The rising concentration of Foreign Direct Investment*

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Abstract

Using two decades of granular data on foreign direct investments (FDI) globally, this study shows a consistent global rise in concentration of cross-border investment in fewer multinational firms and larger projects. Concentration is most prominent in developing economies, reaching record highs in recent years, and more pronounced in countries grappling with economic uncertainty. The implications are significant, as increased concentration can hinder the developmental impact of FDI. Importantly, these stylized facts challenge existing analytical and policy frameworks, by highlighting the growing importance of firm-level shocks as a driver of variation in aggregate FDI flows.

Keywords — Foreign Direct Investment (FDI), Concentration, Development

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1 Introduction

Market concentration has garnered considerable attention in both the media and academic discourse, since the onset of the global financial crisis. Although the focus of the debate has centered on the United States, where fewer, larger, more productive firms account over time for greater shares of economic activity, (Philippon & Gutierrez 2018, OECD 2018, Grullon et al. 2019, De Loecker et al. 2020), there is evidence that concentration has been rising also in other advanced economies (OECD 2018, Affeldt et al. 2021) and, to a smaller extent, in selected emerging economies (Akcigit et al. 2021). Theory and a small body of evidence suggests that market concentration tends to reduce capital investment (Gutiérrez & Philippon 2017); however, the direction of the effect is unclear when it comes to foreign direct investment (FDI) - an activity typically undertaken by the few lead firms with a capacity to expand their operations across borders. Whether FDI is indeed becoming more concentrated across multinational enterprises (MNEs), in which countries and under which conditions, remains an open question, and a gap in our understanding of foreign investment dynamics.

This paper aims to bridge this gap by bringing new evidence on the question. Using granular data on FDI projects across the globe spanning two decades, we show that the share of the largest enterprises in total cross-border investment has steadily increased in the aftermath of the global financial crisis. This pattern is robust across measures of concentration, modes of investment, source countries and targeted industries, regardless of the overall trajectory of aggregate FDI flows, which have grown in several regions during the same period. The surge in foreign investment concentration has been particularly pronounced in developing economies, reaching an all-time high over the past two years, with destination economies in Asia leading the way. This trend appears to be more the result of declining number of investing firms into developing countries rather than higher project capital expenditures, while the reverse is true for high-income economies. Importantly, structural shifts into services are not the prime driver of variation of investment concentration across countries and over time; instead, concentration has grown significantly more in destinations grappling with high economic uncertainty. This stylized fact adds to a nascent literature enquiring about the impact of uncertainty on trade and FDI (Juvenal & Monteiro 2021, Jardet et al. 2023), that generally emphasizes forward-looking drivers of cross-border flows of goods and capital.

The implications of these facts are vast. Investment concentration can gradually erode the developmental impact of foreign capital in developing countries, as fewer, larger MNEs establish production facilities or acquire domestic firms. The trend can undermine competition through reduced market entry or through excessive market power that stifles domestic producers. Concentration of foreign capital into fewer MNEs can also impede the diffusion of critical technologies and slow productivity growth in developing economies (De Loecker et al. 2020, Philippon & Gutierrez 2018).

Ultimately, the fact that cross-border investment is driven by fewer multinational firms underscores the granularity of FDI flows. Mirroring the granularity of growth (Gabaix 2011), our stylized facts point to the neglected importance of idiosyncratic

firm-level shocks as a driver of variation in aggregate investment flows, challenging the prevailing analytical frameworks used for their analysis, as well as the horizontal policy toolbox typically used for their attraction and retention.

The remainder of this paper is organized as follows. Section 2 describes the data on FDI projects we use to establish patterns of concentration. Section 3 presents selected stylized facts about its evolution over time, its main features and associations. The last section is left for conclusions and policy implications.

2 Data

Greenfield FDI. Cross-border "greenfield investment" refers to the construction of new production facilities or expansion of existing ones. It differs from mergers and acquisitions - the other major component of FDI flows - in that it involves the generation of new productive capacity and jobs. These two components account for the bulk of cross-border direct investment globally. Information on greenfield FDI projects are compiled by the *Financial Times* in real time into the commercially available *fDi Markets* database. Observations are recorded at the project level, and include the sector and subsector of investment activity, estimates of capital expenditure invested, as well as expected job creation from this investment. The dataset, which includes an identifier of the parent company, the country of origin and destination, has global coverage: 175 source countries, 200 destination countries, and observations matched with 53 ISIC Rev. 4 industries at 2-digit level of aggregation. Historical extracts of the database span years 2003 to 2022.

Mergers and Acquisitions (M&A). Mergers and acquisitions refers to the consolidation of companies or assets through various types of financial transactions, without generation of new productive capacity. Cross-border M&A observations - referring to the purchase by a foreign entity of assets that corresponds to more than 10 percent of the total assets of a target company - are sourced from the *Thomson Reuters* commercially available *Refinitiv* database. Observations are at the project level, and include, for each investment project, the same information as *fDi Markets* without the estimation of jobs created. The dataset has global coverage spanning years well before 2003 to 2022.

A limitation of both data sets is that observations refer to announcements of future rather than current investment flows, which may take time to materialize. They therefore differ from official FDI data in Balance of Payments (IMF) and government records compiled by the United Nations, which track actual movements of capital within given annual intervals.Moreover, in fDi Markets, missing figures for capital expenditure and employment are often estimated by the publisher, and are not attributed proportionally according to the equity participation of investors. A recent evaluation of alignment with official sources has shown that aggregates produced from fDi Markets have high levels of correlation with actual flows (Shekhar Aiyar & Presbitero 2023). Regularly used in combination with official FDI statistics by international organizations (United Nations 2023, World Bank Group 2020) to analyze investment project dynamics, both sources may however have incomplete coverage of smaller countries at the low end of

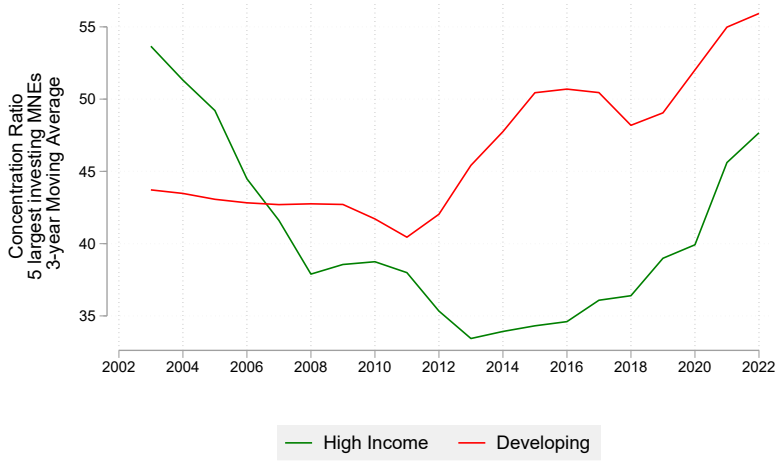
the income spectrum (Casella et al. 2023), which is mitigated appropriately using a minimum threshold of observations per year for inclusion in the analysis that follows.

3 Stylized Facts

This section outlines two key stylized facts about the increasing concentration of FDI in developing economies.

Fact 1. *FDI concentration is on the rise, especially in developing countries.* Based on observations of capital expenditure for greenfield FDI projects, Figure 1 reveals that FDI concentration has been increasing in developing economies, particularly since the global financial crisis.[1] This upward trend has even accelerated in recent years. FDI concentration in high-income economies has followed a U-shaped pattern, declining until 2013 and rebounding since then at an accelerating pace.

Figure 1: FDI Concentration has been rising across the income spectrum (2003-2022



Notes: The analysis relies on reported capital expenditure of FDI greenfield projects. The concentration ratio of country groups is calculated as the three-year moving average of each country's concentration ratio, weighted by the country's total FDI investments. Countries with on average less than 10 investing MNEs per year are excluded from the sample. Countries are considered 'developing' if classified as low income, lower-middle income or upper-middle income in 2003 based on the World Bank's income classification.

A formal regression analysis of FDI concentration on an interaction term between a linear time trend and a binary indicator for developing economies highlights how the

[1]This evidence is robust to a battery of robustness analyses: using different thresholds for the number of top investors (Figure A2); using different thresholds for the minimum number of investors (Figure A3); or using the Herfindahl-Hirschman index (HHI) as a measure of concentration (Figure A4).

trend of investment concentration is more pronounced in the latter. Table B8 shows a consistently positive and statistically significant coefficient estimate on the interaction across all specifications. This result confirms that the concentration ratio in developing countries grows 0.37 percentage points per year faster than in high-income economies. This leads to a cumulative 23 percentage point higher concentration ratio between 2011 and 2022.[2]

The same trend holds for M&A projects in developing countries in the aftermath of the global financial crisis, although concentration has been rising at slower pace and with larger fluctuations from one year to the next, leading to less precise trend (Figure A5). Contrary to greenfield FDI, the trend in M&A in developing countries has reversed during the years of the COVID-19 pandemic, likely due to the shock increase in company restructurings and so-called "fire-sale FDI" associated with the recession. Replicating the regression of FDI concentration on an interaction term between a linear time trend and a binary indicator for developing economies confirms the positive trend in the latter, albeit lower than for greenfield FDI, as expected (see Table B8). Excluding the years of the pandemic from the regression, moreover, improves considerably the precision of the medium-term upward drift on concentration.

Table 1: FDI concentration dynamics

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	CR5	HHI	CR5	HHI	CR5	HHI
Trend × Developing	0.368**	0.018**	0.341**	0.018**	0.347*	0.016*
	(0.168)	(0.008)	(0.162)	(0.008)	(0.183)	(0.009)
Observations	2,349	2,349	2,691	2,691	2,047	2,047
R-squared	0.831	0.749	0.856	0.791	0.799	0.718
Minimum # of Foreign Investors	5		1		10	

Note: Each observation corresponds to a destination-year, represented as it. "CR5" refers to the concentration ratio of the top 5 investing firms. Analysis in Columns 1 and 2 excludes destination countries averaging less than 5 foreign investors; Columns 3 and 4 include all destinations without restrictions on the number of foreign investors; Columns 5 and 6 exclude destinations averaging less than 10 foreign investors. "HHI" denotes the Herfindahl-Hirschman concentration index, computed using the corresponding sample for "CR5". For ease of interpretation, HHI values are expressed in natural logarithm form. The indicator variable, *Developing*, is assigned the value 1 for countries classified as Low, Lower-Middle, or Upper-Middle income, as per the 2003 World Bank classification. The analysis includes country fixed effects and (world) region by year fixed effects. Standard errors are clustered at the destination country level. Statistical significance denoted by; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

A smaller number of MNEs invest in gradually larger investment projects. FDI concentration has strengthened through the last decade in both developing and high-income economies, while FDI flows in both groups have neither consis-

[2]Appendix B provides a comprehensive set of results based on both the threshold of 10 investors and on no threshold at all.

tently declined nor grown (World Bank Group 2023). One possible explanation is that a smaller number of MNEs have been able to sustain cross-border investment in gradually larger investment projects. This pattern may be associated with heightened uncertainty afflicting the global economy in the aftermath of the 2008-2009 global financial crisis, the US-China trade war, or more recently the COVID-19 pandemic and Russia's war on Ukraine.

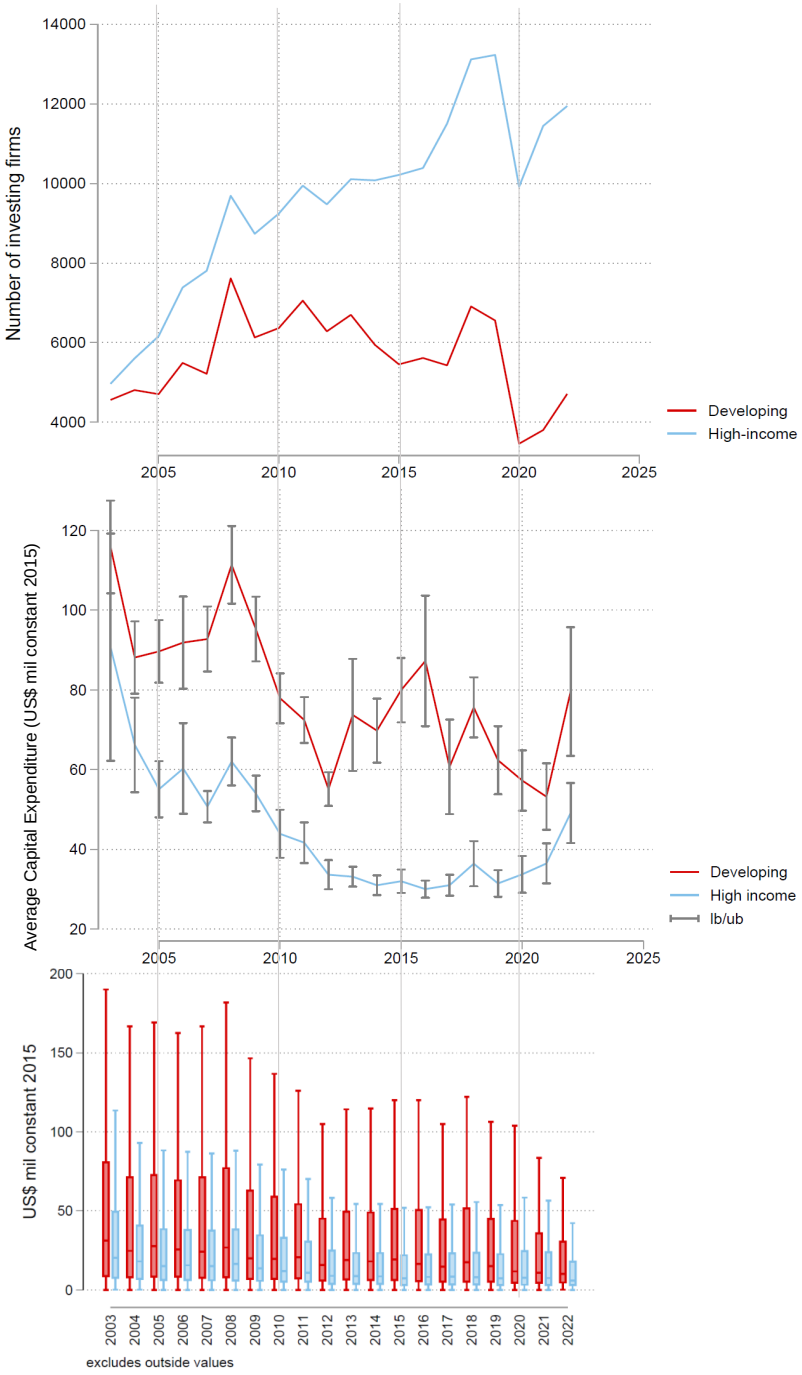
To examine this hypothesis, we look into trends in the number of investing MNEs, as well as the distribution of capital expenditure across greenfield FDI projects over time in developing and high income economies. We find that, after a peak preceding the global financial crisis, the number of MNEs investing in developing countries has gradually decreased (Figure 2). More recently, during the COVID-19 pandemic, the number of investors dropped dramatically both in high-income and developing economies. The distribution of capital expenditures, on the other hand, illustrates a consistent drop over time in median project expenditure; yet at stable and even increasing average mean. The latter suggests the presence over time of additional large investment projects in developing countries at the top end of the distribution, keeping the mean roughly at the same level.

Overall, the rising FDI concentration in developing countries appears to be more the result of declining number of investing firms rather than average capital expenditure per project. The opposite is true for high-income economies where the rising FDI concentration appears to be more the result of a higher over time average capital expenditure per project. While the number of investors into advanced economies has grown considerably over the last decade, the average project capital expenditure has also risen, outweighing the dumping effect of the former on FDI concentration.

The distribution of capital expenditure in cross-border M&A projects show similar dynamics, with gradual increases in median and, to some extent, mean investment over time, but with larger shifts around the center of the expenditure distribution rather than outliers. In other words, the median capital expenditure per project has grown significantly but, contrary to greenfield investment, less has changed at the extremes of the distribution. The number of firms, moreover, engaging in cross-border M&A has remained rather stable in advanced economies and gradually fallen in developing countries to levels experienced prior to global financial crisis. During the years of the COVID-19 pandemic, the data confirm an irregular spike likely due an increase in company restructurings and fire-sale FDI associated with the recession (Figure A6).

Structural change of FDI is not the primary driver of the rising concentration. One potential driver of rising concentration is the growing importance of capital-intensive services in developing countries (World Bank Group 2023), which tend to have more concentrated markets. A closer examination of within-sector concentration, however, shows that most services cross-border investments tend to be less concentrated than key FDI manufacturing sectors, such as the automotive industry, chemicals, or electronics (Figure A12). Moreover, within-sector concentration across manufacturing and services sectors has generally declined in the period after 2016.

Figure 2: Fewer investing firms undertake larger investment projects



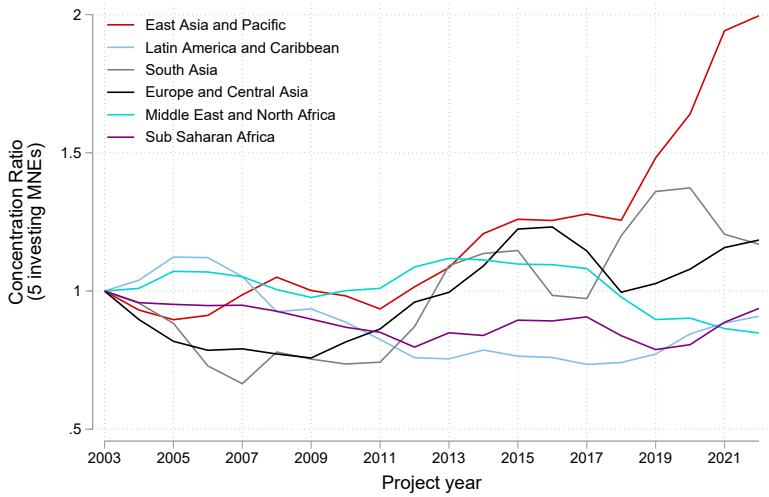
Source: Authors' Calculations on fDi Markets.
Note: The analysis relies on greenfield FDI investment project counts and capital expenditure. All project observations in the country groupings are included in the sample for the descriptives. In the third panel, the box-plot for each year consists of a five-number summary of capital expenditure observed in different country groupings, from bottom to top: the lower adjacent value, the first quartile, the sample median, the third quartile and the upper adjacent value. Adjacent values are defined as per (Tukey 1977). Countries are considered as low-income if low, lower middle income or upper middle income in 2003 based on the World Bank's income classification.

Netting out the effect of structural change by demeaning the distribution of capital expenditures by 2-digit industrial sectors, suggests still greater stability over time of the right tale of the distribution, consistent with resilience of larger undertakings (Figures A10 A11).

A more formal evaluation of variance explained by country and sector dynamics using an ANOVA decomposition shows that, while sector-year determinants seem to explain a significant share of variation in country-industry-year level FDI concentration, greater shares are attributed to country- or country-year-specific factors, as shown in Table B1 in Appendix B). This pattern lends support to the hypothesis that rising concentration is driven to a larger extent by dynamics of competitiveness and uncertainty experienced in destination markets rather than structural change.

Asia leads the way among developing countries in FDI concentration. East Asian countries have accounted for a significant part of the global increase in FDI concentration, as shown in Figure 3. In particular, China has been a key driver of this trend until 2017 (see Figure A8). More recently, however, FDI concentration has accelerated within the broader East Asian region beyond China, in countries such as Malaysia, Indonesia and Viet Nam. The pattern is consistent with a "reallocation effect"[3], whereby investment flows from developed ("North") to developing ("South") countries are shifting away from China and toward neighboring low-wage economies that are more geopolitically aligned with the United States (IMF 2023).

Figure 3: East Asia leads the way in global FDI concentration



Note: The analysis relies on greenfield FDI capital expenditure values. Each line denotes the destination region's concentration ratio calculated as the regional average share of each country's 5 largest investing MNEs in total capital expenditure, weighted by the latter for each year. Countries with on average less than 10 investing MNEs per year are excluded from this analysis.

[3]A phenomenon also noted in trade literature Fajgelbaum et al. (2021)

Fact 2. *Uncertainty in destination markets is associated with greater FDI concentration.* There are a number of potential mechanisms behind the rise in FDI concentration in developing countries. Among destination-specific characteristics that may reduce MNEs' expected returns, economic and political uncertainty features prominently in recent studies (Juvenal & Monteiro 2021, Jardet et al. 2023). Resilience, or in other words the ability of firms to cope with risk and recover from shocks, is associated with firm size, age, productivity and has been a relatively novel area of study with several contributions during the COVID-19 pandemic (Cirera et al. 2021). New measures of global uncertainty have allowed this line of enquiry to expand (Ahir et al. 2022). And the link with investment concentration seems rather intuitive: the set of global firms able to sustain positive returns under greater variation in business environment, greater fluctuations in demand and cost structure shocks is naturally narrower. As such, destination-country uncertainty is expected to strongly shape investment concentration patterns.

Our analysis confirms that destination country idiosyncratic uncertainty correlates, not only with higher levels of investment concentration, but also with a lower number of investors; a trend that is particularly pronounced in developing countries. Table 2 illustrates formally the relationship between FDI concentration and uncertainty, netting out country and year time-invariant effects. Uncertainty is quantified using the *World Uncertainty Index* as described in Ahir et al. (2022). The findings are robust to alternative measurement of uncertainty (see table B2, which uses exchange rate volatility) as well as different thresholds for the concentration ratio (see table B3 and table B4). Besides greenfield investment, the pattern holds as well for M&As (as shown in table B9) with stronger significance in the years until the COVID-19 pandemic when M&As experienced an exogenous shock.

Overall, the association between uncertainty and investment concentration mirrors similar findings in the literature, whereby greater risk in destination markets is associated with narrowing of the extensive margin of trade (Juvenal & Monteiro 2021) .

Market concentration in source economies is also expected to have an effect on investment concentration at destination, by reducing the number of large firms able to sustain investment towards host economies of any idiosyncratic conditions. Measured at the level of source economies, the concentration of outward FDI into fewer MNEs is a regular trend, particularly pronounced in the United States as would be expected (see Figure A7). Separating source and destination effects in investment projects, however, proves challenging given the small numbers of bilateral observations of investment projects over time (compared e.g. to trade transactions), and thus the limited variation that can be explored for neat identification. This constraint adds to poor comparability of measures of source market concentration across countries, that would be suitable for the purpose.[4]

[4]It is noteworthy that, while the number of MNEs headquartered in the European Union and the United States investing to developing countries have decreased (Figure A9), the number of US investors in other high-income countries has not.

Table 2: Mechanism at play

VARIABLES	(1) CR5	(2) CR5	(3) CR5	(4) CR5	(5) HHI	(6) log(# MNEs)	(7) log(K)
Uncertainty (standardized)	0.927**	-0.298	1.460***	1.560***	0.059**	-0.067**	0.019
	(0.440)	(0.600)	(0.520)	(0.501)	(0.025)	(0.027)	(0.031)
Uncertainty × Developing		1.862***					
		(0.687)					
Observations	2,349	2,349	1,489	1,472	1,472	1,472	1,472
R-squared	0.830	0.831	0.819	0.824	0.738	0.894	0.385
Controls	No	No	No	Yes	Yes	Yes	Yes
Data Coverage	All countries				Developing		

Note: Each observation corresponds to a destination-year, represented as it. "CR5" denotes the concentration ratio of the top 5 investing firms. Countries averaging fewer than 5 foreign investors are excluded from these calculations. "HHI" refers to the Herfindahl-Hirschman concentration index, calculated using the "CR5" sample. "log(# MNEs)" represents the natural logarithm of the number of foreign investors, and "log(K)" denotes the natural logarithm of the average capital expenditure. "Uncertainty" is based on the "T3" variable from the World Uncertainty database (Ahir et al. 2022), which counts words from EIU reports for 143 countries since the 1950s. A higher "T3" value indicates greater uncertainty. Uncertainty in year is approximated as the logarithm of the average word count in EIU reports over the three years preceding the investment. The analysis includes country fixed effects and (world) region by year fixed effects. Countries are classified into 7 regions based on World Bank classifications. Destination-specific control variables include the logarithms of population and GDP (source: Conte et al. (2022)) and the average exchange rate over the three years preceding the investment (national currency/USD, Penn World Tables, mark 10.1, Feenstra et al. (2015)). Standard errors are clustered at the destination country level. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

However, eliminating source countries one by one from the descriptive regression associating uncertainty with investment concentration at destination does not yield major variation in the coefficient (see tables B5 and B6). This result points to destination-specific variation as the main driver of the pattern. Controlling for home-country concentration (see table B7) and disaggregating industry-level concentration (see table B10) confirms the robustness of the result.

4 Conclusions

Using comprehensive data of cross-border investment projects from a wide range of countries, this study provides evidence that FDI has become more concentrated in the past decade. This trend is especially marked in developing countries and East-Asian economies in particular (including China and India); it is also sharper when it comes to greenfield investment relative to M&A and has accelerated during the COVID-19 pandemic. Our analysis provides suggestive evidence that concentration is associated with both an increase in idiosyncratic macroeconomic uncertainty and, relatedly, a dramatic reduction in the number of foreign investors. Although the structural shift of FDI into services as well as rising market concentration in some major source economies seem to underlie part of the variation in investment concentration, destination-country

characteristics have overall greater explanatory power, which points to actionable recommendations for developing countries.

Specifically, the rise in FDI concentration in developing economies raises significant concerns for policymakers. Firstly, a high degree of FDI concentration can lead to overdependency on a few dominant MNEs for some of the established development benefits of foreign investment: knowledge and technology transfers, job creation, international standards' diffusion, and competition-related productivity improvements, all of which stand to weaken. Secondly, there is a risk that concentrated FDI may lead to regulatory capture, where powerful MNEs influence government policies in their favour. Third, the effectiveness of established policy instruments based on horizontal interventions for investment attraction and retention is put into question. The concentration of cross-border investment into fewer MNEs highlights the granularity of FDI flows, and specifically the growing importance of origin firm-level idiosyncratic shocks as a driving force behind aggregate investment flows. Besides challenging the prevailing analytical frameworks used to analyze their trends, this acknowledgment calls for flexible policy frameworks better adapted to the needs, the challenges posed by greater macroeconomic uncertainty and the specific constraints of lead firms driving large investment projects in developing economies. Instruments such as innovative dispute resolution mechanisms, political and market risk guarantees, or market intelligence infrastructure to address information gaps stand out as particularly potent in that context.

In conclusion, while FDI can still play a crucial role in the development of emerging economies, policymakers need to adapt to the reality of concentrated investment flows, pursue investment retention systematically, and ultimately strike a balance between addressing constraints of global firms and creating an attractive investment climate for new investors by reducing vulnerabilities they may have in a context of high uncertainty.

Moving forward beyond stylized facts, the impact of the ongoing economic fragmentation, evolving trade patterns, and firm-level idiosyncratic shocks on investment concentration holds significant promise for future research. By combining backward-looking and forward-looking insights, policymakers can craft more flexible strategies in line with emerging trends and ultimately a more conducive environment for sustainable economic growth.

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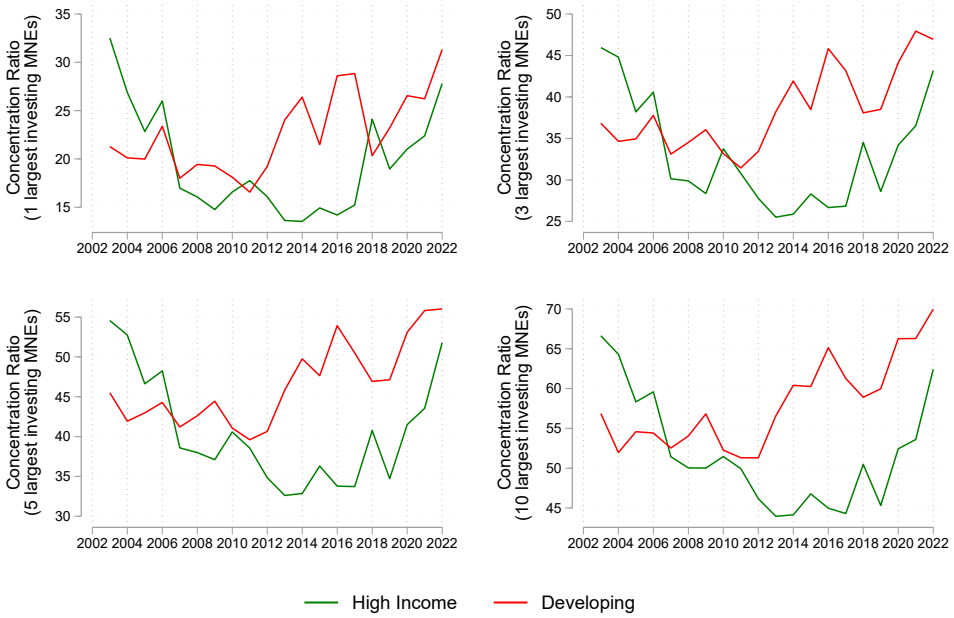
APPENDIX

A Additional figures

Figure A1: FDI Concentration Ratio (non-averaged estimates across years)

Source: Authors' analysis on fDi Markets.
Note: The analysis relies on greenfield FDI investment project capital expenditure. The concentration ratio of country groups is calculated as the weighted average of each country's concentration ratio, weighted by the country's total investment. Countries with on average less than 10 investing MNEs per year are excluded from this analysis. Countries are considered developing if classified as low income, lower-middle income or upper-middle income in 2003 based on the World Bank's income classification.

Figure A2: FDI Concentration Ratio (Alternative definitions)



Source: Authors' analysis on fDi Markets.
Note: The analysis relies on greenfield FDI investment project capital expenditure. The concentration ratio of country groups is calculated as the weighted average of each country's concentration ratio , weighted by the country's total investment. Countries are considered developing if classified as low income, lower-middle income or upper-middle income in 2003 based on the World Bank's income classification.

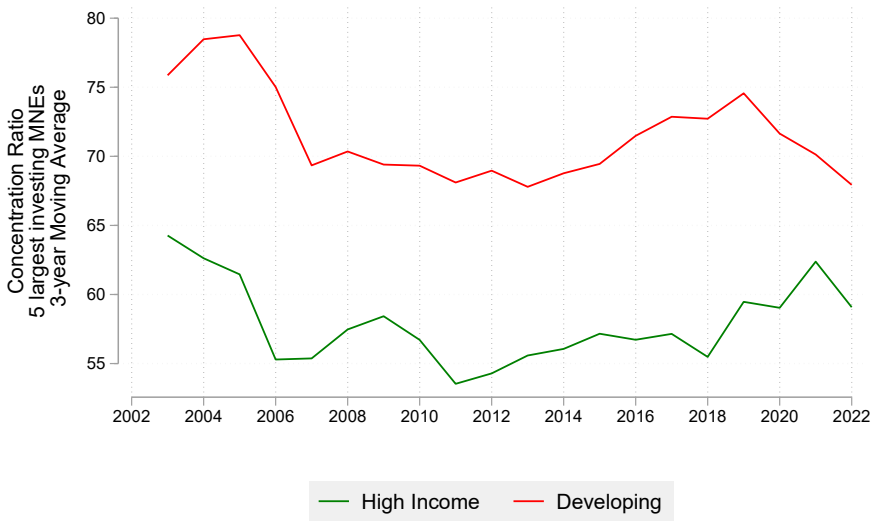
Figure A3: FDI Concentration Ratio (Threshold Robustness)

Source: Authors' analysis on fDi Markets.
Note: The analysis relies on greenfield FDI investment project capital expenditure. The concentration ratio of country groups is calculated as the weighted average of each country's concentration ratio , weighted by the country's total investment. Countries are considered developing if classified as low income, lower-middle income or upper-middle income in 2003 based on the World Bank's income classification.

Figure A4: Herfindahl-Hirschman index

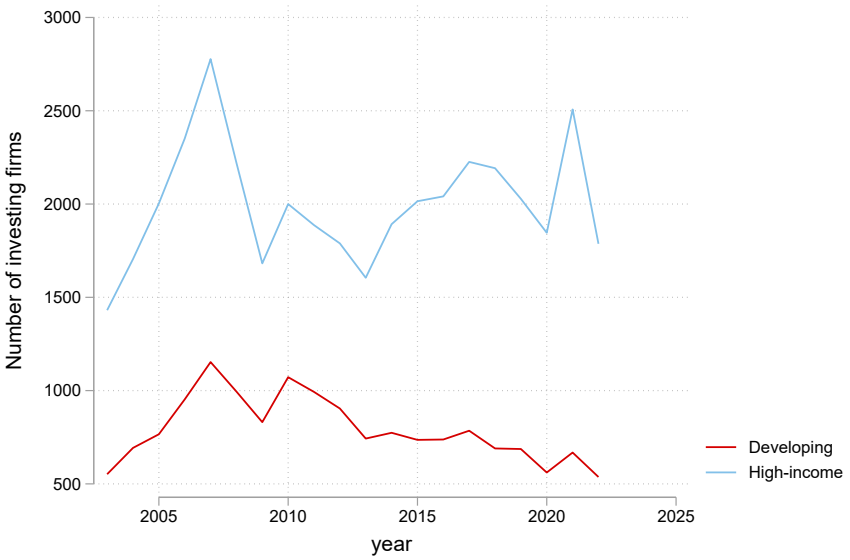
Note: The analysis relies on greenfield FDI investment values. The green line denotes the Herfindahl-Hirschman index (HHI) of high-income countries calculated as the weighted average of each country's HHI for each year. The red line denotes the HHI of low-income countries calculated as the weighted average of each country's HHI for each year. Countries' shares in total greenfield FDI investment values are used as weights. Countries with on average less than 10 investing MNEs per year are excluded from this analysis. Countries are considered as low-income if low, lower middle income or upper middle income in 2003 based on the World Bank's income classification. The robustness of the analysis is tested by considering different thresholds for calculating the concentration ratio. More details are available in the Appendix.

Figure A5: FDI Concentration Ratio, M&A (Moving Average and Raw Estimates 2003-2022)



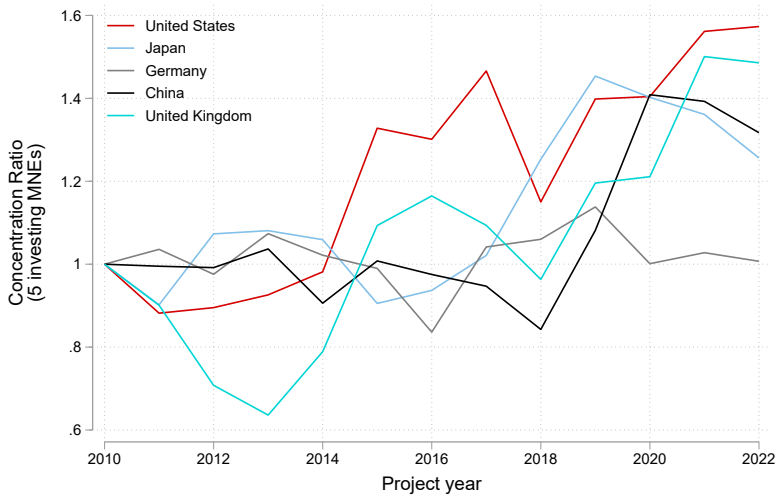
Source: Authors' analysis on Refinitiv M&A.
Note: The analysis relies on M&A investment project capital expenditure. The concentration ratio of country groups is calculated as the simple average of each country's concentration ratio. Countries are considered developing if classified as low income, lower-middle income or upper-middle income in 2003 based on the World Bank's income classification.

Figure A6: M&A Number of Investing Firms 2003-2022



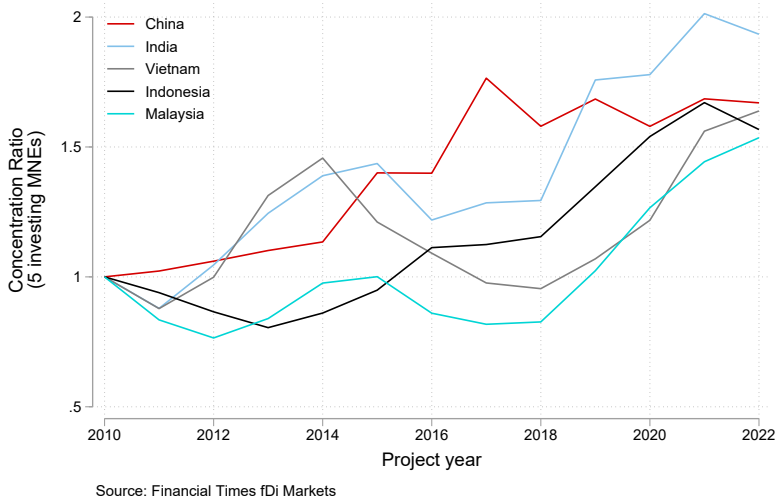
Source: Authors' analysis on Refinitiv M&A.
Note: The analysis relies on M&A investment project unique firm identifiers, without any exclusion from the full sample. Countries are considered developing if classified as low income, lower-middle income or upper-middle income in 2003 based on the World Bank's income classification.

Figure A7



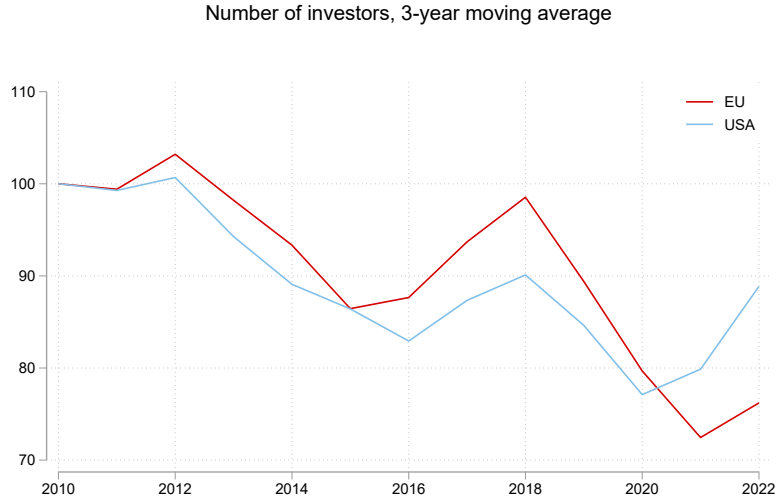
Note: The analysis relies on greenfield FDI capital expenditure values. Each line denotes the destination country's outward FDI concentration ratio calculated as the share of the 5 largest outward investors for each year.

Figure A8



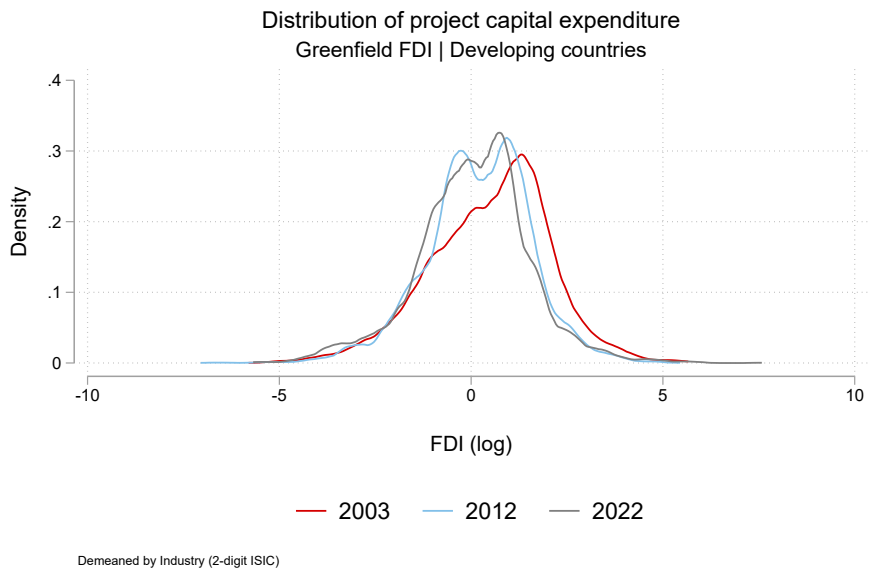
Note: The analysis relies on greenfield FDI investment capital expenditure values. Each line denotes the destination country's inward FDI concentration ratio calculated as the share of the 5 largest inward investors for each year.

Figure A9: Number of Investing Firms into developing countries by source (United States and European Union, 2010-2022



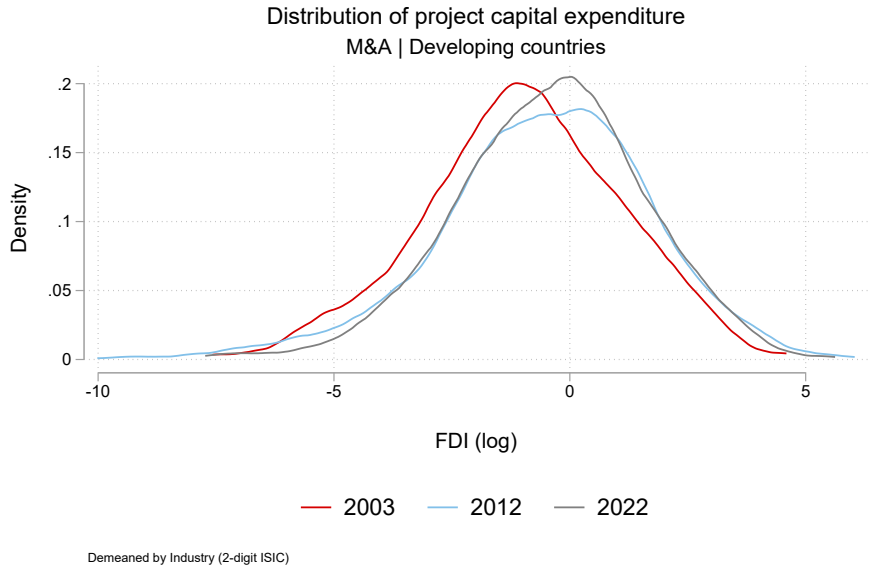
Note: The analysis relies on greenfield FDI project unique firm identifiers, without any exclusion from the full sample.

Figure A10



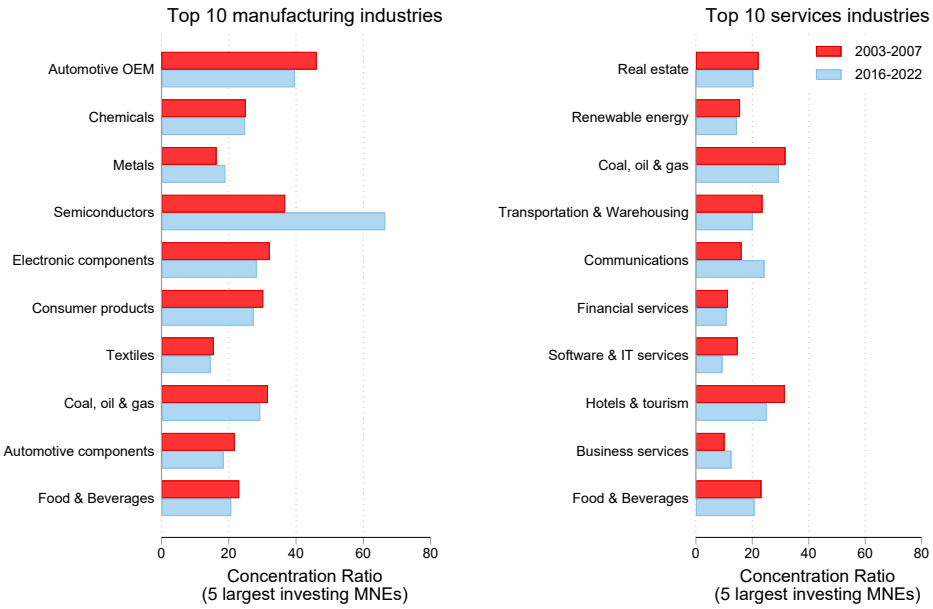
Note: The analysis relies on greenfield FDI capital expenditure, without any exclusion from the full sample. Countries are considered developing if classified as low income, lower-middle income or upper-middle income in 2003 based on the World Bank's income classification.

Figure A11



Note: The analysis relies on M&A capital expenditure, without any exclusion from the full sample. Countries are considered developing if classified as low income, lower-middle income or upper-middle income in 2003 based on the World Bank's income classification.

Figure A12



Note: The analysis relies on greenfield FDI capital expenditure, without any exclusion from the full sample.

B Additional tables

In this section, we present a series of robustness checks and extensions that provide further support for the empirical evidence discussed in the main text.

We begin with an analysis of variance (ANOVA) approach to investigate the sources of variation in FDI concentration, which is detailed in Table B1 and based on the methodology outlined in Gamst et al. (2008).[5] This analysis confirms that most of the variation in FDI concentration can be attributed to factors specific to countries or to specific combinations of countries and years, while elements of the sector and year play only a marginal role.

Table B2 uses an alternative measure of uncertainty based on exchange rate volatility to further confirm our results. The examination of different definitions of concentration ratios in tables B3 and B4 contributes to the robustness of our results. Excluding major partner and source countries, as shown in tables B5 and B6, is consistent with and supports the main effects. Furthermore, table B7, which controls for home country concentration, and table B10, which measures industry concentration, verify the robustness of our analysis. Finally, the time dynamics of mergers and acquisitions (M&A) are examined in table B9, finding patterns that are consistent with and support our main conclusions.

[5] ANOVA is a statistical method used for hypothesis testing in which the observed variance in a variable is decomposed into components attributed to different sources. The percentage of total variance explained by each component is calculated as $\left(\frac{\text{Sum of squares explained by component}}{\text{Total sum of squares}}\right) \times 100$.

Table B1: ANOVA Decomposition of FDI Concentration at the Country-Industry-Year Level

	Concentration Measure, % Variance			
	CR5	HHI	CR5	HHI
	(1)	(3)	(3)	(4)
Destination-Year:				
Year	1.77	1.98	2.33	2.44
Country	79.56	70.12	75.24	66.02
Region-Year	10.93	11.70	13.79	14.21
Country	66.91	56.99	60.37	51.13
Observations	2,349	2,349	2,047	2,047
Destination-Industry-Year:				
Sector-Year	32.94	20.07	31.45	15.49
Country-Year	36.55	35.40	42.66	43.57
Sector-Year	8.93	3.01	7.78	2.72
Country-Year	29.80	33.14	37.45	43.27
Country-Sector	29.32	12.05	23.67	8.39
Observations	9,464	9,464	5,422	5,422
Minimum # of Foreign Investors	5		10	

Note: The unit of observation is at the destination-industry-year level. Industries are grouped into 17 ISIC codes (1-digit). "CR5" stands for the concentration ratio of the top 5 investing firms; "HHI" stands for the Herfindahl-Hirschman concentration index (computed using the "CR" sample).

Table B2: Mechanism at play, exchange rate volatility as proxy for uncertainty

VARIABLES	(1) CR5	(2) CR5	(3) CR5	(4) CR5	(5) CR5	(6) CR5
ExchangeRateVolatility (standardized)	0.614	-0.857	3.827***	3.669***	3.067***	4.255***
	(1.461)	(1.910)	(0.856)	(0.818)	(0.824)	(0.936)
ExchangeRateVolatility × Developing		4.075**				
		(1.979)				
Observations	2,349	2,349	1,489	1,472	1,777	1,170
R-squared	0.830	0.830	0.819	0.824	0.843	0.801
Controls	No	No	Yes	Yes	Yes	Yes
Data Coverage	All countries			Developing		
Minimum # of Foreign Investors			3		1	10

Note: Each observation corresponds to a destination-year, represented as it. "CR5" stands for the concentration ratio of the top 5 investing firms; the minimum number of foreign investors to be included in the sample is indicated in the last row of the table. The $ExchangeRateVolatility$ is calculated from the monthly exchange rate of the local currency against the US dollar, normalized by the whole-period mean and standard deviation. For a given destination-year, it, $ExchangeRateVolatility$ is proxied as the average score in the three years preceding the investment. The analysis includes country fixed effects and (world) region by year fixed effects. Countries are classified into 7 regions based on World Bank classifications.Destination-specific control variables include the logarithms of population and GDP (source: Conte et al. (2022)) and the average exchange rate over the three years preceding the investment (national currency/USD, Penn World Tables, mark 10.1, Feenstra et al. (2015)). Standard errors are clustered at the destination country level. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table B3: Mechanism at play, no restriction on the minimum number of foreign investors

VARIABLES	(1) CR5	(2) CR5	(3) CR5	(4) CR5	(5) HHI	(6) log(# MNEs)	(7) log(K)
Uncertainty (standardized)	0.863**	-0.227	1.329***	1.404***	0.047**	-0.061**	0.010
	(0.389)	(0.579)	(0.445)	(0.439)	(0.022)	(0.025)	(0.032)
Uncertainty × Developing		1.590**					
		(0.648)					
Observations	2,691	2,691	1,831	1,777	1,777	1,777	1,777
R-squared	0.856	0.856	0.840	0.844	0.775	0.905	0.332
Controls	No	No	No	Yes	Yes	Yes	Yes
Data Coverage	All countries				Developing		

Note: Each observation corresponds to a destination-year, represented as *it*. "CR5" stands for the concentration ratio of the top 5 investing firms, with no restriction on the minimum number of foreign investors. "HHI" refers to the Herfindahl-Hirschman concentration index, calculated using the "CR5" sample. "log(# MNEs)" represents the natural logarithm of the number of foreign investors, and "log(K)" denotes the natural logarithm of the average capital expenditure. "Uncertainty" is based on the "T3" variable from the World Uncertainty database (Ahir et al. 2022), which counts words from EIU reports for 143 countries since the 1950s. A higher "T3" value indicates greater uncertainty. Uncertainty in year is approximated as the logarithm of the average word count in EIU reports over the three years preceding the investment. The analysis includes country fixed effects and (world) region by year fixed effects. Countries are classified into 7 regions based on World Bank classifications. Destination-specific control variables include the logarithms of population and GDP (source: Conte et al. (2022)) and the average exchange rate over the three years preceding the investment (national currency/USD, Penn World Tables, mark 10.1, Feenstra et al. (2015)). Standard errors are clustered at the destination country level. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table B4: Mechanism at play, destinations averaging fewer than 10 foreign investors are excluded

VARIABLES	(1) CR5	(2) CR5	(3) CR5	(4) CR5	(5) HHI	(6) log(# MNEs)	(7) log(K)
Uncertainty (standardized)	1.023*	-0.237	1.789***	1.903***	0.075**	-0.092***	-0.015
	(0.518)	(0.624)	(0.630)	(0.608)	(0.029)	(0.031)	(0.033)
Uncertainty × Developing		2.109***					
		(0.735)					
Observations	2,047	2,047	1,187	1,170	1,170	1,170	1,170
R-squared	0.799	0.800	0.796	0.802	0.722	0.894	0.453
Controls	No	No	No	Yes	Yes	Yes	Yes
Data Coverage	All countries				Developing		

Note: Each observation corresponds to a destination-year, represented as *it*. "CR5" denotes the concentration ratio of the top 5 investing firms. Countries averaging fewer than 10 foreign investors are excluded from these calculations. "HHI" refers to the Herfindahl-Hirschman concentration index, calculated using the "CR5" sample. "log(# MNEs)" represents the natural logarithm of the number of foreign investors, and "log(K)" denotes the natural logarithm of the average capital expenditure. "Uncertainty" is based on the "T3" variable from the World Uncertainty database (Ahir et al. 2022), which counts words from EIU reports for 143 countries since the 1950s. A higher "T3" value indicates greater uncertainty. Uncertainty in year is approximated as the logarithm of the average word count in EIU reports over the three years preceding the investment. The analysis includes country fixed effects and (world) region by year fixed effects. Countries are classified into 7 regions based on World Bank classifications. Destination-specific control variables include the logarithms of population and GDP (source: Conte et al. (2022)) and the average exchange rate over the three years preceding the investment (national currency/USD, Penn World Tables, mark 10.1, Feenstra et al. (2015)). Standard errors are clustered at the destination country level. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table B5: Mechanism at play, excluding major source countries of foreign investment

VARIABLES	(1) CR5 (no GBR)	(2) CR5 (no USA)	(3) CR5 (no JPN)	(4) CR5 (no DEU)	(5) CR5 (no FRA)	(6) CR5 (no CHN)
Uncertainty (standardized)	-0.189	-0.683	-0.231	-0.121	-0.191	-0.162
	(0.603)	(0.616)	(0.607)	(0.553)	(0.603)	(0.597)
Uncertainty × Developing	1.626**	2.220***	1.740**	1.641**	1.687**	1.712**
	(0.705)	(0.721)	(0.708)	(0.656)	(0.709)	(0.712)
Observations	2,329	2,273	2,312	2,313	2,295	2,294
R-squared	0.831	0.818	0.828	0.827	0.828	0.832

Notes: The unit of observation is the destination-year level, *it*. "CR5" stands for the concentration ratio of the top 5 investing firms; countries with fewer than 5 foreign investors on average are excluded. "HHI" refers to the Herfindahl-Hirschman concentration index, calculated using the "CR5" sample. "Uncertainty" is based on the "T3" variable from the World Uncertainty database (Ahir et al. 2022). "T3" provides the time series of word counts from the EIU reports for 143 countries, dating back to the 1950s, a higher number means higher uncertainty. Uncertainty for a given year t is proxied as the log of the average number of words in the three years preceding the investment.The analysis includes country fixed effects and (world) region by year fixed effects. Countries are classified into 7 regions based on World Bank classifications. Destination-specific control variables include the logarithms of population and GDP (source: Conte et al. (2022)) and the average exchange rate over the three years preceding the investment (national currency/USD, Penn World Tables, mark 10.1, Feenstra et al. (2015)). Standard errors are clustered at the destination country level. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table B6: Mechanism at play, excluding China and India as destination countries

VARIABLES	(1) CR5	(2) CR5	(3) CR5	(4) CR5	(5) HHI	(6) log(# MNEs)	(7) log(K)
Uncertainty (standardized)	0.891*	-0.316	1.437***	1.507***	0.051**	-0.056**	0.019
	(0.451)	(0.603)	(0.536)	(0.514)	(0.025)	(0.027)	(0.032)
Uncertainty × Developing		1.861***					
		(0.694)					
Observations	2,309	2,309	1,449	1,432	1,432	1,432	1,432
R-squared	0.823	0.824	0.791	0.797	0.691	0.875	0.389
Controls	No	No	No	Yes	Yes	Yes	Yes
Data Coverage	All countries				Developing		

Note: Each observation corresponds to a destination-year, represented as it. "CR5" denotes the concentration ratio of the top 5 investing firms. Countries averaging fewer than 5 foreign investors are excluded from these calculations. "HHI" refers to the Herfindahl-Hirschman concentration index, calculated using the "CR5" sample. "log(# MNEs)" represents the natural logarithm of the number of foreign investors, and "log(K)" denotes the natural logarithm of the average capital expenditure. "Uncertainty" is based on the "T3" variable from the World Uncertainty database (Ahir et al. 2022), which counts words from EIU reports for 143 countries since the 1950s. A higher "T3" value indicates greater uncertainty. Uncertainty in year is approximated as the logarithm of the average word count in EIU reports over the three years preceding the investment. The analysis includes country fixed effects and (world) region by year fixed effects. Countries are classified into 7 regions based on World Bank classifications. Destination-specific control variables include the logarithms of population and GDP (source: Conte et al. (2022)) and the average exchange rate over the three years preceding the investment (national currency/USD, Penn World Tables, mark 10.1, Feenstra et al. (2015)). Standard errors are clustered at the destination country level. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table B7: Mechanism at play, controlling for investor concentration in source countries

VARIABLES	(1) CR5	(2) CR5	(3) CR5	(4) CR5
Uncertainty (standardized)	-0.014	1.521***	1.411***	1.752***
	(0.589)	(0.527)	(0.482)	(0.627)
Uncertainty × Developing	1.420*			
	(0.721)			
Observations	2,199	1,341	1,498	1,110
R-squared	0.823	0.819	0.835	0.797
Data Coverage	All countries		Developing	
Minimum # of Foreign Investors	3		1	10

Note: Each observation corresponds to a destination-year, represented as it. "CR5" denotes the concentration ratio of the top 5 investing firms. Countries averaging fewer than 5 foreign investors are excluded from these calculations. "HHI" refers to the Herfindahl-Hirschman concentration index, calculated using the "CR5" sample. "log(# MNEs)" represents the natural logarithm of the number of foreign investors, and "log(K)" denotes the natural logarithm of the average capital expenditure. "Uncertainty" is based on the "T3" variable from the World Uncertainty database (Ahir et al. 2022), which counts words from EIU reports for 143 countries since the 1950s. A higher "T3" value indicates greater uncertainty. Uncertainty in year is approximated as the logarithm of the average word count in EIU reports over the three years preceding the investment. The analysis includes country fixed effects and (world) region by year fixed effects. Countries are classified into 7 regions based on World Bank classifications. DDestination-specific control variables include logarithms of population, GDP, the average exchange rate and a measure of concentration in the top 5 FDI sources (i.e., United States, Japan, Germany, United Kingdom, and France, weighted by their respective 2003 destination shares). Standard errors are clustered at the destination country. Standard errors are clustered at the destination country level. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table B8: FDI concentration dynamics on Mergers and Acquisitions

VARIABLES	(1) CR5	(2) CR5	(3) CR5	(4) CR5	(5) CR5
Trend × Developing	0.007***	0.119**	0.168	0.190	0.266**
	(0.002)	(0.054)	(0.104)	(0.122)	(0.119)
Observations	1,542	1,542	1,542	1,542	1,311
R-squared	0.148	0.772	0.786	0.800	0.810
FEs	No	Country	Country, Year	Country, Region-Year	Country, Region-Year
Period			2003-2022		2003-2019

Note: Each observation corresponds to a destination-year, represented as *it*. "CR5" refers to the concentration ratio of the top 5 investing firms. The indicator variable, *Developing*, is assigned the value 1 for countries classified as Low, Lower-Middle, or Upper-Middle income, as per the 2003 World Bank classification. Standard errors are clustered at the destination country level. Statistical significance denoted by; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table B9: Mechanism at play, the role of uncertainty on Mergers and Acquisitions

VARIABLES	(1) CR5	(2) CR5	(3) CR5	(4) CR5	(5) HHI
Uncertainty (standardized)	-0.379	-1.381	-1.442	-1.327	-0.048
	(0.508)	(0.965)	(0.960)	(0.888)	(0.040)
Uncertainty × Developing		1.715	1.784*	1.997*	0.103**
		(1.051)	(1.048)	(1.029)	(0.049)
Observations	1,370	1,370	1,352	1,149	1,149
R-squared	0.794	0.795	0.793	0.802	0.695
Controls	No	No s	Yes	Yes	Yes
Period	2003-2022	2003-2022	2003-2022	2003-2019	2003-2019

Notes: The unit of observation is the destination-year level, *it*. 'CR5" stands for the concentration ratio of the top 5 investing firms; countries with fewer than 5 foreign investors on average are excluded. "HHI" refers to the Herfindahl-Hirschman concentration index, calculated using the "CR5" sample. "Uncertainty" is based on the "T3" variable from the World Uncertainty database (Ahir et al. 2022), which counts words from EIU reports for 143 countries since the 1950s. A higher "T3" value indicates greater uncertainty. Uncertainty in year is approximated as the logarithm of the average word count in EIU reports over the three years preceding the investment. The $ExchangeRateVolatility$ is calculated from the monthly exchange rate of the local currency against the US dollar, normalized by the whole-period mean and standard deviation. For a given destination-year, *it*, $ExchangeRateVolatility$ is proxied as the average score in the three years preceding the investment. All specifications include world-region by time fixed effects, and countries are grouped into 7 regions based on World Bank classifications; country fixed effects. Destination-specific control variables include the logarithms of population and GDP (source: Conte et al. (2022)) and the average exchange rate over the three years preceding the investment (national currency/USD, Penn World Tables, mark 10.1, Feenstra et al. (2015)). Standard errors are clustered at the destination country level. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table B10: Mechanism at play, destination-by-sector, controlling for industry specific trend

VARIABLES	(1) CR5	(2) CR5	(3) CR5	(4) CR5	(5) HHI	(6) log(# MNEs)	(7) log(K)
Uncertainty (standardized)	0.005	-0.007	0.018***	0.018***	0.103***	-0.134***	-0.049*
	(0.003)	(0.004)	(0.005)	(0.005)	(0.021)	(0.024)	(0.029)
Uncertainty × Developing		0.025***					
		(0.006)					
Observations	9,132	9,132	3,935	3,922	3,922	3,922	3,922
R-squared	0.745	0.746	0.713	0.713	0.657	0.803	0.689
Controls	No	No	No	Yes	Yes	Yes	Yes
Data Coverage	All countries				Developing		

Note: Each observation corresponds to a destination-industry-year, represented as *ist*. "CR5" denotes the concentration ratio of the top 5 investing firms. Country-industries averaging fewer than 5 foreign investors are excluded from these calculations. "HHI" refers to the Herfindahl-Hirschman concentration index, calculated using the "CR5" sample. "log(# MNEs)" represents the natural logarithm of the number of foreign investors, and "log(K)" denotes the natural logarithm of the average capital expenditure. "Uncertainty" is based on the "T3" variable from the World Uncertainty database (Ahir et al. 2022), which counts words from EIU reports for 143 countries since the 1950s. A higher "T3" value indicates greater uncertainty. Uncertainty in year is approximated as the logarithm of the average word count in EIU reports over the three years preceding the investment. The analysis includes country fixed effects and (world) region by year fixed effects. Countries are classified into 7 regions based on World Bank classifications. Destination-specific control variables include the logarithms of population and GDP (source: Conte et al. (2022)) and the average exchange rate over the three years preceding the investment (national currency/USD, Penn World Tables, mark 10.1, Feenstra et al. (2015)). Standard errors are clustered at the destination country level. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.