the unconditional mean of 2.0 investments. Column (2) reports a coefficient of -0.0003, suggesting that a one-standard-deviation higher EPU score of leads to a 0.03 reduction in deals for the average PE firm. This equates to a 1.6% decrease relative to the mean of 1.7 investments. As per Column (3), with a coefficient of -0.0003, a one-standard-deviation leads to a reduction in deal volume of approximately $6.0 million for the average PE firm, a 1.0% decrease relative to the mean of $597 million. To contextualize these findings, consider the EPU score in Germany increased by an average of 117.81 points from 2019 to

2020 from the impact of the COVID-19 crisis. Although the deal size coefficient is negative, it lacks statistical significance, indicating that it is unclear whether PE firms opt for smaller deals in the face of EPU. The positive and statistically significant coefficients of GDP growth in columns (1) and (2) indicate that GDP growth is a strong driver of PE investment activity.

4.2 The Impact of Policy Uncertainty on Entry Multiples and Exit Multiples

Table 3 displays the regression results for the models of Equation (3.2) to Equation (3.5).

Table 3: EPU and Entry Multiple, Exit Multiple, Role of PE Firm Maturity, Returns

	(1) Entry Multiple	(2) Exit Multiple	(3) Inv. Count	(4) ROI	(5) ROI
EPU	-0.0008**	-0.0005*	-0.0026**	0.0011	0.0029*
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
EPU x Age			0.0002**		
			(0.00)		
Age			0.0217*		
			(0.01)		
GDP Growth	0.5642	4.2361**	0.3289	-8.3799	-0.5537
	(1.25)	(1.31)	(2.70)	(10.51)	(5.25)
Credit to GDP	0.0006	0.0012	0.0047***	-0.0127	-0.0142**
	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)
Governance Index	0.3722	-0.0961	-0.0713	0.3469	-0.0154
	(0.35)	(0.31)	(0.05)	(1.83)	(0.22)
(ln) Deal Size	0.3291***	-0.0452***	0.3985***	-1.4451***	-1.3272***
	(0.01)	(0.01)	(0.04)	(0.08)	(0.06)
N	4245	1598	21316	2088	2088
R^2	0.237	0.101	0.107	0.216	0.185
Year FE	Yes	Yes	Yes	Yes	No
Country FE	Yes	Yes	Yes	Yes	No

Standard errors are clustered on the year level.
*, **, and *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

Column (1) reports the results of the second model. In line with the hypothesis, the EPU coefficient is negative and statistically significant at the 5% level, indicating that the entry revenue multiples decrease in periods of increased EPU. More specifically, the estimates suggest that a one-standard-deviation higher EPU score (97.51 points) corresponds to a 42.2% decrease relative to the unconditional mean (ln) entry revenue multiple, equating to a discount of 1.0 on the mean entry revenue multiple of 2.4. Furthermore, the results show a significant positive relationship between average deal size and entry revenue multiple, suggesting that PE firms are more inclined to pay higher entry multiples for larger deals. The results remain robust

when re-running the regression for entry EBITDA multiple and incorporating additional fixed effects, as presented in Appendix 5, columns (1) and (2).

Column (2) displays the results of the third model. Consistent with the hypothesis, the EPU coefficient is both negative and statistically significant at the 10% level, suggesting lower exit multiples in periods of high EPU, and vice versa. Specifically, a one-standard-deviation higher EPU score (110.2 points) corresponds to a 4.1% decrease relative to the unconditional mean (ln) exit multiple, translating to an absolute reduction of 0.2 on the mean exit multiple of 5.4. Additionally, the GDP growth control variable shows a significant positive relationship, indicating that economic growth contributes to increased exit multiples. Appendix 5, column (3) shows that results remain robust when incorporating additional fixed effects.

4.3 The Role of PE Firm Maturity in Responses to EPU

Column (3) displays the findings of the fourth model. The coefficient of the interaction term EPU x Age is positive and statistically significant at a 5% level, indicating that more mature PE firms undertake more deals during periods of increased EPU. The age coefficient is also statistically significant, suggesting that age is an important determinant of investment activity and that older PE firms generally conduct more deals. Furthermore, the negative significant coefficient of EPU supports the robustness of the results. Appendix 4, which displays a sample split by age, shows that the subgroup with an age above the median age (>11 years) engages in deals that are on average 13 EPU points higher than the subgroup with an age below or equal to the median (<= 11 years). The t-statistic values for EPU and EPU x Age reveal positive values of 11.64 for EPU and 109.69 for EPU x Age, highlighting the significant differences between the two subgroups. Additionally, the t-statistic values show that the above median age subgroup engages in more deals and in larger deals. The supplementary analysis displayed in Appendix 6, column (1), which examines Age when holding EPU constant, also shows a positive significant relationship between Age and Deal activity, supporting the results above.

A second robustness test presented in Appendix 6, column (2), which substitutes Investment Count by Deal Volume for the dependent variable further bolsters the results.

4.4 The Effect of Policy Uncertainty on Returns

Columns (4) and (5) report the results of the investigation of how EPU affects exit outcomes. Column (4) depicts the results of the model that incorporates fixed effects, which reveals a positive but insignificant relationship. Column (5) shows the model without fixed effects, which is statistically significant at the 10% level. This finding suggests that deals conducted at times of heightened EPU generate superior returns. The positive coefficient of 0.0029 implies that an increase of one EPU point results in a 0.29 percentage points increase in ROI. A one-standard-deviation higher EPU score (71.6 points) corresponds to a 20.59 percentage point increase in ROI. Even though both regressions show positive coefficients, the result should be interpreted with caution. The robustness tests using MOIC instead of ROI, presented in Appendix 6, columns (3) and (4), show a statistically significant positive relationship for the model without fixed effects, but no significance for the model incorporating fixed effects.

5 Discussion

This section discusses the findings and their implications for PE firms and policymakers while acknowledging the limitations and making recommendations for future research. The results of the study provide evidence that EPU has a negative impact on PE investment activity. This suggests that PE firms adopt a more cautious approach in periods of high EPU as suggested by the real options theory (e.g. Dixit, Dixit, and Pindyck 1994). However, contrary to the more pronounced effect (i.e., an 4.3% decrease in the investment amount) of EPU on VC firms reported by Litov, Liu, and Sitorus (2021), this study finds a weaker effect on PE investment activity. This implies that PE firms are less sensitive to policy uncertainty. The insignificant results of the deal size variable indicate that PE firms do not necessarily engage in

smaller deals to mitigate risks associated with EPU. Consequently, the observed negative effect on investment activity stems primarily from the reduction in the number of investments rather than the amount per investment, implying that PE firms become more selective in their target selection during these times and prioritize quality over quantity. These findings not only extend the literature on PE investment activity by identifying EPU as an influencing factor but also confirm Lerner, Sorensen, and Strömberg's (2009) findings that GDP growth strongly stimulants PE investment activity.

In support of the second hypothesis, I find evidence that entry revenue multiples decrease in times of policy uncertainty, reflecting PE firms' reduced willingness to pay high acquisition prices. This observation is consistent with the M&A literature, suggesting that EPU leads to a decrease in bid premiums (N. H. Nguyen and Phan 2017). My finding implies that EPU provides opportunities for PE firms to acquire targets at lower prices.

Consistent with the third hypothesis, my study shows that PE firms are more likely to exit their investments at higher exit multiples during periods of low EPU. This implies that by timing their exits during periods of low EPU, PE firms can benefit from higher exit prices. This finding extends the literature on PE investment timing (e.g., Sommer 2012) by demonstrating that not only investments but also exits should be timed based on market cycles.

In line with the fourth hypothesis, I find that more mature PE firms are more active in deal-making during periods of increased EPU compared to their counterparts. This lends support to the theory that established PE firms are capitalizing on these opportunities arising from EPU. Furthermore, it highlights that experience plays a crucial role in navigating uncertain environments. This extends the literature on PE firm heterogeneity and shows PE firm maturity has not only an influence on performance (e.g. Steven N. Kaplan and Schoar 2005) but also on their investment behavior under uncertainty.

Lastly, the results provide limited evidence that PE firms generate superior returns when conducting transactions during periods of increased EPU. The insignificance of the results of the model that includes fixed effects may be attributed to the possible higher variations in returns that result from the increased risk associated with EPU. However, Bain & Company's recent study (2023) supports the notion of superior returns in periods of high EPU, showing that PE investments undertaken in downturns are associated with higher IRRs.

These findings hold critical implications for PE firms and policymakers. PE firms should incorporate EPU into their investment and exit decisions, viewing it not solely as a risk factor but also as a potential opportunity. Consequently, particularly for mature PE firms, a counter-cyclical investment strategy, might prove beneficial. A way for less experienced PE firms to benefit from these opportunities without taking excessive risks is by partnering with experienced PE firms in club deals. These insights are particularly relevant given the recent challenges PE firms face in sustaining high returns due to elevated entry multiples and increased competition. Policymakers should facilitate a stable investment climate, thereby ensuring that PE investments continue to support the real economy. This understanding becomes particularly important in navigating crises, as PE firms have shown to strongly support their portfolio companies by providing 50% more capital to their portfolio companies in these times (Jürgens and Braun, 2022).

The overall findings should be interpreted given certain limitations that apply, primarily related to data availability. The need to make use of approximation techniques and subsamples due to missing values for certain variables may affect the accuracy and generalizability of the results.

As this study is the first investigation of the impact of policy uncertainty on PE investment activity and returns, significant opportunities remain for further research. Since this study only provides limited evidence on the effect of EPU on returns, future studies with access to a larger

sample of PE performance metrics should dive deeper into this field and use alternative performance metrics. Furthermore, additional research is needed to gain a deeper understanding of the behavior of PE firms in uncertain policy environments, particularly in aspects such as target selection and investment strategies.

6 Conclusion

This study presents the first comprehensive investigation of the impact of EPU on PE investments and exits. Based on two novel samples that cover over two decades and 15 countries, this study uncovers the complex relationship between EPU and PE investment activity while highlighting potential opportunities that arise during these periods.

The findings provide evidence of a small negative effect of the EPU on PE investment activity, emphasizing the resilience of PE firms in uncertainty. Contrary to the conventional belief that EPU is primarily associated with negative implications for investments, this study shows that it can also provide opportunities for PE firms, as evidenced by reduced entry multiples. This challenges the traditional notion of policy uncertainty as a mere risk factor and emphasizes the potential for countercyclical investment approaches, particularly for mature PE firms. Furthermore, this study uncovers that mature PE firms are more active in deal-making in these times, supporting the notion that mature PE firms capitalize on these opportunities arising from EPU. Although the study could not conclusively demonstrate that deals in high EPU are associated with higher returns, it paves the way for future research in this area.

Despite certain limitations caused by the availability of data, this study adds value to both the academic literature and real-world applications. The study makes PE firms aware of a possible approach to navigate the current challenges posed by elevated entry multiples and intensified competition. Policymakers are encouraged to consider measures to minimize policy uncertainty, thereby stimulating economic growth through PE investments.

References

Alperovych, Yan, Kevin Amess, and Mike Wright. 2013. "Private Equity Firm Experience and Buyout Vendor Source: What Is Their Impact on Efficiency?" *European Journal of Operational Research* 228 (3): 601–11.

Al-Thaqeb, Saud Asaad, and Barrak Ghanim Algharabali. 2019. "Economic Policy Uncertainty: A Literature Review." *The Journal of Economic Asymmetries* 20 (November): e00133.

Bachmann, Rüdiger, Steffen Elstner, and Eric R. Sims. 2013. "Uncertainty and Economic Activity: Evidence from Business Survey Data." *American Economic Journal Macroeconomics* 5 (2): 217–49.

Baker, Scott R., Nicholas Bloom, and Steven J. Davis. 2016. "Measuring Economic Policy Uncertainty." *The Quarterly Journal of Economics* 131 (4): 1593–1636.

Bernanke, Ben S. 1983. "Irreversibility, Uncertainty, and Cyclical Investment." *The Quarterly Journal of Economics* 98 (1): 85–106.

Bernstein, Shai, Josh Lerner, and Filippo Mezzanotti. 2018. "Private Equity and Financial Fragility during the Crisis." *The Review of Financial Studies* 32 (4): 1309–73.

Bloom, N. 2009. "The Impact of Uncertainty Shocks." *Econometrica: Journal of the Econometric Society*. https://onlinelibrary.wiley.com/doi/abs/10.3982/ecta6248?casa_token=mYqZFlUleAEAAAAA:QlfJd2BrhPZ7A1rx3HhvvhjhuH9PL-ExqgF7K5aS8J-oMQ8aiDEDYx_zjXZ5i5C6T-9a4UxMrl-HkBra.

Bloom, Nicholas. 2014. “Fluctuations in Uncertainty.” *The Journal of Economic Perspectives: A Journal of the American Economic Association* 28 (2): 153–76.

Bonaime, Alice, Huseyin Gulen, and Mihai Ion. 2018. “Does Policy Uncertainty Affect Mergers and Acquisitions?” *Journal of Financial Economics* 129 (3): 531–58.

Brown, Gregory, Robert Harris, Wendy Hu, Tim Jenkinson, Steven N. Kaplan, and David T. Robinson. 2021. “Can Investors Time Their Exposure to Private Equity?” *Journal of Financial Economics* 139 (2): 561–77.

Brown, Gregory W., and Steven N. Kaplan. 2019. “Have Private Equity Returns Really Declined?” *The Journal of Private Equity* 22 (4): 11–18.

Cassel, J. 2020. “Essays in Private Equity.” University of Oxford. https://ora.ox.ac.uk/objects/uuid:12881541-9e26-45cf-96a0-36a25624d5dd.

Cendrowski, Harry, Louis W. Petro, James P. Martin, and Adam A. Wadecki. 2012. *Private Equity: History, Governance, and Operations*. John Wiley & Sons.

Dixit, Robert K., Avinash K. Dixit, and Robert S. Pindyck. 1994. *Investment Under Uncertainty*. Princeton University Press.

Francis, Bill B., Iftekhar Hasan, and Yun Zhu. 2014. “Political Uncertainty and Bank Loan Contracting.” *Journal of Empirical Finance* 29 (December): 281–86.

Gianfrate, Gianfranco, and Simone Loewenthal. 2015. “Private Equity throughout the Financial Crisis.” *The Journal of Private Equity*. https://doi.org/10.3905/jpe.2015.2015.1.048.

Gohil, Raviraj Karmvir, and Vijay Vyas. 2016. “Private Equity Performance: A Literature Review.” *The Journal of Private Equity* 19 (3): 76–88.

Gompers, Paul, and Josh Lerner. 2000. “Money Chasing Deals? The Impact of Fund Inflows on Private Equity Valuations.” *Journal of Financial Economics* 55 (2): 281–325.

Gorman, Michael, and William A. Sahlman. 1989. “What Do Venture Capitalists Do?” *Journal of Business Venturing* 4 (4): 231–48.

Groh, Alexander Peter, and Heinrich Liechtenstein. 2012. “Assessing Country Attractiveness in the Venture Capital and Private Equity Landscape in Emerging Markets.” *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.2021987.

Gudiškis, Karolis, and Laimutė Urbšienė. 2015. “The Relationship between Private Equity and Economic Growth.” *Ekonomika* 94 (1): 79–96.

Gulen, Huseyin, and Mihai Ion. 2015. “Policy Uncertainty and Corporate Investment.” *The Review of Financial Studies*, September, hhv050.

Hammer, Benjamin, Heiko Hinrichs, and Bernhard Schwetzler. 2018. “Does Culture Affect the Performance of Private Equity Buyouts?” *Journal of Business Economics* 88 (3–4): 393–469.

Hammer, Benjamin, Sven Mettner, Schweizer, Denis, and Norbert Wünsche. 2023. “Management Buyouts in Times of Economic Policy Uncertainty.” *Finance Research Letters* 52 (March): 103499.

Harris, Robert S., Tim Jenkinson, and Steven N. Kaplan. 2014. “Private Equity Performance: What Do We Know?” *The Journal of Finance* 69 (5): 1851–82.

Hellmann, Thomas, and Manju Puri. 2002. “Venture Capital and the Professionalization of Start-up Firms: Empirical Evidence.” *The Journal of Finance* 57 (1): 169–97.

Hochberg, Yael V., Alexander Ljungqvist, and Yang Lu. 2007. "Whom You Know Matters: Venture Capital Networks and Investment Performance." *The Journal of Finance* 62 (1): 251–301.

Istiak, Khandokar, and Apostolos Serletis. 2018. "Economic Policy Uncertainty and Real Output: Evidence from the G7 Countries." *Applied Economics* 50 (39): 4222–33.

Jenkinson, Tim, Stefan Morkoetter, Tobias Schori, and Thomas Wetzer. 2022. "Buy Low, Sell High? Do Private Equity Fund Managers Have Market Timing Abilities?" *Journal of Banking & Finance* 138 (May): 106424.

Jensen, Michael C. 1991. "Corporate Control and the Politics of Finance." *Journal of Applied Corporate Finance* 4 (2): 13–34.

Jordaan, Frederick W. R. 2018. "An Investigation of Private Equity Buyout Performance During the 2007-2009 Financial Crisis," Joseph Wharton Scholars, . https://repository.upenn.edu/joseph_wharton_scholars/55/.

Jürgens, Alexander, and Reiner Braun. n.d. "Resilience and Cyclicality in Private Equity: Value Creation and Investment Flows in Economic Cycles." *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.4260530.

Kaplan, S. N., and J. C. Stein. 1993. "The Evolution of Buyout Pricing and Financial Structure in the 1980s." *The Quarterly Journal of Economics* 108 (2): 313–57.

Kaplan, Steven N., and Antoinette Schoar. 2005. "Private Equity Performance: Returns, Persistence, and Capital Flows." *The Journal of Finance* 60 (4): 1791–1823.

Kaplan, Steven N., and Berk A. Sensoy. 2015. "Private Equity Performance: A Survey," December. https://doi.org/10.1146/annurev-financial-111914-041858.

Kaplan, Steven N., and Per Stromberg. 2003. “Financial Contracting Theory Meets the Real World: An Empirical Analysis of Venture Capital Contracts.” *The Review of Economic Studies* 70 (2): 281–315.

Lerner, Josh, Morten Sorensen, and Per Strömberg. 2009. “What Drives Private Equity Activity and Success Globally.” In *World Economic Forum, Globalization of Alternative Investments Working Papers*, 2:165–94.

Litov, Lubomir P., Xia Liu, and Romora Edward Sitorus. 2021. “The Effect of Policy Uncertainty on VC Investments around the World.” *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3940017.

Ljungqvist, Alexander, Matthew Richardson, and Daniel Wolfenzon. 2020. “The Investment Behavior of Buyout Funds: Theory and Evidence.” *Financial Management* 49 (1): 3–32.

Meuleman, Miguel, Mike Wright, Sophie Manigart, and Andy Lockett. 2009. “Private Equity Syndication: Agency Costs, Reputation and Collaboration.” *Journal of Business Finance & Accounting* 36 (5–6): 616–44.

Moon, Hyungsik Roger, and Martin Weidner. 2015. “Linear Regression for Panel with Unknown Number of Factors as Interactive Fixed Effects.” *Econometrica: Journal of the Econometric Society* 83 (4): 1543–79.

Nagar, Venky, Jordan Schoenfeld, and Laura Wellman. 2019. “The Effect of Economic Policy Uncertainty on Investor Information Asymmetry and Management Disclosures.” *Journal of Accounting and Economics* 67 (1): 36–57.

Nguyen, Canh Phuc, Thai-Ha Le, and Thanh Dinh Su. 2020. “Economic Policy Uncertainty and Credit Growth: Evidence from a Global Sample.” *Research in International Business and Finance* 51 (January): 101118.

Nguyen, Nam H., and Hieu V. Phan. 2017. “Policy Uncertainty and Mergers and Acquisitions.” *Journal of Financial and Quantitative Analysis* 52 (2): 613–44.

Phalippou, Ludovic, and Oliver Gottschalg. 2008. “The Performance of Private Equity Funds.” *The Review of Financial Studies* 22 (4): 1747–76.

Pham, Anh Viet. 2019. “Political Risk and Cost of Equity: The Mediating Role of Political Connections.” *Journal of Corporate Finance* 56 (June): 64–87.

Robinson, David T., and Berk A. Sensoy. 2016. “Cyclicality, Performance Measurement, and Cash Flow Liquidity in Private Equity.” *Journal of Financial Economics* 122 (3): 521–43.

Smit, Han, and Ward A. van den Berg. 2006. “Private Equity Waves.” https://doi.org/10.2139/ssrn.909169.

Sommer, Claudia. 2012. *Private Equity Investments: Drivers and Performance Implications of Investment Cycles*. Springer Science & Business Media.

Tian, Xuan, Yichu Wang, and Kailei Ye. 2018. “How Does Policy Uncertainty Affect Venture Capital?” https://doi.org/10.2139/ssrn.4365390.

Uddin, Moshfique, and Anup Chowdhury. 2021. “Private Equity Exit Strategies and Profitability during the Global Pandemic: Evidence from around the World.” *British Journal of Management* 32 (4): 1302–37.

Vasvari, Florin, and Eli Talmor. 2011. *International Private Equity*. John Wiley & Sons.

Yi, Shiwei, Yifan Liao, and Qiang Zhang. 2022. “Effects of Economic Policy Uncertainty on the Investment Behavior of Venture Capital Institutions: Evidence from China.” *Complexity* 2022 (August). https://doi.org/10.1155/2022/2528464.

Zhang, Bing. 2019. “Economic Policy Uncertainty and Investor Sentiment: Linear and Nonlinear Causality Analysis.” *Applied Economics Letters* 26 (15): 1264–68.

Appendix

Appendix 1: List of Abbreviations

Abbreviation	Full Form
EBITDA	Earnings Before Interest, Taxes, Depreciation, and Amortization
EPU	Economic Policy Uncertainty
FE	Fixed Effects
M&A	Mergers and Acquisitions
MOIC	Multiple on Invested Capital
PE	Private Equity
ROI	Return on Investment
VC	Venture Capital

Appendix 2: Variables Description

This table presents an overview of the dependent, and independent variables as well as fixed effects, along with the construction details and sources.

Panel A: Dependent variables		
Variable	Description	Source
Deal Count	Total number of deals conducted by a PE firm in the respective country and year. This variable only includes unique Deal IDs and not investment stakes. Duplicate Deal IDs were removed and attributed to the Lead private equity firm.	Preqin
Deal Volume	Aggregate value of deals conducted by a PE firm within a respective country and year, calculated by multiplying the deal count by the deal size.	Preqin
Investment Count	Total number of investments made by each private equity firm in the respective country and year. This variable takes each investment stake into account, as opposed to the Deal Count variable.	Preqin
MOIC	Multiple of Invested Capital for a respective deal, which is the ratio of returned capital (Exit Value) to the amount of capital invested (Deal Size). Higher MOIC indicates higher returns.	Preqin
ROI	Return of Investment for a respective deal, calculated by subtracting the entry value from the exit value and dividing the result by the entry value.	Preqin
(ln) Entry revenue multiple	Natural logarithm of the entry revenue multiple for a respective deal, calculated by Entry EV divided by Revenue. This metric is common in private equity, as it helps to determine the purchase price of a company relative to a financial metric. Low entry multiples are seen as favourable.	Preqin
(ln) Exit multiple	Natural logarithm of the exit multiple for a respective deal.	Preqin
Panel B: Independent variables and fixed effects (FE)		
Variable	Description	Source
Age	Age of the respective PE firm at the time of the investment, calculated as the difference between the investment year and the vintage year of the PE firm.	Preqin
Credit to GDP	Domestic credit to the private sector as a percentage of GDP in the respective portfolio company's country and year of the buyout. It reflects the extent to which credit support private sector activities as well as the overall health of the credit market in an economy.	World Development Indicators
GDP Growth	Annual percentage growth rate of GDP in the country of the respective portfolio company and the year of the buyout.	World Development Indicators

Governance index	Average score of six distinct governance dimensions (accountability, political stability, government effectiveness, regulatory quality, rule of law, control of corruption) in the respective country of the portfolio company and year of the buyout. The scale ranges from -2.5 (indicating weak governance) to 2.5 (indicating strong governance).	World Bank https://data.worldbank.org/data-catalog/worldwide-governance-indicators
EPU	EPU scores that reflects monthly Economic Policy Uncertainty. For the use of this study, the yearly average EPU score in the respective portfolio company's country and year of the buyout is computed.	Baker, Blook and Davis (2016), policyuncertainty.com
PE Firm FE	PE Firm, which is involved in a respective transaction.	Preqin
Target Country FE	Country in which the respective portfolio company is based.	Preqin
Year FE	The year in that the buyout took place	Preqin
(ln) Deal size	Natural logarithm of deal size in million USD. For aggregated regression analysis the average deal size for the respective private equity firm for a given year and country has been computed. For missing deal sizes, a two-stage imputation model by Heckman (1979) has been applied.	Preqin

Appendix 3: Summary Statistics

This table presents the summary statistics of distinct samples, which are used for separate Equations. Panel A reports the distribution of deals and corresponding EPU summary statistics by country. Panel B provides the distribution of deals and corresponding EPU summary statistics by year. Panels C to E correspond to the sample used for Equation (3.1), examining the impact of EPU on PE investment activity. Panel F presents the summary statistics for the subsample employed in examining Equation (3.2), incorporating only deals with disclosed Entry Revenue Multiples. Panel G displays the summary statistics for the subsample used in Equation (3.3), including only disclosed Exit Multiples. Panel H outlines the summary statistics for the sample used in Equation (3.4), including only deals that have age values. Panel I provides the summary statistics for the subsample used in Equation (3.5), incorporating only deals with ROI values. Variables are defined in Appendix 2.

Panel A: Distribution of deals and Summary Statistics of EPU by country

	All deals		EPU				
	N	in %	Mean	SD	Min	Median	Max
Australia	1131	2.00%	110.5509	39.9318	43.0371	106.1476	182.2761
Brazil	492	0.87%	184.0804	73.2123	91.0986	161.5845	346.49
Canada	2458	4.34%	235.16	102.5812	53.3663	232.7398	464.2434
China	589	1.04%	260.3297	169.9521	48.7429	189.7058	588.3733
France	3474	6.14%	214.9939	79.3899	37.6033	247.6891	317.1185
Germany	3050	5.39%	185.4145	74.6994	81.3486	177.6344	322.3637
Hong Kong	139	0.25%	146.3908	46.6950	56.5261	138.5153	236.0745
India	567	1.00%	92.7903	40.2661	49.4826	73.9753	185.4646
Italy	1524	2.69%	114.2018	29.2858	60.1406	114.63	173.075
Japan	1001	1.77%	110.1007	23.0833	64.8557	98.3684	145.6307
Netherlands	1626	2.87%	93.0214	25.4778	48.7247	88.4502	142.8684
South Korea	558	0.99%	166.2388	47.0840	68.6396	163.275	257.3615
Spain	989	1.75%	124.654	32.4547	70.9251	119.8886	196.7192
UK	6248	11.04%	253.1807	140.9387	47.8444	222.4019	542.7656
US	32738	57.86%	151.1492	60.6191	67.1363	145.1282	326.3201
Total	56584	100%	168.1406	88.4011	37.6033	147.6456	588.3733

Panel B: Distribution of deals and Summary Statistics of EPU by year

	All deals		EPU				
	N	in %	Mean	SD	Min	Median	Max
2000	724	1.28%	79.7161	23.0318	37.6033	96.5535	96.5535
2001	555	0.98%	128.5662	30.4352	65.8393	152.185	152.185
2002	651	1.15%	117.8083	15.4923	63.0543	128.6468	135.2159
2003	874	1.54%	123.7298	10.8110	63.2025	127.8522	165.823
2004	1228	2.17%	90.0414	13.3484	57.4939	90.6005	131.5542
2005	1591	2.81%	74.3625	10.7061	43.0371	70.8735	120.2911
2006	2236	3.95%	68.9947	6.3773	46.3901	67.1363	102.9044
2007	2499	4.42%	78.984	13.6177	48.7247	79.7098	116.1907
2008	1968	3.48%	140.3599	16.3011	85.5314	139.3826	174.0386
2009	1327	2.35%	126.768	8.9838	95.575	125.8881	147.0834
2010	2060	3.64%	159.1477	33.4561	92.7766	147.6456	231.8706
2011	2493	4.41%	176.0156	34.9412	123.5527	157.3521	250.129
2012	2689	4.75%	184.6423	53.4669	117.5302	157.9769	305.4302
2013	2460	4.35%	156.2968	36.7293	99.1444	137.9606	247.6891
2014	3113	5.50%	114.8615	35.8824	76.8657	92.4672	191.2675
2015	3399	6.01%	135.5845	42.6890	70.8935	112.9414	249.8168
2016	3647	6.45%	206.2909	126.1139	73.9753	145.1282	542.7656
2017	4012	7.09%	189.3897	112.5408	72.7429	142.3957	475.844
2018	4531	8.01%	182.6958	82.9542	57.0282	153.1932	386.4131
2019	4264	7.54%	219.9845	95.0488	73.0939	188.6957	588.3733
2020	4392	7.76%	305.3271	72.6540	99.5458	326.3201	587.1021
2021	5871	10.38%	185.6829	52.8237	59.7909	175.2527	409.2571
Total	56584	100%	168.1406	88.4011	37.6033	147.6456	588.3733

Panel C: Aggregation on PE firm-country-year level (Sample 1)

	N	Mean	SD	Min	Median	Max
Investment Count	32415	1.9973	2.0172	1.0000	1.0000	13.0000
EPU	32415	167.4161	92.1601	53.3663	145.1282	542.7656
GDP Growth	32415	.0195	0.0270	-.0904	.0224	.0811
Credit to GDP	32415	87.8109	41.2291	48.9749	73.0495	190.0188
Governance	32415	1.2189	0.4087	-.4058	1.2908	1.7041
(ln) Deal Size	32412	1.0000	1.5115	.1209	1.5617	7.0316

Panel D: Aggregation on PE firm-country-year level (Sample 1 - Subsample)

	N	Mean	SD	Min	Median	Max
Deal Count	28648	1.7432	1.2030	1.0000	1.0000	5.0000
EPU	28648	166.2941	90.6852	53.3629	145.1282	542.7656
GDP Growth	28648	.0193	0.0268	-.0904	.0224	.0800
Credit to GDP	28648	87.3131	40.8718	48.9749	70.0023	190.0188
Governance	28648	1.2271	0.3979	-.4058	1.2908	1.7041
(ln) Deal Size	28648	3.4009	0.9631	1.6094	3.0920	7.0049

Panel E: Aggregation on PE firm-country-year level (Sample 1 - Subsample)

	N	Mean	SD	Min	Median	Max
(ln) Deal Volume	7777	4.9589	1.8181	.4318	4.9884	9.0419
Deal Volume	7777	597.0406	1271.0403	1.5000	146.7000	8450.0000
(ln) Deal Size	7777	4.7782	1.7223	.4253	4.8363	8.4764
Deal Size	7777	416.9472	777.1846	1.4600	126.0000	4800.0000
EPU	7777	161.5148	93.5235	48.7247	142.3957	542.7656
GDP Growth	7777	.0207	0.0260	-.0904	.0228	.0826
Credit to GDP	7777	95.8327	44.0409	48.9749	87.1966	191.5883
Governance	7777	1.1914	0.4604	-.4556	1.2918	1.7017

Panel F: Deal level (Sample 1 - Subsample)

	N	Mean	SD	Min	Median	Max
(ln) Entry Revenue Multiple	4245	.1859	1.1783	-3.2189	.2231	3.5835
Entry Revenue Multiple	4245	2.4437	4.5272	.0400	1.2500	36.0000
EPU	4245	173.2191	97.5076	59.7909	148.6347	475.8440
GDP Growth	4245	.0187	0.0246	-.1133	.0221	.1423
Governance Index	4245	1.2539	0.3774	-.3165	1.3025	1.7033
Credit to GDP	4245	103.2366	43.4740	48.9749	98.7698	183.9294
(ln) Deal Size	4245	5.1025	1.6416	1.9110	5.1401	7.6009

Panel G: Deal level (Sample 2 - Subsample)

	N	Mean	SD	Min	Median	Max
(ln) Exit Multiple	1598	1.3412	0.5752	.2624	1.2238	3.2658
Exit Multiple	1598	4.6646	3.8489	1.3000	3.4000	26.2000
EPU	1598	185.7175	110.1842	57.4939	157.3521	542.7656
GDP Growth	1598	.0206	0.0247	-.1133	.0224	.1139
Governance Index	1598	1.284	0.3671	-.3537	1.3419	1.6835
Credit to GDP	1598	104.562	43.2682	49.1897	102.6673	190.0188
(ln) Deal Size	1598	3.5516	1.7840	1.1182	3.1699	8.2663

Panel H: Aggregation on PE firm-PE firm country-year level (Sample 1)

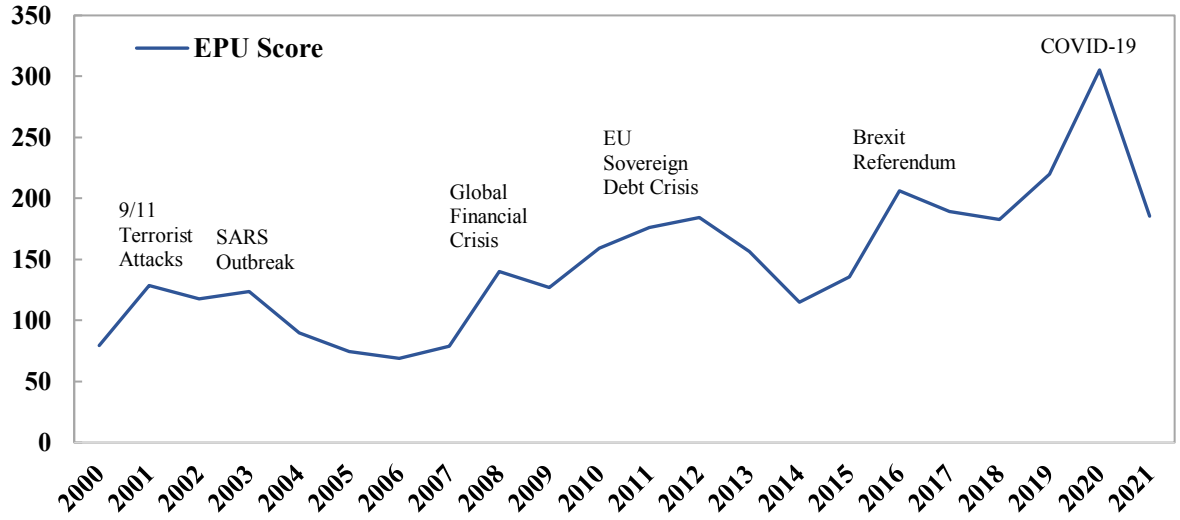
	N	Mean	SD	Min	Median	Max
Investment Count	21333	2.7443	3.3142	1.0000	2.0000	22.0000
EPU	21333	164.7599	81.9366	60.4611	145.1282	475.8440
EPU x Age	21333	2453.8364	2657.2522	79.7098	1593.1786	14669.6050
Age	21333	14.3998	12.9713	1.0000	11.0000	77.0000
GDP Growth	21333	.0197	0.0252	-.0778	.0224	.0792
Credit to GDP	21333	82.1151	36.8289	48.9749	60.9877	183.9294
Governance Index	21333	1.2159	0.3617	-.3697	1.2850	1.7017
(ln) Deal Size	21332	3.0835	0.8867	1.5132	2.8752	6.3750

Panel I: Deal level (Sample 2 - Subsample)

	N	Mean	SD	Min	Median	Max
ROI	2088	2.2298	4.7764	-.9562	.8893	35.2666
EPU	2088	132.7877	71.6223	46.3901	125.8881	475.844
GDP Growth	2088	.0241	0.0226	-.1103	.0233	.1423
Governance Index	2088	1.1921	0.5128	-.5329	1.3337	1.6769
Credit to GDP	2088	100.2086	44.6937	45.6278	96.8991	191.5883
(ln) Deal Size	2088	4.9336	1.5500	1.2149	4.9559	8.3894

Appendix 3: Mean EPU by Year

This graph presents the annual mean EPU score for the investment sample. Additionally, it also includes significant events that had a substantial impact on global EPU levels, as indicated by the spikes in the EPU score.



Source: own representation

Appendix 4: Sample Splits by Age

This table reports the sample splits based on the age of the PE firms for the main variables of interest. The table displays the overall sample average (All), the average for the subgroup of PE firms with ages less or equal to the median age (Age <= Median), and the average for the subgroup of PE firms with ages greater than the median age (Age > Median). Additionally, the t-statistic for the difference between the two subsamples is provided, allowing for comparisons of the respective subsample means. Positive t-stat values indicate that the mean of the Age > Median group is higher than the mean of the Age <= Median group.

	All	Age <= Median	Age > Median	t-stat
Age	14.40	5.52	23.68	143.15
Investment Count	2.74	2.01	3.51	33.95
EPU	164.76	158.39	171.42	11.64
EPU x Age	2453.84	92.93	4085.23	109.69
GDP Growth	0.02	0.02	0.02	-3.81
Credit to GDP	82.12	82.67	81.53	-2.25
Governance Index	1.22	1.21	1.22	3.24
(ln) Deal Size	3.08	2.88	3.29	35.05
N	21333	10902	10431	21333

Appendix 5: Robustness Checks for Entry Multiple and Exit Multiple

This table presents the robustness test results for the Equations (3.2) and (3.3). Column (1) displays the results for modified Equation (3.2), which substitutes Entry Revenue Multiple by the Entry EBITDA Multiple. Column (2) provides the results for the Equation (3.2), which includes additional industry and deal type fixed effects. Column (3) shows the results for Equation (3.3), with additional industry and exit type fixed effects. Standard errors are clustered on the year level. *,**, and *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

	(1) Entry EBITDA Multiple	(2) Entry Revenue Multiple	(3) Exit Multiple
EPU	-0.0007*	-0.0009**	-0.0005*
	(0.00)	(0.00)	(0.00)
GDP Growth	3.9942	1.1247	3.7026*
	(2.02)	(1.19)	(1.32)
Credit to GDP	-0.0014	0.0002	0.0009
	(0.00)	(0.00)	(0.00)
Governance Index	0.2939	0.3762	-0.1121
	(0.42)	(0.38)	(0.31)
(ln) Deal Size	0.2078***	0.3336***	-0.0522***
	(0.02)	(0.01)	(0.01)
N	2200	4245	1598
R^2	0.298	0.171	0.126
Industry FE	No	Yes	Yes
Type FE	No	Yes	Yes
Year FE	Yes	Yes	Yes
Country FE	Yes	Yes	Yes

Appendix 6: Robustness Checks for Role of Maturity and ROI/MOIC

This table presents the robustness test results for Equations (3.4) and (3.5). Column (1) displays the results for the modified Equation (3.4), which does not include the interaction term EPU x Age. Column (2) provides the results for the modified Equation (3.4), where Investment Count is replaced with Deal Volume. Column (3), and (4) shows the results for the modified Equation (3.5), where ROI is substituted by MOIC. Column (3) includes fixed effects, whereas Column (4) excludes them. Standard errors are clustered on the year level. *,**, and *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

	(1) Inv. Count	(2) Deal Volume	(3) MOIC	(4) MOIC
EPU	-0.0004	-0.0092**	-0.0011	0.0030*
	(0.00)	(0.00)	(0.00)	(0.00)
EPU x Age		0.0005*		
		(0.00)		
Age	0.0476***	0.0981*		
	(0.00)	(0.04)		
GDP Growth	1.5819	2.7786	-5.6385	1.3713
	(1.30)	(4.46)	(8.48)	(4.93)
Credit to GDP	0.0047***	0.0184***	-0.0121	-0.0142***
	(0.00)	(0.00)	(0.01)	(0.00)
Governance Index	-0.0766	-0.4784*	0.2879	0.0280
	(0.05)	(0.18)	(1.83)	(0.22)
(ln) Deal Size	0.3967***	3.5825***	-1.4457***	-1.3266***
	(0.04)	(0.18)	(0.08)	(0.06)
N	21316	21316	2088	2088
R^2	0.106	0.175	0.216	0.185
Year FE	Yes	Yes	Yes	No
Country FE	Yes	Yes	Yes	No