Uncertainty and FDI adjustments

Ha Thi Thanh Doan (ERIA)

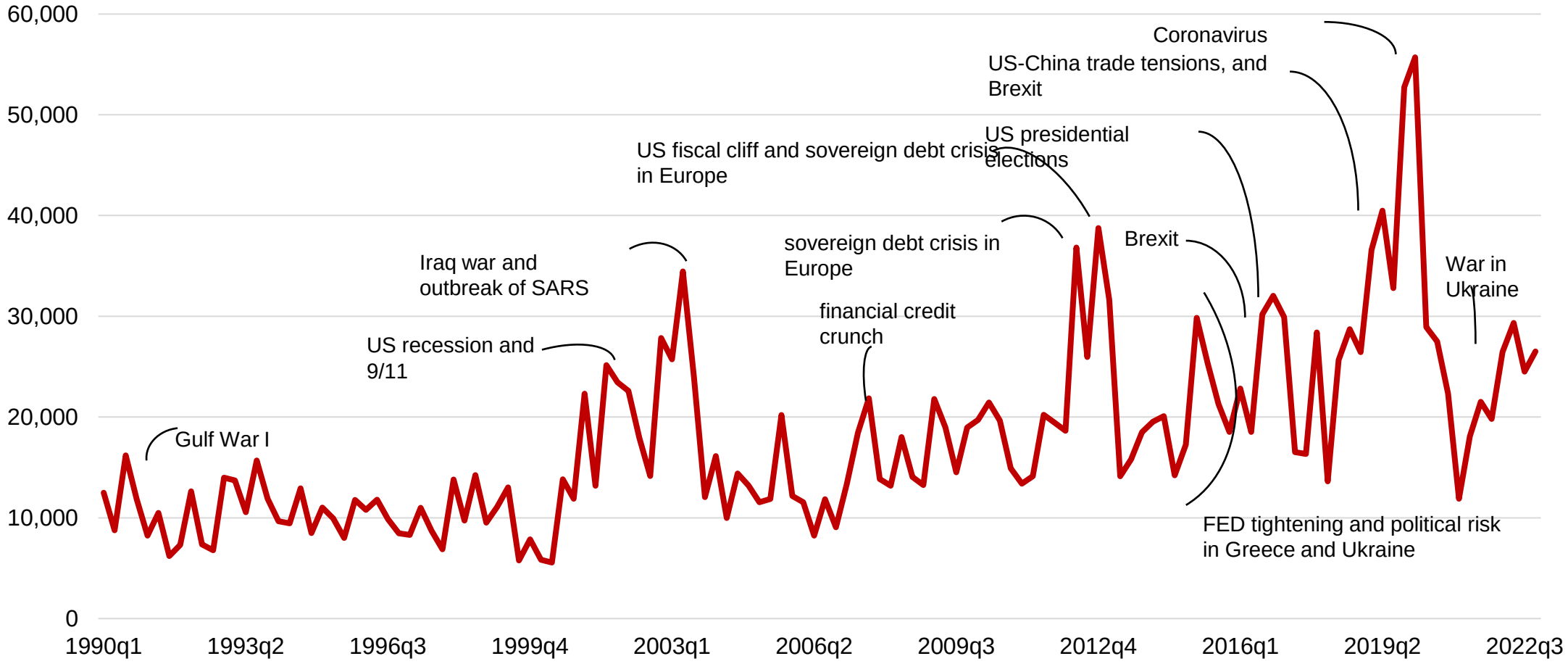
Phuong Mai Vu (Foreign Trade University)

2024 RIN Online Workshop I, 2 August 2024

Introduction

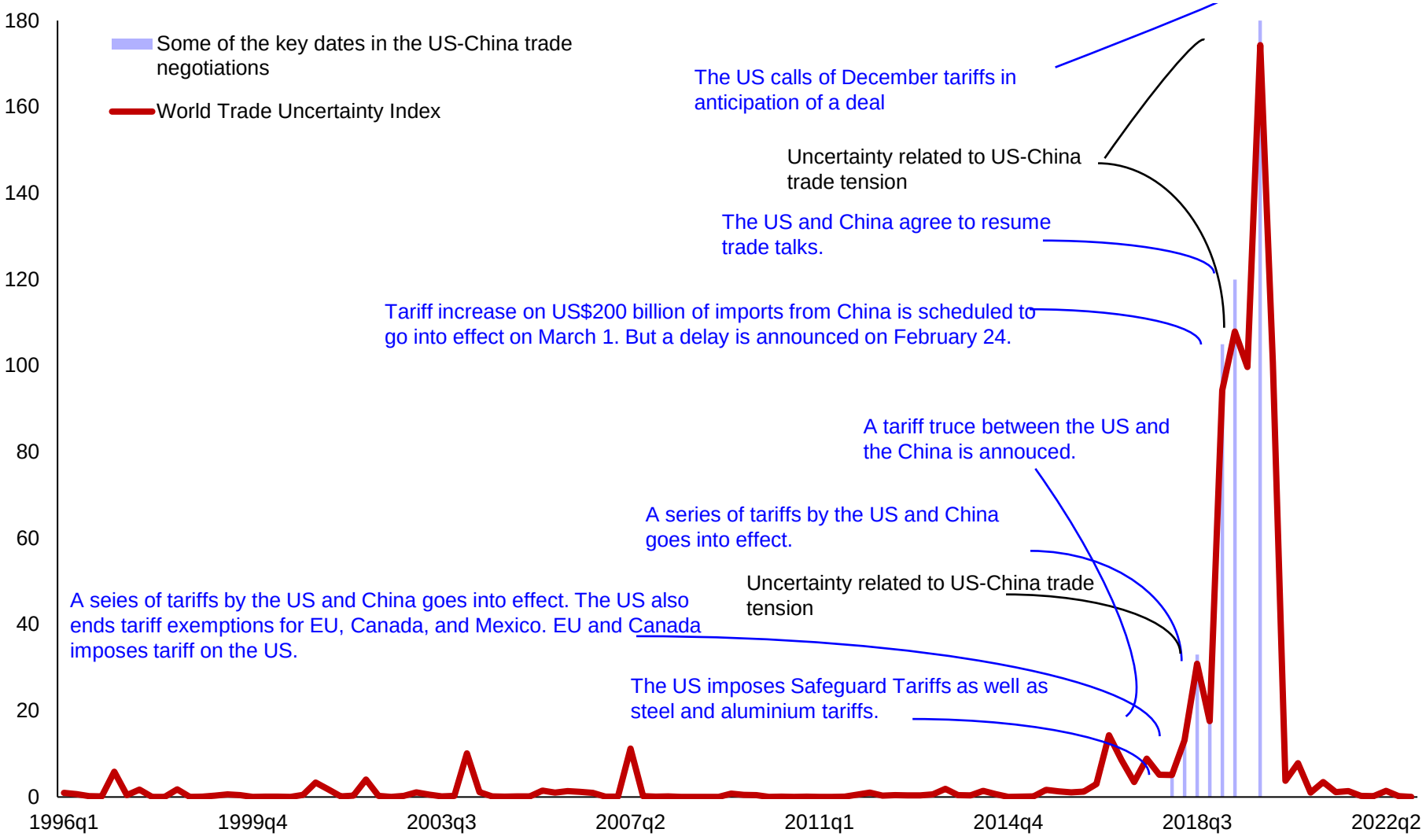
- Rising and widespread global uncertainties
  - US-China trade tension: reshoring, re-orientation of the value chain, anti-globalization sentiment.
  - Covid-19: severe supply and demand disruption
  - Climate change: efforts to reduce detrimental environmental impact of trade and industrial activities
  - Ukraine-Russia: energy and food crises, trade measures for environmental purposes

World Uncertainty Index



Source: Ahir, H, N Bloom, and D Furceri (2022), "World Uncertainty Index", NBER Working Paper
Note: GDP-weighted world uncertainty

World Trade Uncertainty Index



Source: Ahir, H, N Bloom, and D Furceri (2022), “World Uncertainty Index”, NBER Working Paper

Introduction

- Contribution of FDI to economic growth is well-documented
  - Market for final products
  - Job creation
  - Technology transfer
  - Knowledge spillover
- The existing literature has devoted significant efforts on examining the determinants of FDI inflows and analyzing various factors affecting the decision of FDI firms
- Few research on FDI and uncertainty, especially at firm-level

Introduction

- Supply chain disruptions and rising uncertainty have brought the risks and potential benefits and costs of geoeconomic fragmentation to the center of the policy debate (IMF, 2023). Companies and policymakers are increasingly looking at strategies to make supply chains more resilient by moving production home or to trusted countries.
- Understanding MNEs' responses to rising uncertainty is crucial to facilitate policy design to support firms effectively, or, for host countries, to attract more FDI
- Important for supply chain participation and resilience

Research objectives

- This research aims to examine FDI firms' response to uncertainties.

- We ask if FDI firms adjust their extensive margins (the number of markets invested) and intensive margins (the scale of FDI projects in each market) in response to changes in the uncertainties across different host markets.

- We utilize an extensive firm-level dataset covering all FDI projects globally from January 2015 to December 2023, combined with a quarterly database on world uncertainty by Ahir, Bloom and Furceri (2022).

Our contribution

- We provide empirical evidence of the impact of uncertainty on foreign direct investment (FDI) using detailed, up-to-date *firm- project-level* data.

  - Information about firms' announcements →capture early responses to uncertainty.
  - Global coverage, updated until 2023q4 →US-China trade war, covid-19, UK-Russia war
  - High-frequency data (analysis conducted at a quarterly level)→capture high uncertainty fluctuations across time.

- Global data allows examination of FDI diversion, i.e, relocation of FDI across host markets

Literature Review

- Uncertainty- Concept and Measurement

  - Conventional measures
    - Volatility of financial variables such as the stock market or credit rating indicates investor mood or risk aversion (Asamoah et al., 2016; Bloom, 2009; Cai et al., 2018; Choi & Furceri, 2019).
    - Politics-related measures: Elections and political risk were also investigated as potential sources of uncertainty (Gulen & Ion, 2015; Honig, 2020; Julio & Yook, 2016).
    - Huang, Wu, Yu, and Zhang (2015) use crises occurrences as a proxy for political risk

  - More innovative: news-based measures: Text mining technique based on certain criteria related to uncertainty
    - Baker et al. (2006): Economic Policy Uncertainty Index
    - Caldara and Iacoviello (2022): Geopolitical risk index (adverse geopolitical events and associated risks)
    - Ahir et al. (2018): World Uncertainty Index

Literature Review

- FDI relocation/diversion
  - Belderbos and Zou (2006) document the magnitude and pattern of foreign divestment and relocation by Japanese electronics firms in East Asian countries during 1995-2003.
  - Flaaen, Hortacsu, and Tintenot (2020) find that the US antidumping duties against South Korea and China accompanied downward or minor price movements and production relocation to other export platform countries.

Literature Review

- Uncertainty and trade, FDI and supply chain
  - Fajgelbaum, Goldberg, Kennedy, Khandelwal, and Taglioni (2023) examine the impact of the US-China trade war on trade opportunities for bystander countries and find that it generally enhanced trade opportunities for most countries rather than just causing shifts in trade patterns across destinations.
  -
  - Using quarterly data on the foreign affiliates of Japanese MNCs, Sun, Tao, Yuan, and Zhang (2019) show that, relative to affiliates in other Asian countries, Chinese affiliates, especially those with high exposure to trade with North America, see a decline in sales after the trade war.

  - Grossman, Helpman, and Redding (2024) estimate that the US tariffs on China result in a welfare loss of 0.12 percent of GDP, with substantial contribution from changes in input sourcing and search costs.

Data

- Firm-project level data: Financial Times' fdimarkets database

  - Records announced greenfield investments globally from various data sources: media sources, industry organizations and investment promotion agencies, market research, and publications companies, etc., at the project level. The complete database provides monthly information covering manufacturing and services sectors from January 2003, divided into company and project databases.

  - The company database contains information about the FDI firms, including their year of establishment, total capital, revenue, and employment at the most recent update, as well as aggregate statistics on their FDI projects. However, the firm's characteristics data is not available for all firms.

  - The project database contains information on each individual project, including the names of the parent company and the FDI firm, their location, sector and activity, employment, and capital of the projects. Detailed textual information about the project is also explained.

Data

- Firm-project level data: Financial Times' fdimarkets database

  - We extract raw information for manufacturing activities from January 2015 to December 2023. Based on the description, we match the sectors from FDImarket to the 2-digit International Standard Industrial Classification (ISIC) revision 4.

  - We aggregate this project database to quarterly data at the firm-destination country level. We also link the project database to the company database using the company's ID.

Data

- World Uncertainty Index
  - We utilize the World Uncertainty Index Database by Ahir, Bloom, and Furceri (2018). Quarterly data for 143 countries from 1996Q1 to 2023Q4 is available.
  - The index is developed using a text mining technique based on all the country reports from the Economic Intelligent Unit. In particular, the number of times uncertainty is mentioned in the EIU country reports. Keywords include words “uncertain,” “uncertainty,” and “uncertainties.”
  - Then, the raw counts are scaled by the total number of words in each report to make the WUI comparable across countries.

Methodology

$$\ln(Cap_{isdt}) = \alpha_i + \mu \ln(Cap_{isdt-1}) + \theta lnWUI_{dt,t} + \beta(lnWUI_{dt,t} * lnNb.Host_{ist}) + \delta X_{dt,t} + \gamma_t + \varepsilon_{i,t}$$
(Eq. 1)

$$\ln(Job_{isdt}) = \alpha_i + \mu \ln(Job_{isdt-1}) + \theta lnWUI_{dt,t} + \beta(lnWUI_{dt,t} * lnNb.Host_{ist}) + \delta X_{dt,t} + \gamma_t + \varepsilon_{i,t}$$
(Eq. 2)

$$\ln(Project\_nb_{isdt}) = \alpha_i + \mu \ln(Project\_nb_{isdt}) + \theta lnWUI_{dt,t} + \beta(lnWUI_{dt,t} * lnNb.Host_{ist}) + \delta X_{dt,t} + \gamma_t + \varepsilon_{i,t}$$ **(Eq. 3)**

where i,j,s denote firm s in home country i, host country j at time t.

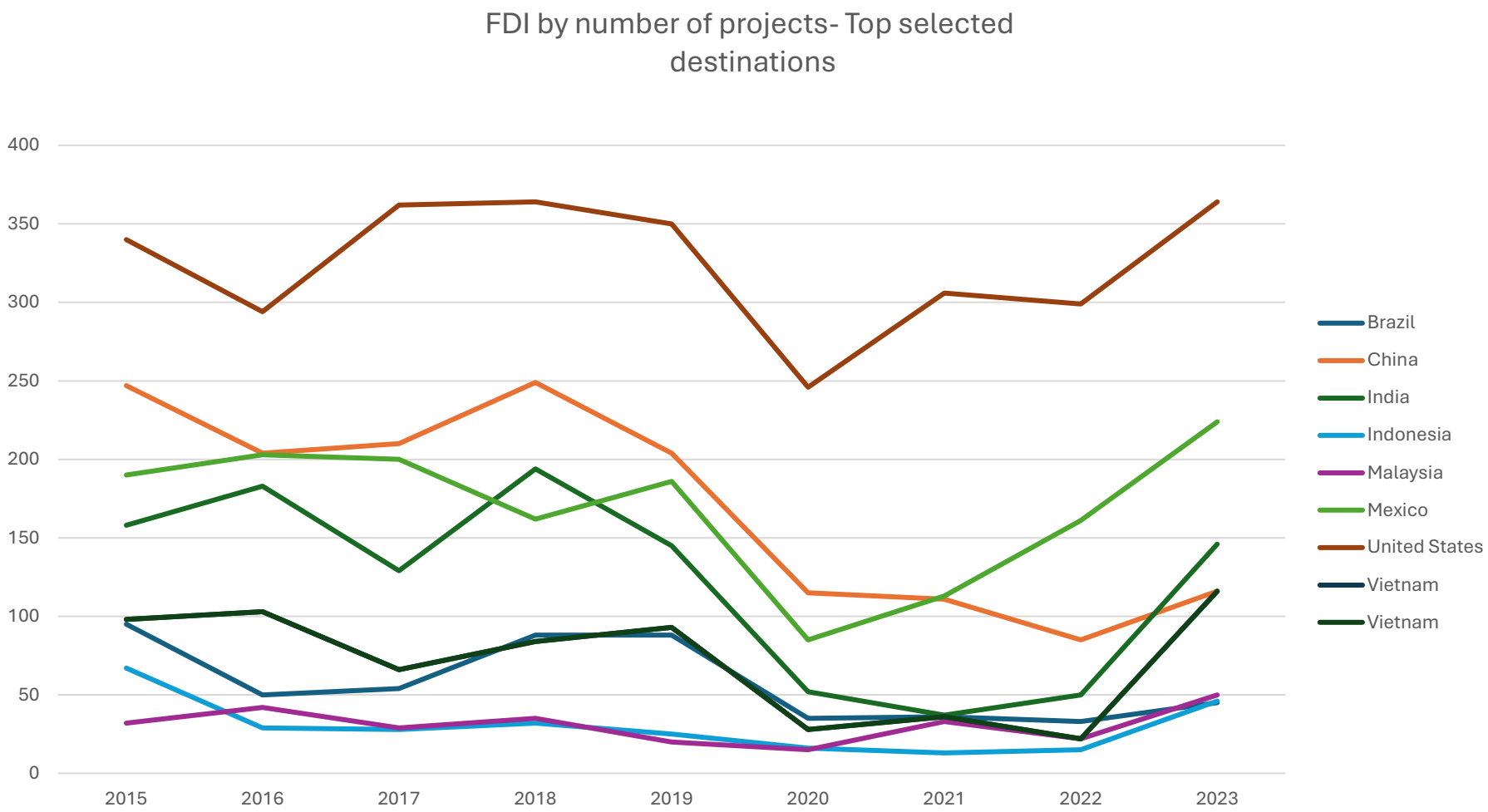
LHS var: FDI intensive margin (average size of the project- by capital and jobs) and extensive margin (number of FDI projects). Note that we can only capture the FDI information in the entry year.

WUI: relative uncertainty between home and host country.

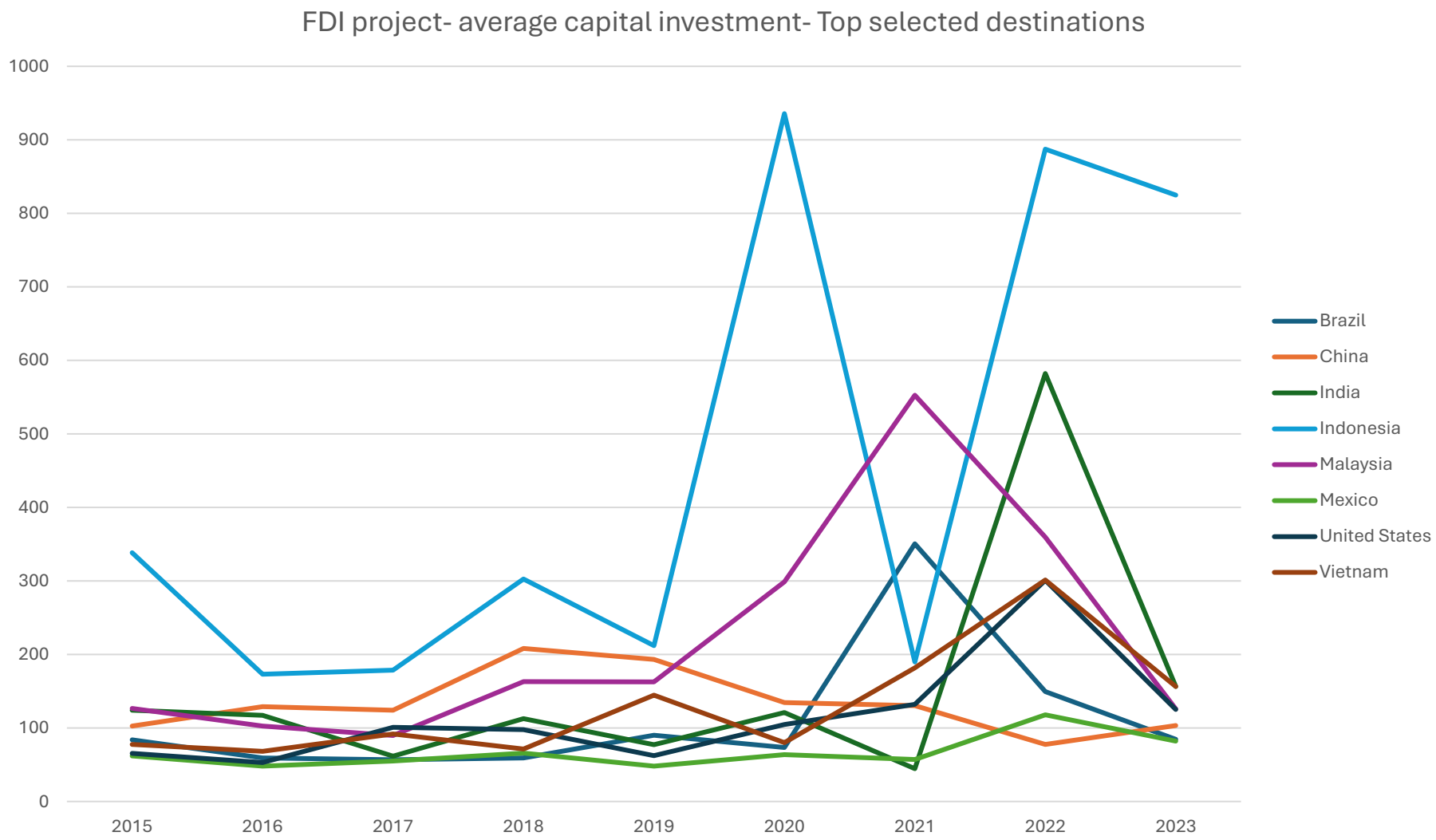
Nb. Host: number of host countries that firm s invests in.

X: host country's controls

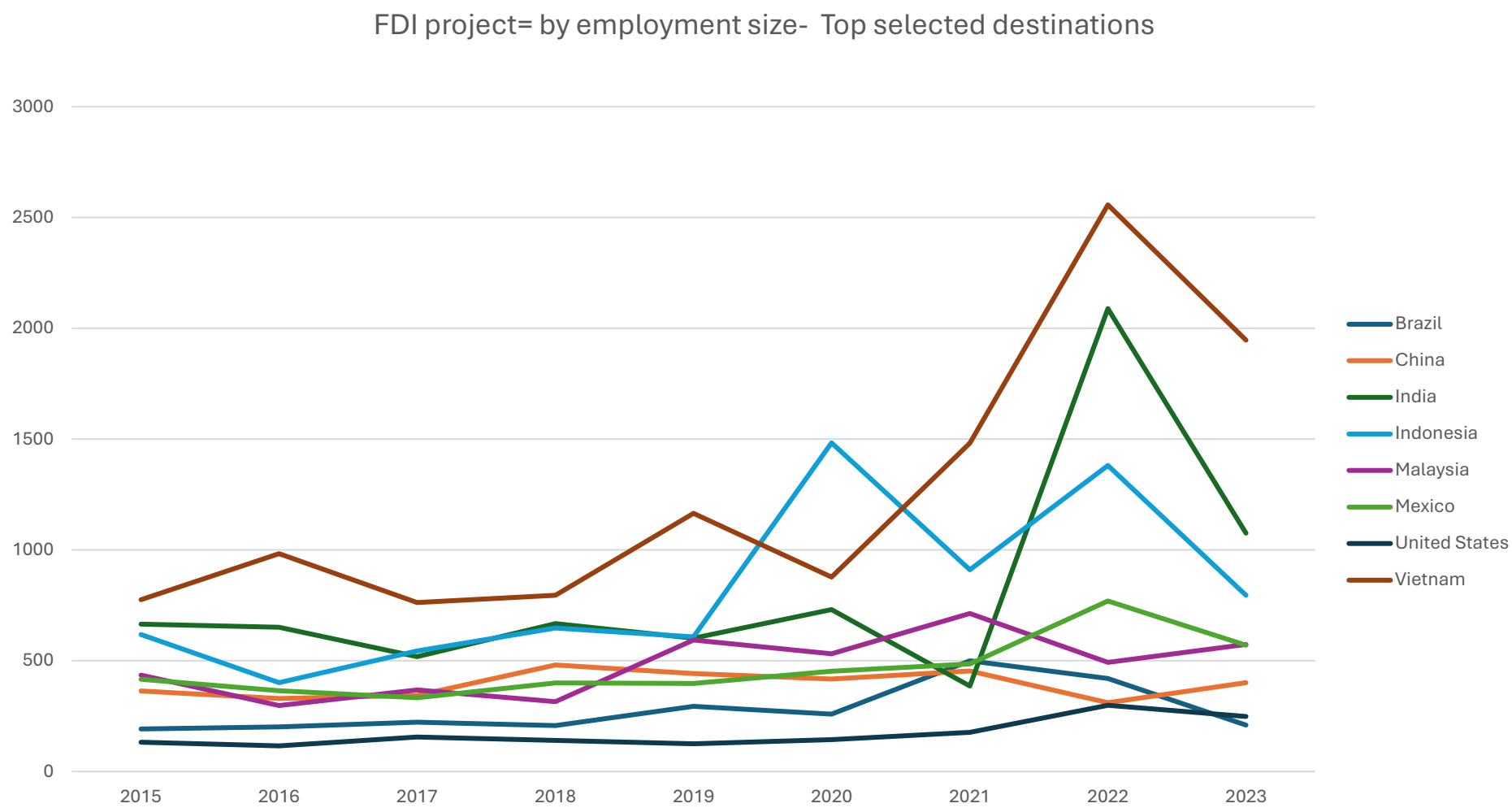
Descriptive statistics



Descriptive Statistics



Descriptive Statistics



Summary statistics

Table 1: Summary statistics					
Variable	Obs	Mean	Std. Dev.	Min	Max
lncap_qt	19,975	17.119	1.607	10	24
lnjob_qt	20,010	4.772	1.452	1	11
lnpro_nb_dt	20,010	3.065	1.026	1	5
lnhost_nb	20,010	1.916	1.148	1	5.361
lnwui_dest	20,010	0.229	0.167	0.000	1.072
lnwui_global	20,010	10.167	0.340	9.383	10.927
lngpr_global	17,777	4.886	0.188	4.085	5.768
wui_dt_host_nb	20,010	0.442	0.461	0.000	5.437
lngdppc_dest	19,927	9.660	1.080	7	11
lnfi_dest	19,924	0.478	0.121	0	1
tradewar	20,010	0.3107946	0.4628304	0	1
covid	20,010	0.2734133	0.4457223	0	1
ru_ukr	20,010	0.156022	0.3628853	0	1

Baseline results: OLS

	(1)	(2)	(3)
VARIABLES	Dep var: lncap_qt	Dep var: lnjob_qt	Dep var: lnpro_nb_dt
lnwui_dest	-1.901***	-0.973***	0.847***
	(0.0972)	(0.0804)	(0.0496)
wui_dt_host_nb	0.768***	0.384***	-0.0387**
	(0.0318)	(0.0263)	(0.0162)
lngdppc_dest	0.435***	0.0856***	-0.184***
	(0.0324)	(0.0268)	(0.0165)
lnfi_dest	-2.015***	-2.385***	0.673***
	(0.202)	(0.167)	(0.103)
lnwui_global	0.934	1.077*	0.0705
	(0.689)	(0.571)	(0.352)
sub_region dummy	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes
Quarter dummy	Yes	Yes	Yes
Constant	5.440	-4.619	2.698
	(6.781)	(5.615)	(3.465)
Observations	19,857	19,891	19,891
R-squared	0.260	0.377	0.518
Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1			

Quantile regression

	Dep var: lncap_qt			Dep var: lnjob_qt			Dep var: lnpro_nb_dt		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	q.25	q.5	q.75	q.25	q.5	q.75	q.25	q.5	q.75
lnwui_dest	-1.679***	-1.291***	-1.487***	-0.784***	-0.473***	-0.924***	0.793***	0.355***	0.171***
	(0.138)	(0.141)	(0.122)	(0.107)	(0.0832)	(0.0660)	(0.0490)	(0.0510)	(0.0490)
wui_dt_host_nb	0.718***	0.554***	0.653***	0.273***	0.203***	0.433***	0	0	0
	(0.0435)	(0.0473)	(0.0408)	(0.0354)	(0.0266)	(0.0272)	(0.0107)	(0.00115)	(0)
lngdppc_dest	0.367***	0.433***	0.310***	0.116***	0.130***	0.0321	-0.174***	-0.274***	-0.410***
	(0.0628)	(0.0344)	(0.0383)	(0.0301)	(0.0280)	(0.0307)	(0.0369)	(0.0263)	(0.0241)
lnfi_dest	-1.623***	-2.368***	-1.520***	-2.843***	-2.266***	-1.997***	1.182***	0.269**	0.153
	(0.329)	(0.284)	(0.246)	(0.226)	(0.128)	(0.178)	(0.278)	(0.125)	(0.132)
lnwui_global	1.422	0.878	0.795*	1.873*	0.749	0.633***	0.265	0	0.212
	(1.114)	(0.612)	(0.442)	(1.012)	(0.639)	(0.173)	(0.387)	(0.211)	(0.463)
sub_region dumm	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.392	6.221	8.646**	-13.21	-2.199	0.594	0.213	4.561**	4.142
	(10.72)	(5.941)	(4.300)	(9.948)	(6.226)	(1.689)	(3.819)	(2.096)	(4.574)
Observations	19,857	19,857	19,857	19,891	19,891	19,891	19,891	19,891	19,891
Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1									

Robustness 1: GMM for endogeneity

	(1)	(2)	(3)
VARIABLES	Dep var: lncap_qt	Dep var: lnjob_qt	Dep var: lnpro_nb_dt
lnwui_dest	-1.564**	-2.451***	1.752***
	(0.757)	(0.833)	(0.629)
lnwui_global	-28.85**	-19.53*	3.504
	(13.44)	(11.47)	(2.721)
wui_dt_host_nb	0.287	0.563***	-0.393***
	(0.204)	(0.202)	(0.142)
lngdppc_dest	0.428***	0.0657*	-0.505
	(0.0403)	(0.0353)	(0.372)
lnfi_dest	-1.735***	-1.828***	-1.555**
	(0.306)	(0.290)	(0.686)
sub_region dummy	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes
Quarter dummy	Yes	Yes	Yes
Constant	298.0**	197.8*	-25.44
	(132.1)	(112.8)	(27.64)
Observations	19,857	19,891	19,891
Number of ID	14,434	14,466	14,466
Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1			

Robustness 2: Alternative measure of uncertainty

	(1)	(2)	(3)
VARIABLES	Dep var: lncap_qt	Dep var: lnjob_qt	Dep var: lnpro_nb_dt
lnwui_dest	-1.847***	-0.940***	0.627***
	(0.103)	(0.0850)	(0.0450)
wui_dt_host_nb	0.781***	0.412***	-0.0510***
	(0.0328)	(0.0271)	(0.0143)
lngdppc_dest	0.569***	0.315***	-0.172***
	(0.0497)	(0.0411)	(0.0218)
lnfi_dest	-2.110***	-2.941***	-1.582***
	(0.241)	(0.199)	(0.105)
lngpr_global	-0.260***	-0.102**	1.053***
	(0.0580)	(0.0479)	(0.0254)
sub_region dummy	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes
Quarter dummy	Yes	Yes	Yes
Constant	14.55***	4.451***	-0.364
	(0.577)	(0.476)	(0.252)
Observations	17,675	17,694	17,694
R-squared	0.281	0.401	0.574
Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1			

Conclusion

We document the global FDI patterns using detailed firm-project-level data from January 2015 to December 2023. In particular, we track the changes in the number (extensive margins) and the capital and employment size (intensive margins) of FDI projects across countries and sectors.

Second, we examine the linkage between these changes in FDI and the rising economic and political uncertainty.

Unlike previous studies that focused on realized FDI projects or at sectoral-country level, often with time delays, our analysis is based on firms' announced greenfield investments. While there is a possible discrepancy between intention and actual investments, they indicate firms' early considerations and planned responses to uncertainty, allowing us to assess its potential influence.

We find a positive association between uncertainty in host markets and the number of FDI projects. In contrast, the scale of the projects in terms of employment size and capital investment decreased. Firms navigate around uncertainty by reducing the size of their projects while continuing expansion at the extensive margin.