

Making ownership more visible: A discovery framework for ultimate investor economy statistics

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The views expressed in this presentation are those of the authors and not necessarily those of Bank Negara Malaysia.



Presentation Outline

- 1 Introduction
- 2 Literature review and research gap
- 3 Data sources and framework
- 4 Results and interpretations
- 5 Challenges and limitations
- 6 Conclusion

Introduction



Research Problems

- + Direct investment statistics by **immediate counterpart economy** may not reflect the ultimate owner or destination of funds.
- + **Complex multinational structures** obscure true investment relationships.
- + **Limited availability** of UIE and UHE data beyond the first counterparty.



Motivation

- ✓ Nearly 40% of global FDI is estimated to be **phantom investment** routed through intermediary entities.¹
- ✓ Around **45% of FDI stock originates** from a small number of financial centres/conduit jurisdictions.²
- ✓ **BPM7 recommended** supplementary compilation of UIE and UHE statistics to better understand underlying economic linkages.



Objective

- 1 To develop an **alternative framework using GLEIF** parent-relationship data to identify UIE.
- 2 To apply machine learning techniques (name matching, address clustering, jurisdiction-based inference) to **bridge ownership data gaps within GLEIF**.
- 3 To **evaluate** the framework against survey-based statistics and assess its potential as a discovery and validation tool.

Source:

1. Damgaard, J., Elkjaer, T., & Johannesen, N. (2019). The rise of phantom investments. Finance & Development, 56(3), 11-13. International Monetary Fund.
2. Author's calculations based on BIS offshore centre country classifications and Malaysia's exposure data as at end Dec 2025.

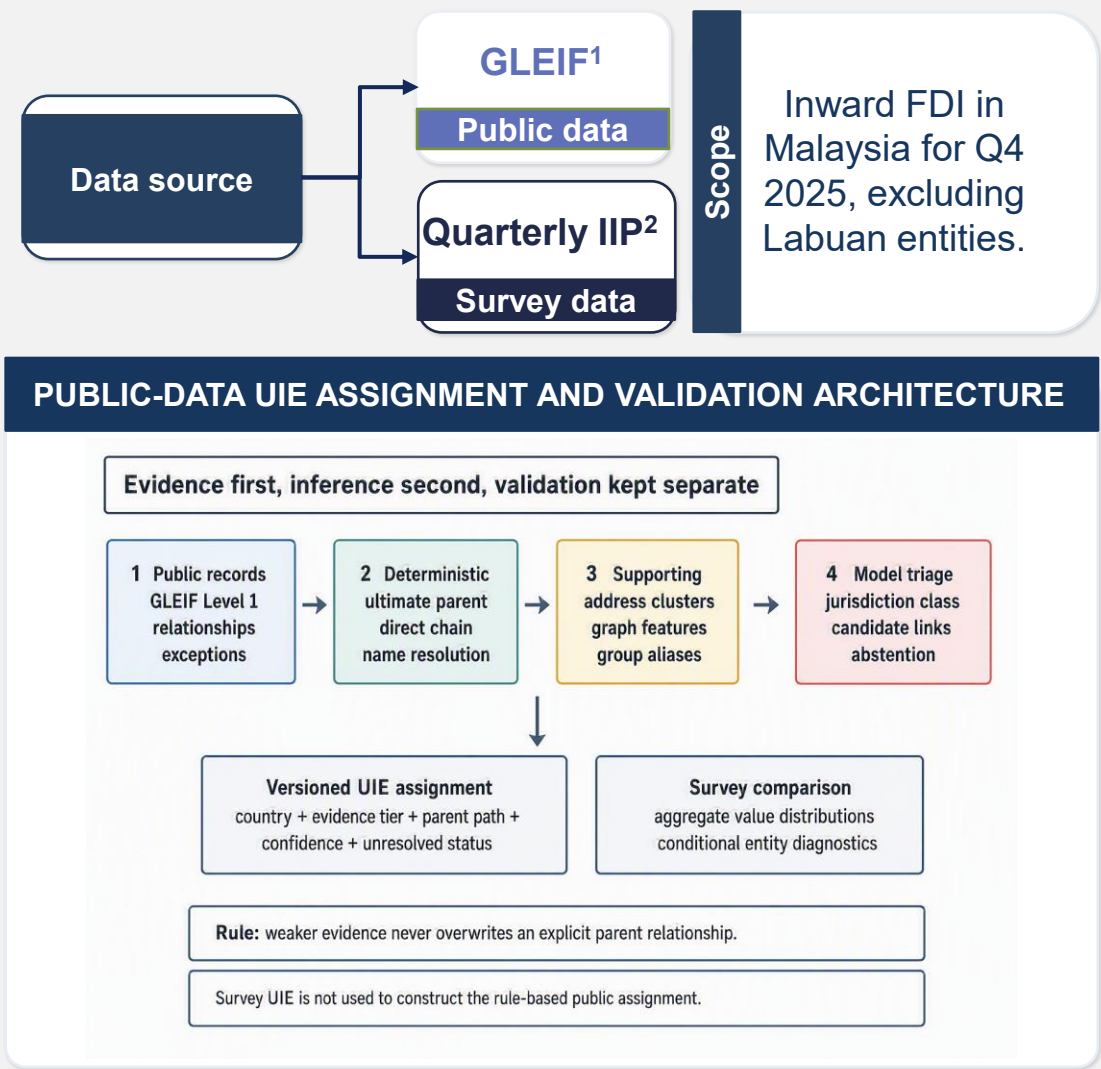


Literature Review & Research Gap

While existing studies increasingly combine traditional and alternative data sources to identify ultimate ownership, this study fills a key gap by leveraging GLEIF parent-relationship data and machine learning to identify and validate ultimate investors at the entity level.

Study	Method
Casella (2019)	Introduces a <u>probabilistic framework</u> (Markov-chain reallocations) to determine the distribution of ultimate investors in bilateral FDI stock as substitute when the direct ownership information is unavailable.
Accoto et al. (2022)	Extended further by <u>demonstrating network-based techniques</u> to identify UHEs using bilateral FDI data from the IMF Coordinated Direct Investment Survey (CDIS).
Wijayawardhana & Perez (2025)	Demonstrated <u>a hybrid UIE framework</u> that integrates survey data, AI-based ownership tracing, and probabilistic allocation to uncover ultimate investors.

Data Sources and Framework



METHODOLOGY

Parent-chain traversal

Assign UIE via verified parent chain, meanwhile unlinked entities flagged for review.

Name resolution

Link company names to verified entities and ownership is determined separately through validated parent relationships.

Address clustering

Address clustering suggests a likely parent economy from shared locations but remains a lower-confidence signal requiring review.

Ownership and graph learning

It verifies known parent relationships and provides network features for UIE classification.

Jurisdiction classifier

A multiclass classifier ranks UIE economies for unresolved entities using entity, graph, and exception features based on models.

Survey-variant stacker

An ensemble model combines multiple rule-based methods to rank likely UIE economies for diagnostics.

Leakage controls

Survey UIE data is excluded from matching and training; validation uses held-out predictions, with future evaluations requiring group-based and time-based testing to prevent leakage.

Note:

1. Global Legal Entity Identifier Foundation (GLEIF) parent-relationship data that was obtained through the GLEIF API (<https://api.gleif.org/docs>)

2. Malaysia's International Investment Position (IIP) survey is a jointly compiled by Bank Negara Malaysia and Department of Statistics Malaysia (DOSM)

Results and interpretations (1/3)

Diagnostics GLEIF Outputs for ASEAN Inward FDI

GLEIF Output

- The ASEAN subset of the GLIEF data contains 16,673 foreign inward assignment rows.
- 13.3% of ASEAN inward FDI assignments were supported by verified evidence, while the majority relied on inference, with 64.2% classified as model-only.

Summary of assignment results		
Measure	Count	Share
Reported ultimate-parent evidence	2,210	13.3%
Direct-parent proxy	77	0.5%
Name inference	248	1.5%
Address inference	3,435	20.6%
Model-only country prediction	10,703	64.2%
Total foreign inward assignments	16,673	100.0%

ASEAN Inward FDI

- Singapore dominates the absolute number of foreign inward rows, with 9,969.
- This reflects greater coverage of foreign-owned entities in the GLEIF database, not necessarily higher investment levels.
- Vietnam shows the highest parent-entity coverage in GLEIF, making it a promising indicator for direct investment estimation.

Summary of assignment results by economies				
Host	Summary of assignment results by economies	GLEIF parent-supported	Model-only Name/address inferred	Model-only prediction
Singapore	9,969	1,159 (11.63%)	3,496 (35.07%)	5,314 (53.30%)
Thailand	2,281	272 (11.92%)	27 (1.18%)	1,982 (86.90%)
Malaysia	1,877	300 (15.98%)	129 (6.87%)	1,448 (77.15%)
Indonesia	1,402	259 (18.47%)	19 (1.36%)	1,124 (80.17%)
Philippines	694	159 (22.91%)	5 (0.72%)	530 76.37%)
Viet Nam	345	120 (34.78%)	4 (1.16%)	221 (64.06%)
Brunei Darussalam	42	7 (16.67%)	3 (7.14%)	32 (76.19%)
Cambodia	36	9 (25.00%)	0 (0.00%)	27 (75.00%)
Lao PDR	21	1 (4.76%)	0 (0.00%)	20 (95.24%)
Myanmar	6	1 (16.67%)	0 (0.00%)	5 (83.33%)
Timor-Leste	0	0 (n/a)	0 (n/a)	0 (n/a)
ASEAN total	16,673	2,287 (13.72%)	3,683 (22.09%)	10,703 (64.19%)

Source: GLEIF output data.



Results and interpretations (2/3)

GLEIF analysis: Case for Malaysia

- Analysis covers 1,877 foreign assignments identified through GLEIF, including 316 high-confidence assignments.
- The United States remained the largest assigned economy; Singapore's share declined (19.7% → 8.9%), while the United Kingdom's share increased (14.1% → 20.3%).
- The United States remained the largest source of inward FDI, accounting for 29% under the full methodology and 24% among high-confidence assignments.

Assigned UIE by economies for Malaysia

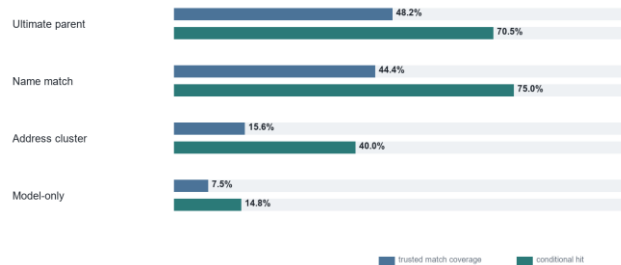
Economy	Public full count share	Public high-confidence count share
United States	29.09%	24.05%
Singapore	19.71%	8.86%
Japan	below top 10	3.80%
Hong Kong SAR	below top 10	below top 10
China	below top 10	below top 10
United Kingdom	14.12%	20.25%
Netherlands	below top 10	2.22%
Switzerland	1.12%	4.43%
Germany	17.21%	14.24%
United Kingdom	14.12%	20.25%

Note:



High-confidence UIE assignments provide stronger evidence but may not reflect the true investor distribution.

Malaysia inward: evidence strength separates signal from coverage



Conditional rates exclude UNK, ZZ and blank survey benchmarks.

Source: GLEIF output and author's own calculations derived from Malaysia's IIP survey data, with FDI stock positions excluding Labuan entities.

Conditional evidence-tier diagnostics

- Verified ownership links provide the most reliable UIE assignments; address- and model-based methods mainly help expand coverage.
- GLEIF parent entities were identified for 400 survey entities, with 70.5% of correct over scorable.

Public GLIEF inward assignment from methodology compared to inward survey UIE

Direction and tier	Tier rows	Safely linked	Scorable	Correct	Trusted match coverage	Conditional hit rate
	All public assignment rows in that evidence tier	Rows confidently linked to a validation entity	Safely linked rows with an available exact survey UIE country	Scorable rows where public and survey UIE countries agree	Safely linked ÷ tier rows	Correct ÷ scorable
Inward: reported ultimate parent	400	193	193	136	48.2%	70.5%

Evaluation

- 284 of 3,567 counterparties reported in the quarterly survey were successfully matched to GLEIF records.
- The matching process achieved a 69.0% accuracy rate for scoreable cases.

Survey GLIEF inward assignment from methodology compared to actual inward survey UIE

Flow	Rows	Counterparty match coverage	Reported ultimate UIE coverage	Scorable assigned	Correct	Conditional hit rate
Inward	3,567	26.10%	7.96%	284	196	69.01%

Key message:



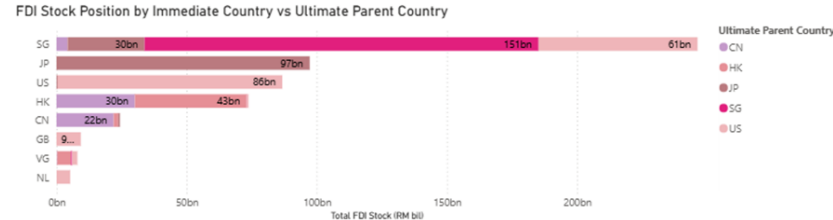
Despite the low number of survey entities identified in GLEIF, the entities that were matched demonstrated an accuracy rate of 69.0%.

Results and interpretations (3/3)

Comparison of Ultimate Investor Economy Estimates: IIP survey and GLEIF-based Approaches

Malaysia's Foreign Direct Investment Profile

- Around 25.6% of Malaysia's inward FDI was reallocated from the immediate investor economy to a different ultimate investor economy, highlighting the significant role of pass-through investment structures.
- The results show that economies such as Singapore and Hong Kong often act as intermediary jurisdictions, while the United States, Japan, and China emerge as larger ultimate investors, with GLEIF-based estimates broadly aligning with survey findings.



Host Country Distribution of Foreign Direct Investment by Immediate and Ultimate Investment Economies

Immediate Investment economy	Immediate Investment economy (IIE), RM bil	Ultimate Investment Economy (UIE), -survey RM bil	Ultimate Investment Economy (UIE), -GLEIF RM bil	Percentage of changes of UIE and IIE- survey data, %	Percentage of changes of UIE and IIE GLEIF estimated, %
Singapore	270	152	163	44%	40%
Japan	99	128	129	-30%	-31%
United States	93	171	176	-83%	-89%
Hong Kong SAR	93	51	61	45%	34%
Switzerland	38	37	33	3%	15%
United Kingdom	31	34	34	-10%	-8%
Netherland	23	35	27	-56%	-21%
British Virgin Islands	28	14	14	50%	49%
South Korea	26	25	25	6%	6%
China	26	57	40	-120%	-55%

Key message:

- Survey data **understates CN** as the UIE and **overstates SG and VG** relative to GLEIF estimates.
- Comparison **reflects GLEIF matching performance** against survey responses and does not represent the actual investor economy distribution.

Source: GLEIF output and author's own calculations derived from Malaysia's IIP survey data, with FDI stock positions excluding Labuan entities.

Challenges and Limitation

The application of the GLEIF database presents several challenges, primarily arising from (i) model calibration, (ii) conceptual and coverage constraints, (iii) the intricacies of multinational ownership arrangements, and (iv) micro-level validation and data reconciliation.



Model calibration

- Approximately 74% of enterprises could not be matched with sufficient confidence using automated linkage procedures.



Concept and coverage

- GLEIF data helps identify UIEs but may miss ultimate controllers and non-LEI entities.



Intricacies of multinational ownership arrangements

- Complex ownership structures can obscure the true UIE and require additional validation.



Micro-level validation & data reconciliation

- Automated mapping scales well, but discrepancies require manual review.

Conclusion



Key Findings

- + This study shows a **potential for survey augmentation**, pass-through investment and data quality assurance.
- + GLEIF data **complements survey-based UIE statistics** and supports scalable FDI ownership analysis instead of a replacement.



Way forward

- 1 **Improve coverage and methodology by expanding** ownership data sources beyond GLEIF and support the adoption of BPM7 statistics by UIE.
- 2 **Enhance operational scalability** through robust validation frameworks, automation improvements.
- 3 **Expansion of the methodology** to identify UHE for Malaysia's direct investment abroad.

Thank you!

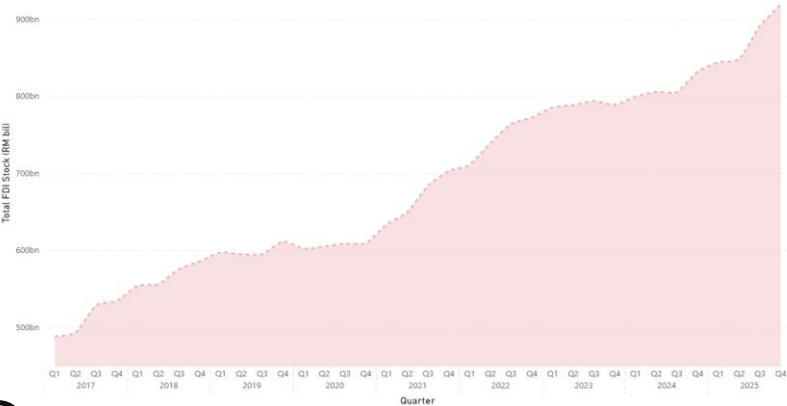
azmina.nawawi@bnm.gov.my
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Appendix 1: Why This Study Matters?

Significant growth in FDI and changing source economies reinforce the importance of ultimate ownership attribution.

Malaysia's Total Foreign Direct Investment Stock Position, 2017–2025



Malaysia's Foreign Direct Investment Profile

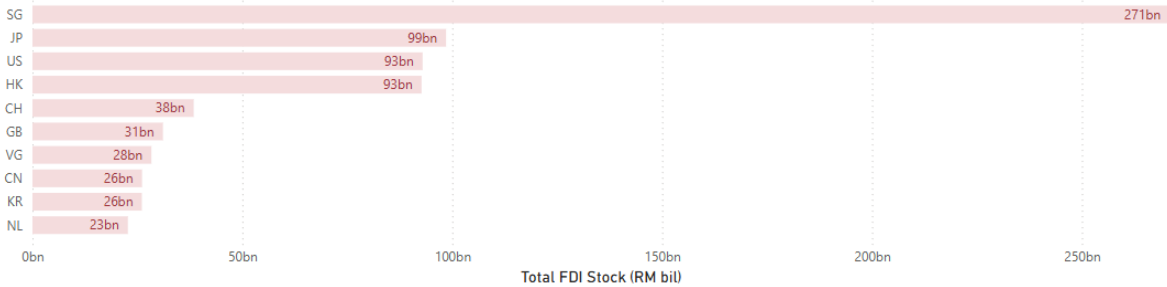
Malaysia's inward FDI stock **nearly doubled from RM488 billion in 2017 to RM902.9 billion in 2025**, reinforcing the importance of identifying ultimate ownership to better understand the true source of foreign investment

Additional note:

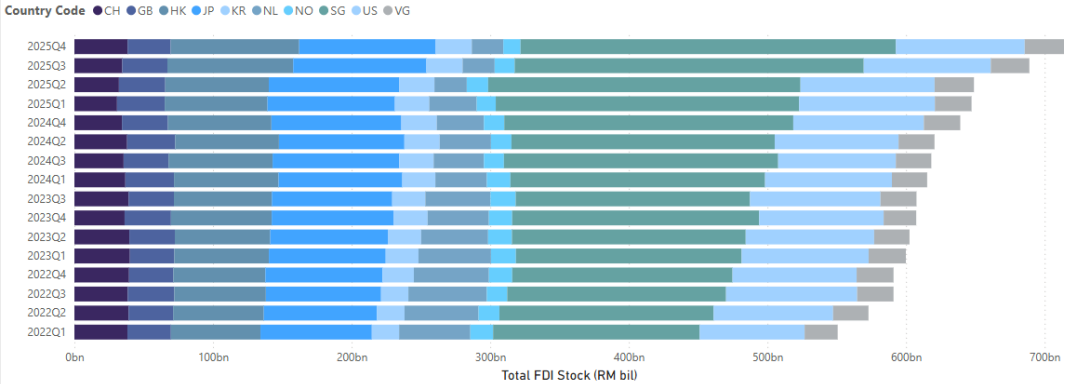
Top Global UIE Economies of Foreign Inward Entities Hosted in ASEAN					
Rank	UIE economy	Foreign UIE rows	GLEIF parent-supported	Name/ address inferred	Model-only prediction
1	United States	3,017	498	471	2,048
2	Germany	1,976	258	60	1,658
3	United Kingdom	1,864	235	343	1,286
4	Cayman Islands	1,211	91	527	593
5	India	1,022	134	377	511

Source: GLEIF Output data

Top 10 FDI Position by Counterparty Country



Top 10 FDI Position by Counterparty Country



FDI position by Counterparty Country

Singapore remained Malaysia's **largest foreign investor from 2017–2025**, while Hong Kong's share increased and the Netherlands' share moderated, reflecting shifts in the composition of inward FDI.

Source: GLEIF output and author's own calculations derived from Malaysia's IIP survey data, with FDI stock positions excluding Labuan entities.





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Towards accurate UHE statistics

Methods and applications for Italian outward FDI

*13th biennial IFC Conference · Session 6 – Tracking globalization
Basel, 21 August 2026*

*Riccardo de Rosa, Michele Nesci
Banca d'Italia
Statistical Analysis Directorate*

Why by Ultimate Host Economy (UHE)?

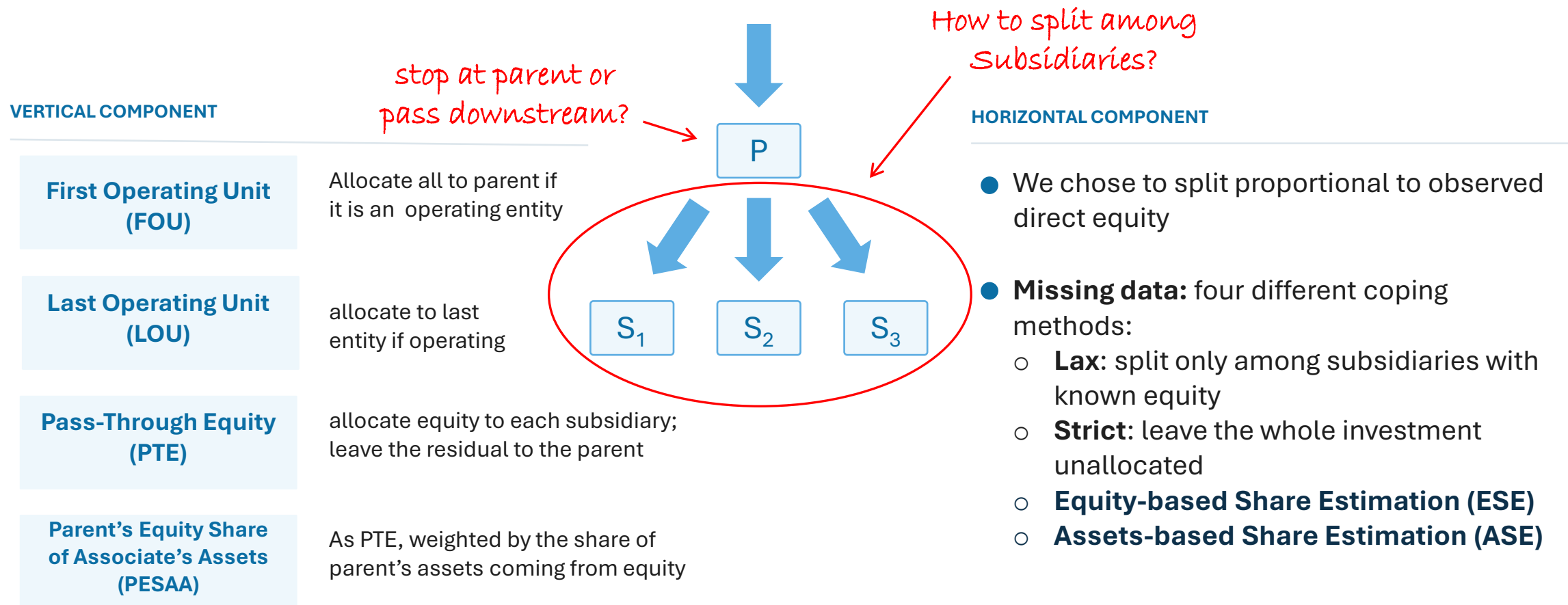
- Foreign Direct Investments (FDI) have an impact on the real economy in which they are invested
- The impact on transit economies is minimal, and they are common in the complex structures of multinational entities
- Official statistics on FDI by immediate counterpart may not represent accurately the economy where the investment is impacting the real economy

Scope of the experiment

- Focus on 2022 Italian FDI outward equity component
- Use of methods that follow the investment along the ownership chain
- Comparison of the results of several method variations and proposal of some of our own
- Evaluation of data limits and identification of data needs

Following the equity: two components to every method

At each iterative step we have a parent entity and potentially several subsidiaries



Dealing with missing information

We only make allocations that are supported by observed data

New horizontal methods:
Equity-based Share Estimation (ESE)
Assets-based Share Estimation (ASE)

- Subsidiary equity estimation borrowed from PTE and PESAA methods
- Any residual investment is left unallocated

Modified “operational” definition:
FOU*, LOU*

Some holding entities are registered with MNE activity code and do not meet all SPE criteria
⇒ Identified as “operating” by the commonly applied criteria

Additional requirement on the number of employees ($n > 5$), borrowed from the SPE identification criteria

Integrated microdata: ownership chains plus financial positions

No single source contains all inputs needed for UHE allocation

THREE DATA SOURCES

- **EuroGroup Register (EGR)**
- **Orbis** commercial database
- **Direct Reporting (DR)** Banca d'Italia survey

MAIN LIMITATIONS

- **Scope:** EGR records controlled foreign affiliates only; associates are outside EGR scope
- **Financial data:** gaps are material for the United States, Switzerland and other countries
- **Hard to join:** the sources lack a shared identifier. Several entities had to be identified manually

Information required for vertical and horizontal methods	FOU, LOU	FOU*, LOU*	PTE, <i>strict, lax, ESE</i>	PESAA, ASE	source
Ownership chain	✓	✓	✓	✓	EGR
Ownership percentage			✓	✓	Orbis, DR
Operativity (SPE, Activity)	✓	✓			EGR
Employees		✓			EGR
Shareholder funds (equity)			✓	✓	Orbis, DR
Total assets				✓	Orbis, DR

REFERENCE POPULATION FOR 2022 OUTWARD FDI EQUITY

€358bn

identified, matched and quantified

€564bn

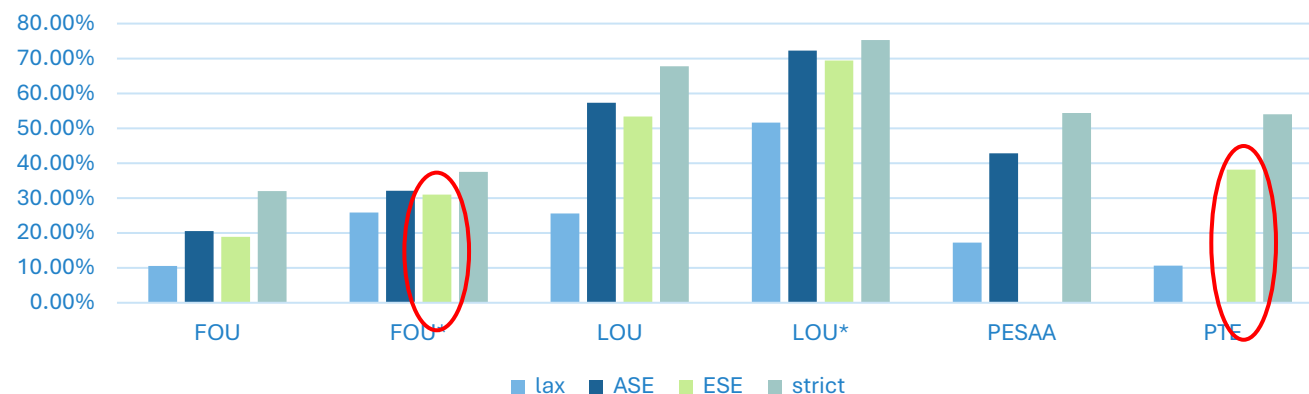
official outward equity positions

From 22 specifications to 2 working candidates

Selection balances allocation coverage, reduction of financial hubs and data requirements

		horizontal			
		strict	ASE	ESE	lax
vertical	FOU	×	×	×	×
	FOU*	×	×	✓	×
	LOU	×	×	×	×
	LOU*	×	×	×	×
	PTE	×		✓	×
	PESAA	×	×		×

UNALLOCATED EQUITY SHARE BY HORIZONTAL AND VERTICAL METHOD



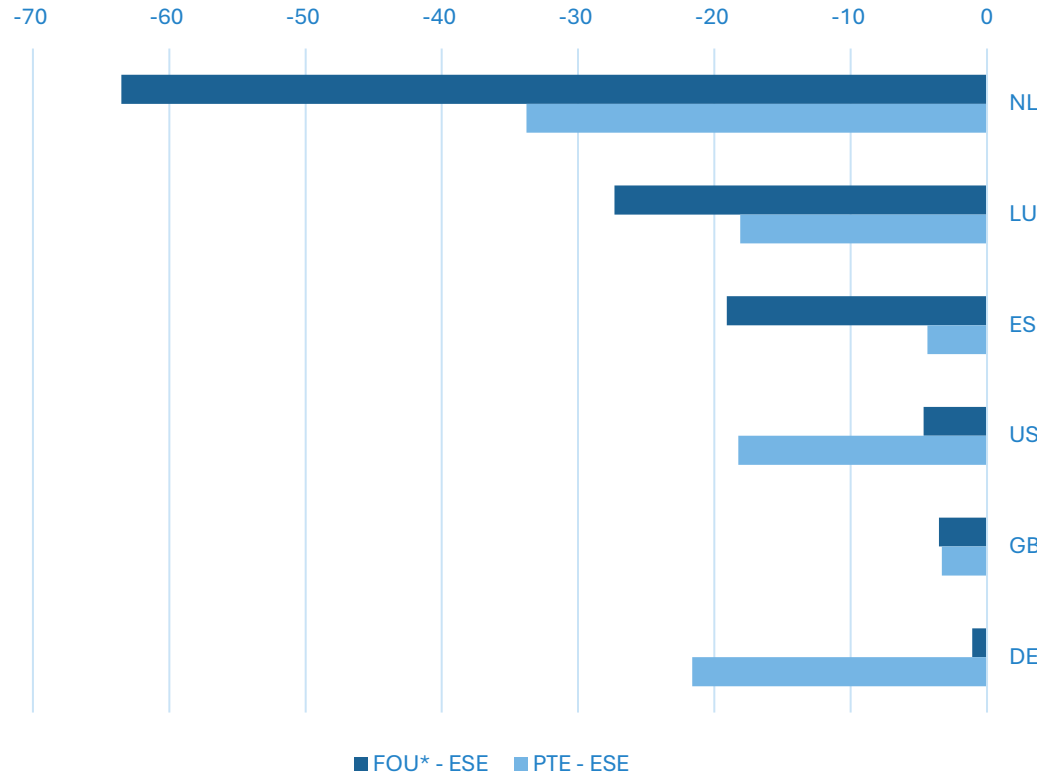
WHY THESE TWO?

- We did not pair **PTE-ASE** and **PESAA-ESE** for methodological coherence
- **LOU** and **LOU*** have too high unallocated shares with any horizontal method
- **Strict** leaves more equity unallocated than ESE or ASE because any missing subsidiary information prevents any allocation
- **Lax** overvalues subsidiaries with observed data, making those allocations less reliable
- **ASE** produces allocations similar to ESE with both FOU and FOU* but also needs assets data
- Analysis of **FOU-ESE** and **FOU*-ESE** allocations finds that the former is deeming operational dubious entities, mostly in NL
- **PESAA-ASE** produces allocations similar to PTE-ESE but also needs assets data

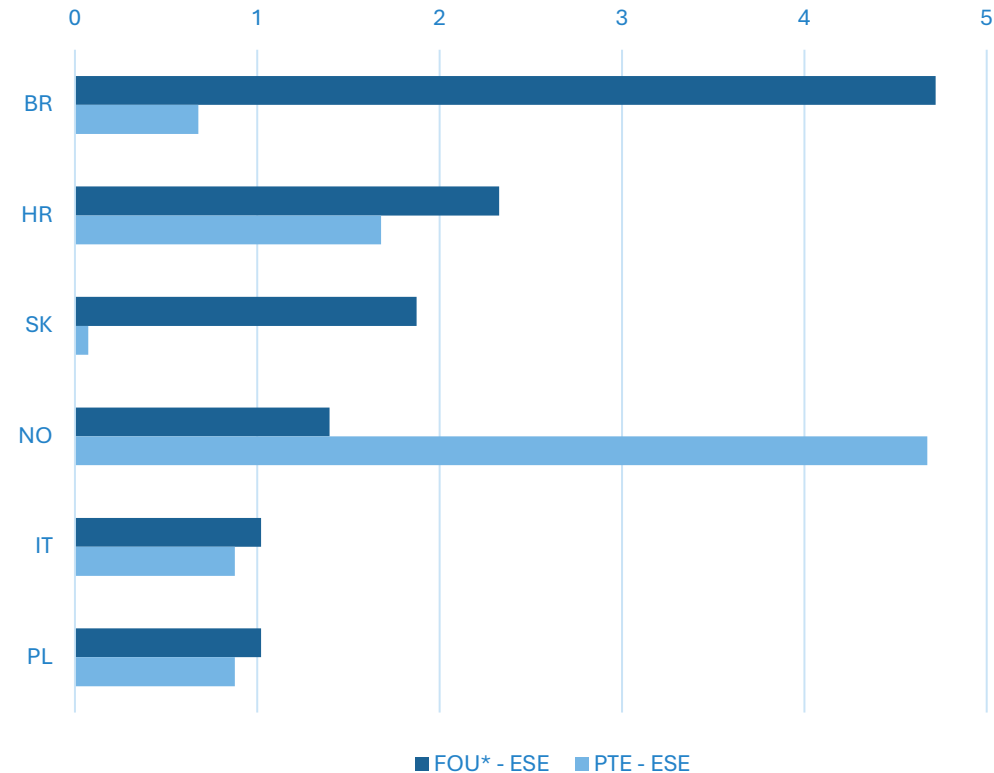
Reallocations: away from hubs, toward identified UHEs

EUR billions; baseline is the allocation by immediate counterpart

Selected large reallocations away



Selected increases/identified UHEs



Key reading

Different scales: much of the equity removed from immediate-counterpart economies cannot be assigned to a known UHE

Conclusions

Method choices

- FOU*-ESE better for incomplete chains
- PTE-ESE traces farther through groups and allocates across multiple levels
- PESAA and ASE didn't impact the results with these data

Data gaps

- Influence FDI (10%-50%) get more relevant downstream than they are for Italian FDI by immediate counterpart; they are out of scope for EGR
- Financial data coverage is not sufficient for some regions

UHE Reallocations

- The examined methods manage to identify investments that can be reallocated
- The positions of the main financial hub economies for Italian outward investments are reduced considerably; destinations of the reallocations include Brazil and Norway
- Only for some of these investments the reallocation economy could be determined

Keep the unallocated component visible

it makes uncertainty explicit and avoids a misleading impression of precision

Future work

Refine the methods

- Explore hybrid approaches combining operating-entity criteria with financial-structure methods
- Introduce more flexible procedures capable of bypassing intermediate entities with missing information
- Analyze alternative apportionment variables, including employment

Expand data coverage

- Improve coverage, in particular on
 - non-European entities
 - associates (10%-50% share)
- Automated linkage of data sources

Thank you!

*Towards accurate UHE
Methods and applications for Italian outward FDI*

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NARODOWY
BANK POLSKI

Determinants of FDI in Central and Eastern Europe Amid Crises

Łukasz Jach, Aleksandra Hałka

August 2026



Agenda

1. FDI in CEE economies
2. Research motivation
3. Data
4. Methodology
5. Main results
6. Conclusions

FDI in CEE economies

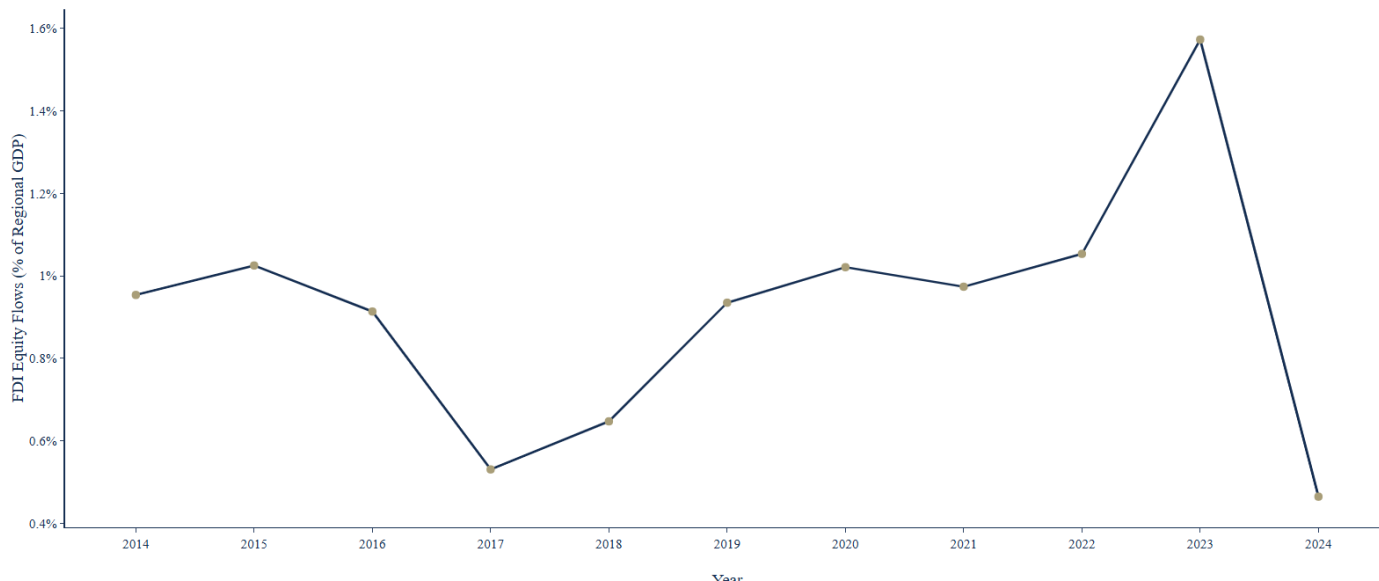
CEE remains highly dependent on foreign capital for investment, technology transfer and GVC integration

Exposure to two major shocks:

- COVID-19
- the war in Ukraine

Investment potential amid macroeconomic and geopolitical uncertainty

FDI Equity Flows in CEE as a Share of Regional GDP



Why revisit FDI determinants now?

- Two major shocks in a short period: the COVID-19 pandemic and Russia's invasion of Ukraine
- Heightened uncertainty, energy-market disruptions and rising production costs
- Direct exposure of CEE economies due to geographical proximity and strong economic linkages
- Continued dependence on foreign capital, technology transfer and global value chains
- Unclear whether traditional FDI determinants remain valid under crisis conditions

Do macroeconomic conditions and institutional quality continue to shape inward equity FDI flow in CEE amid major global shocks?

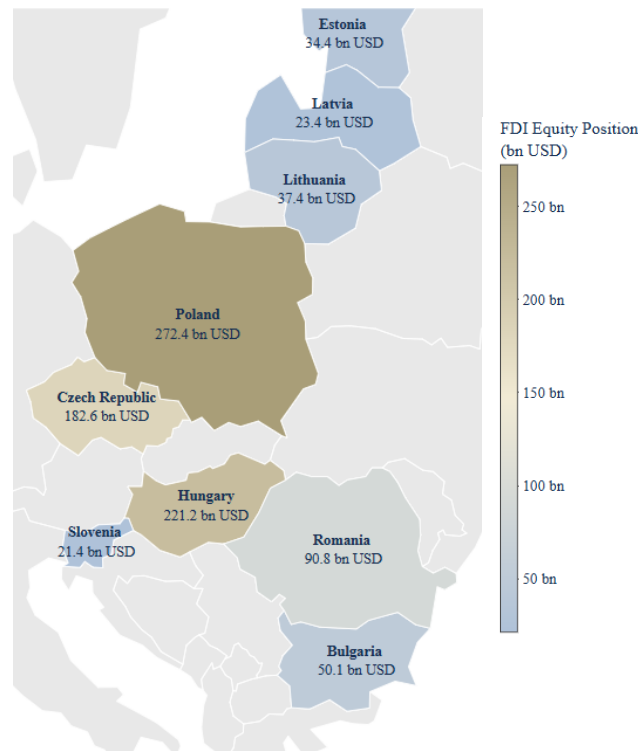
Data

• Four groups of determinants

- Existing foreign investment base
- Market size
- Macroeconomic conditions
- Institutional and regulatory characteristics

• Sources

- OECD and World Bank
- Fraser Institute
- Heritage Foundation



FDI Equity Positions in 2024

Variables

Variables description

Variable	Definition	Economic interpretation
FDI	Inward equity FDI flows relative to GDP	Intensity of new foreign equity investment
FDI Position	Total inward FDI position relative to GDP, lagged by two years; logarithm	Existing foreign-investment base and earlier investor presence
GDP	Nominal GDP; logarithm	Market size
Population	Total population; logarithm	Alternative measure of market size
Inflation	Annual consumer-price inflation	Macroeconomic stability
Protection	Institutional indicator	Security of foreign-owned assets
Financial Openness	Institutional indicator	Degree of access to financial markets and international capital
Trade Freedom	Institutional indicator	Openness of the trade and regulatory environment
Market entry and competition	Institutional indicator	Market-entry conditions and competitive environment
Top marginal income and payroll tax rate	Tax-system indicator	Institutional characteristics of the tax environment
ULC	Annual unit labour cost indicator; logarithm	Labour-cost competitiveness
Year effects	Annual dummy variables	Common time-specific shocks

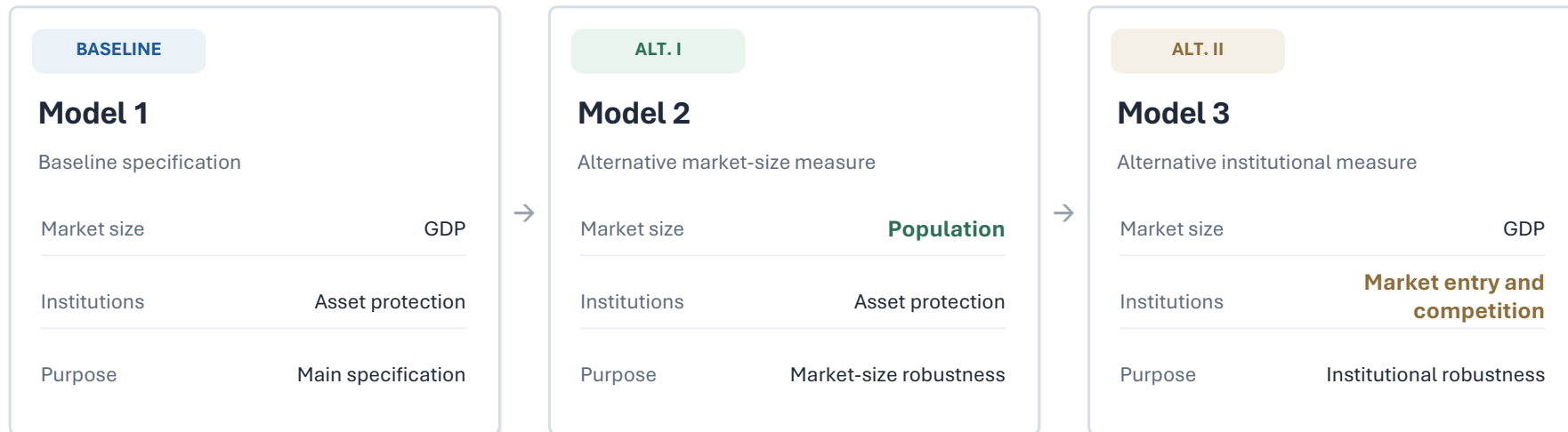
Methodology

- Model specification
 - pooled OLS
 - year effects
 - country-clustered HC1 standard errors
 - two-year lag of inward FDI position

$$\begin{aligned} FDI_{it}^E = & \alpha + \beta_1 \ln(FDI\ Position_{i,t-2}) + \beta_2 \ln(GDP_{it}) + \beta_3 Inflation_{it} + \beta_4 Protection_{it} \\ & + \beta_5 Tax_{it} + \beta_6 Financial\ Openness_{it} + \beta_7 Trade\ Freedom_{it} + \beta_8 \ln(ULC_{it}) \\ & + \lambda_t + \varepsilon_{it}, \end{aligned}$$

Model specifications

Three specifications test whether the main findings depend on how market size and institutional conditions are measured.



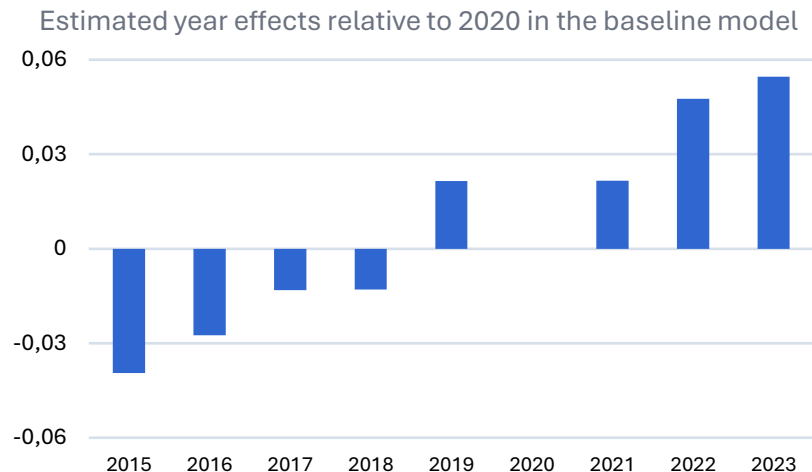
Robustness check

Key coefficient signs remain unchanged across specifications for lagged FDI position, inflation, unit labour costs and financial openness.

Main relationships are not driven by a single definition of market size or institutional quality.

Results

Determinant	Sign	Interpretation
Protection of foreign assets	+	Security and legal predictability
Financial openness	+	Easier access to international capital
Market entry and competition	+	Lower regulatory and entry barriers
Inflation	–	Macroeconomic instability
Unit labour costs	–	Weaker cost competitiveness
Lagged FDI position	–	Convergence, saturation or transaction timing



Interpretation: equity FDI may be relatively long-term and less reactive to short-run shocks than other capital flows

Conclusions

- **Institutional quality matters**
 - Greater financial openness
 - Stronger protection of foreign-owned assets
 - More favourable conditions for market entry and competition
- **Stability and competitiveness matter**
 - Inflation
 - Unit labour costs
- **FDI appears relatively resilient to global shocks**
 - No evidence of a persistent common decline following the pandemic and the outbreak of war in Ukraine
 - Continued importance of quality of institutions as well as macroeconomic stability and cost competitiveness
 - Possible reflection of the long-term nature of FDI decisions



Thank you!

13th IFC Biennial Conference
“Filling information gaps in central banking: effectively leveraging data and innovative tools”

Bank for International Settlements

Basel, 20-21 August 2026

An Analysis of the Relationship between Captive Financial Institutions and External Lenders

Gabriele di Filippo

Department of Statistics

Banque Centrale du Luxembourg

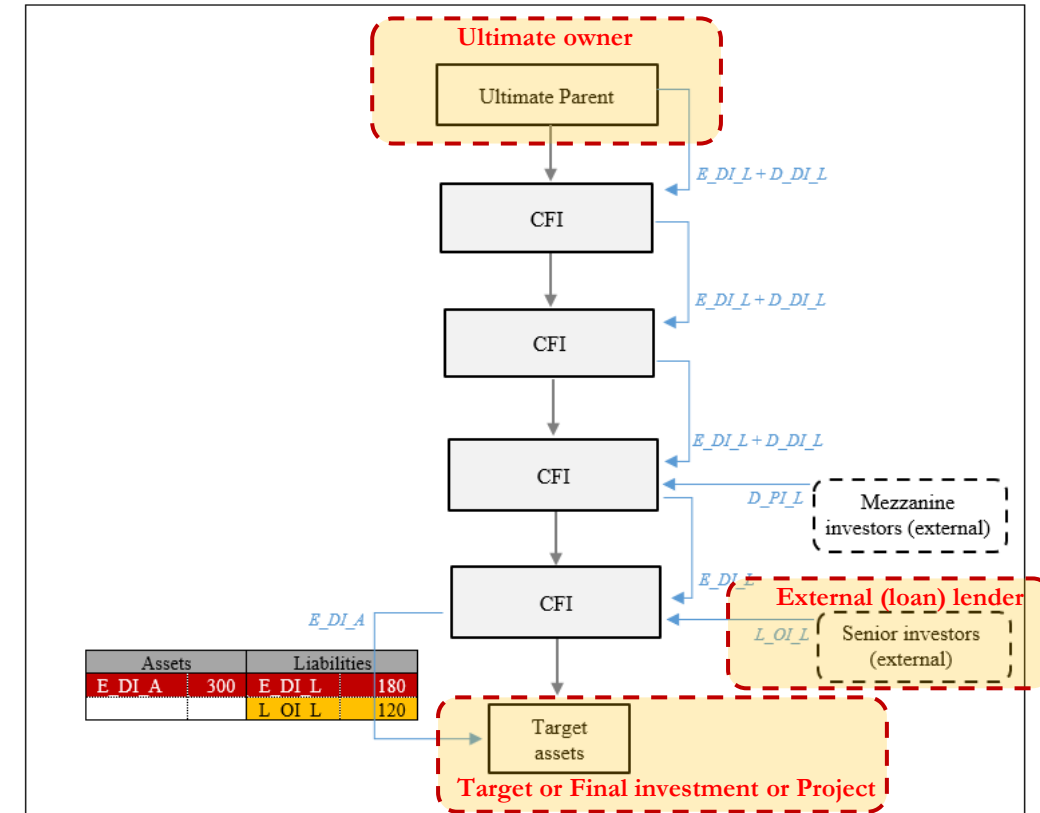
Disclaimer: This presentation should not be reported as representing the views of the BCL or the Eurosystem. The views expressed are those of the authors and may not be shared by other research staff or policy makers in the BCL or the Eurosystem.

Captive Financial Institutions (CFIs, Sector S.127)

Definition

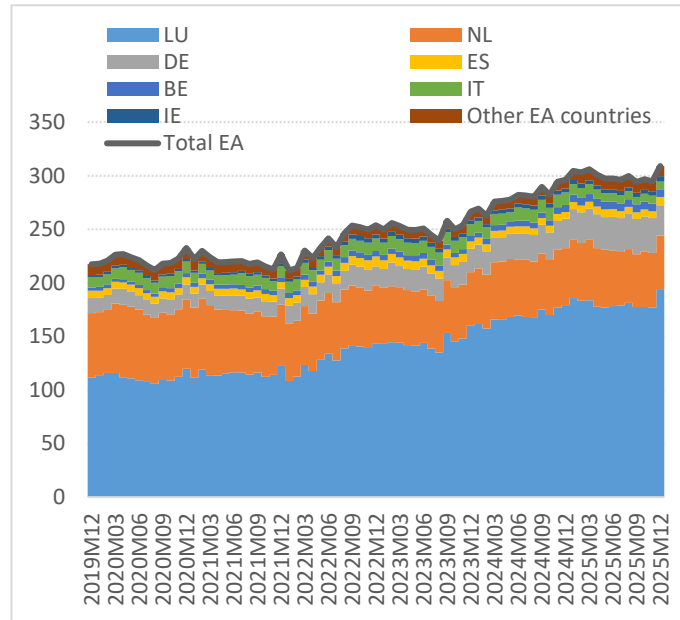
- CFIs are “*institutional units that provide financial services other than insurance, where most of their assets and liabilities are not transacted on open financial markets. This includes entities that transact only within a limited group of units, such as subsidiaries or subsidiaries of the same holding corporation, as well as entities that provide loans from funds provided by only one sponsor*” (IMF (2018), UN (2025))
- “**Captive**” means that the financial company is **owned and controlled** by, and generally used by a **parent company of a group**.
- Parent company** positioned at **the top of the ownership structure**. CFIs typically located **between the ultimate parent company and the operational affiliates**. The **operational affiliates (final investment or target assets)** are at the **bottom of the ownership chain**.
- Transnational corporations often use CFIs to **manage business activities** and **organise corporate investments** on a global scale.
- The use of CFIs implies **internal (or intragroup) financial links** between companies that belong to the same group in the form of equity (E_DI_L) and intragroup loans (D_DI_L).
- Some CFIs may also have **external financial links** with companies belonging to other groups in the form of equity (E_PI_L) and debt (D_PI_L) as portfolio investment, or loans (L_OI_L) as other investment.

Diagram 1: Simplified ownership structure of a transnational corporation including CFIs



Background

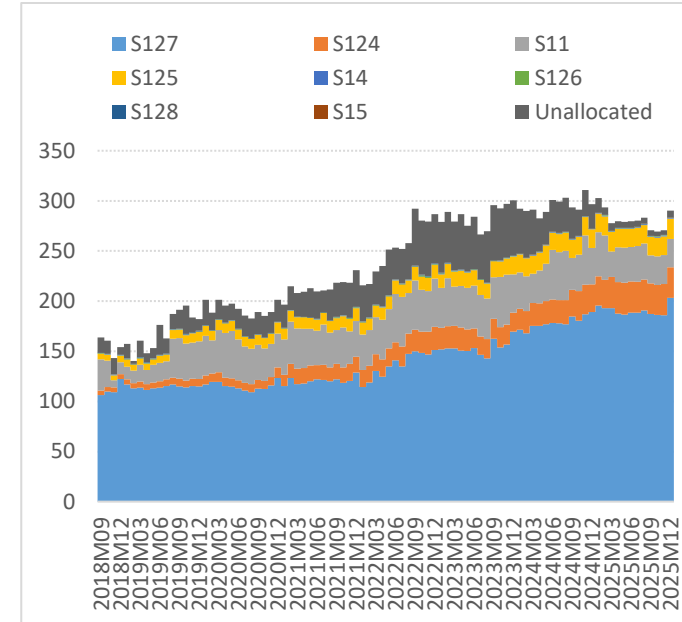
Chart 1.1: Breakdown of loans granted to CFIs by euro area country



Source: AnaCredit. Unit: EUR bn

LU CFIs = most important recipient of loans granted to EA CFIs (56% of total stock of loan), followed by NL (23%), DE (8%), IT (4%), ES (3%), BE (3%) and IE (1%).

Chart 1.2: Breakdown of loans granted by banks to Luxembourg-based companies by sector



Source: AnaCredit (debtor's loan amount), STATEC's Statistical Business Register (debtor's sector). Unit: EUR bn

LU CFIs = Most important recipient of loans granted to LU resident companies (60% of the total stock of loan), followed by NFCs (S.11, 16%), non-MMF investment funds (S.124, 8%) and securitization vehicles (S.125, 6%).

Objective and Data

Objective

- Analyse the relationship between CFIs and external (loan) lenders

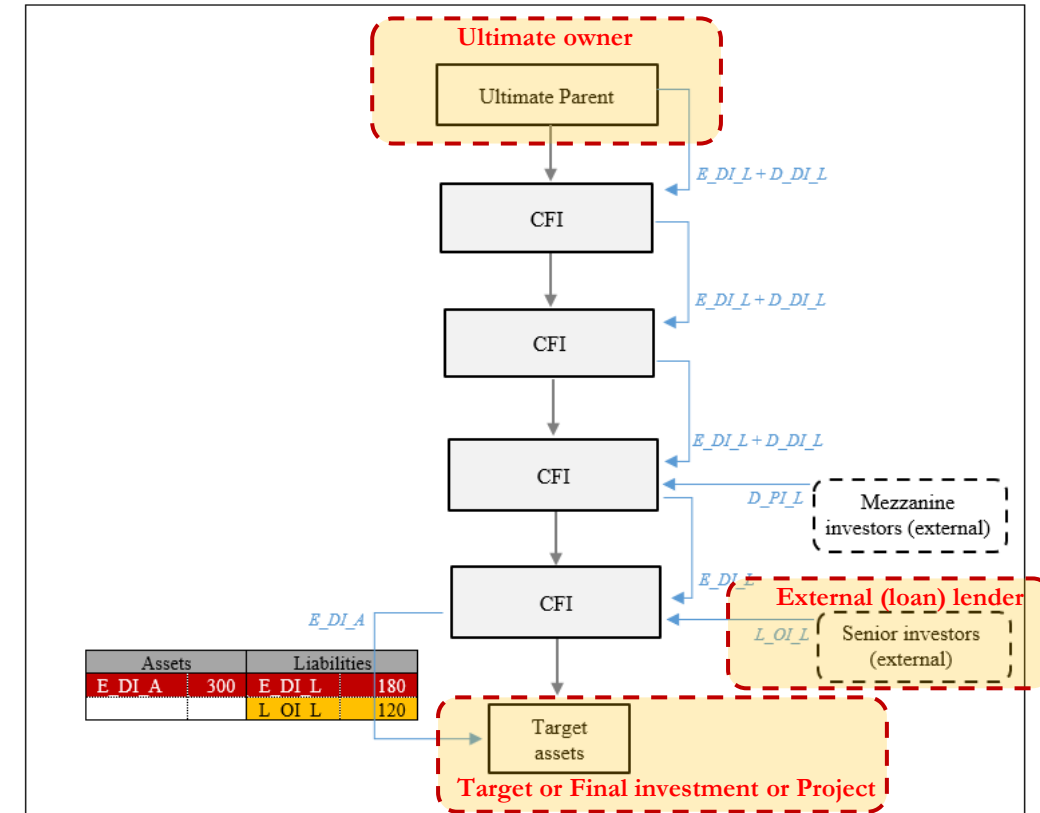
Motivation

- Improve the understanding of ...
 - International capital flows dynamics (eg CFI and external lender in different countries)
 - Interlinkages between sectors (eg CFI and external lender in different sectors)
 - Credit channel of monetary policy transmission by providing information on who ultimately benefits from the loan granted by the external creditor and what the loan is financing.

Data

- Analytical Credit Datasets (AnaCredit)**
- Harmonised credit register covering the EA countries
- Includes confidential, granular data on bank loans granted to companies
- Information about creditor, debtor and instrument
- Creditors include euro area credit institutions or foreign branches of a credit institution resident in the euro area.
- Maintained by the ECB and the NCBs of the Eurosystem
- Data available on a monthly basis from September 2018 (NB: substantial data quality improvement from January 2021 onwards).
- Reporting threshold: only loans granted to legal entities with a value equal to or exceeding 25,000 euro at any time during the reference period are reported

Diagram 1: Simplified ownership structure of a transnational corporation including CFIs



AnaCredit Database: Usefulness and Main Limitations

Useful variables in AnaCredit for the purpose of this analysis

- Creditors' type
- Creditors' country
- Debtors' NACE code
- Debtors' country
- Debtors' ultimate parent
- Loan purpose
- Loan amount
- Loan-to-Value (LTV) Ratio

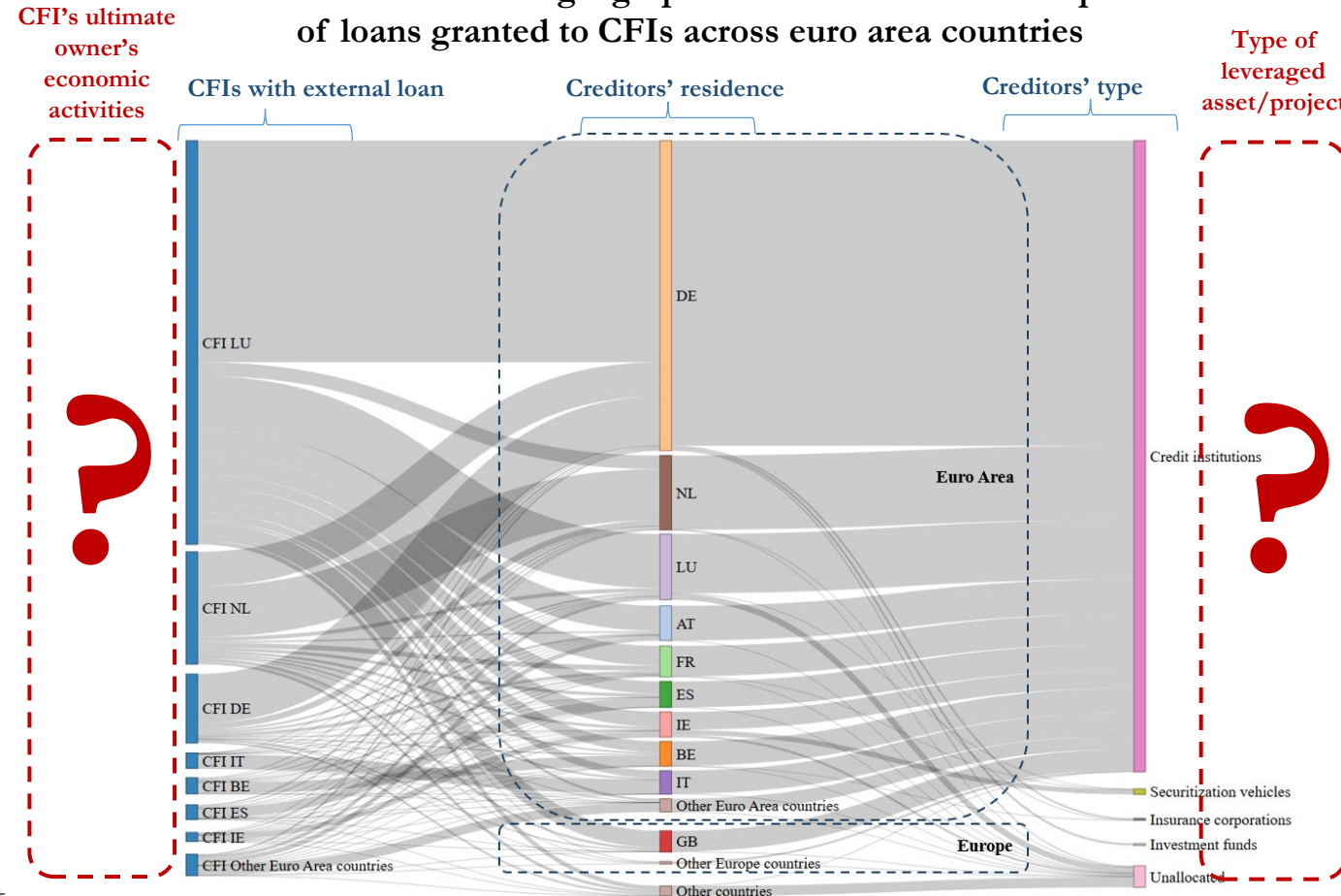
Main limitations

- Missing or inaccurate information for specific variables

Filling Information Gaps

- **Debtors' NACE code**
=> NACE code from **STATEC's Statistical Business Register**
- **Debtors' ultimate parent**
=> Climbing up the ownership chain until reaching the Ultimate Controlling Parent (UCP)
=> Public information: **Financial accounts, SEC, Competition authorities**
- **Loan purpose**
=> Climbing down the ownership chain until reaching the leveraged asset
=> Public information: **Financial accounts, Group-level consolidated financial accounts, etc.**
- **Loan-to-Value (LTV) Ratio & CFIs' Funding Structure**
=> CFI's prototype balance sheet based on accounting data from the **Luxembourg Central Balance Sheet Register**

Chart 2: Breakdown of geographical and sectoral counterparties of loans granted to CFIs across euro area countries



Source: AnaCredit, Period: Q4 2025. Unit: Percentage of outstanding loan amount granted to CFIs in euro area countries.

Breakdown of CFIs' Loan Positions

Chart 3.1:

- External loans primarily directed to CFIs featuring investment funds as ultimate owner.
- ↑ in the proportion of loans granted to CFIs with investment funds as ultimate owner: from 65% in Sep. 2018 to 72% in Dec. 2025.

Chart 3.1: CFIs' loan stock by ultimate owners' main activity

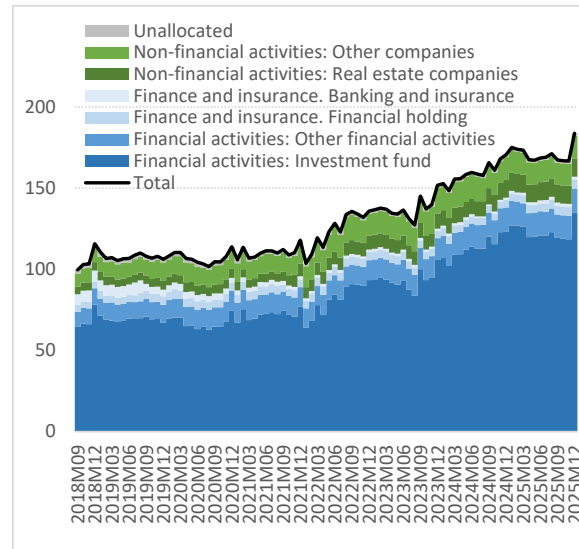


Chart 3.2: CFIs' loan stock by ultimate owners' residence

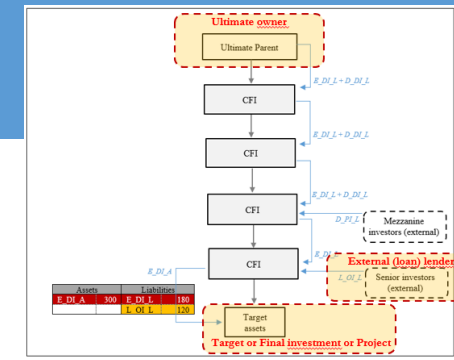
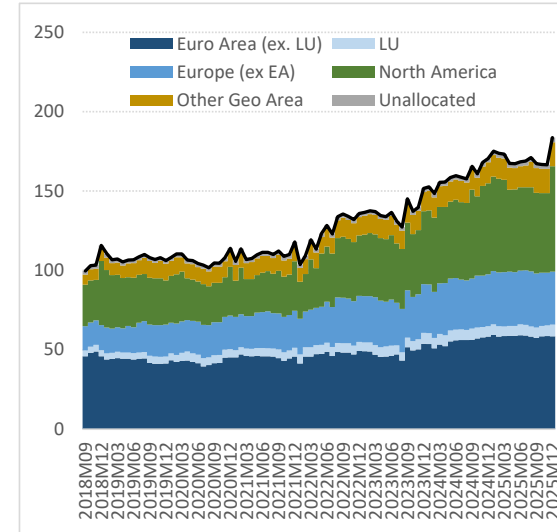


Chart 3.2:

- CFIs ultimate controlling parents are mostly headquartered in Western Europe (62%), especially the euro area (42%), followed by groups headquartered in North America (28%).

Chart 4.1:

- Most important creditors are located in DE (50% of total loan stock), followed by LU (15%), AT (8%), BE (5%), FR (4%), ES (4%) and NL (3%)
- NB: LU = financial centre that hosts a large number of international (foreign-controlled banks)

Chart 4.1: CFIs' loan stock by creditors' country

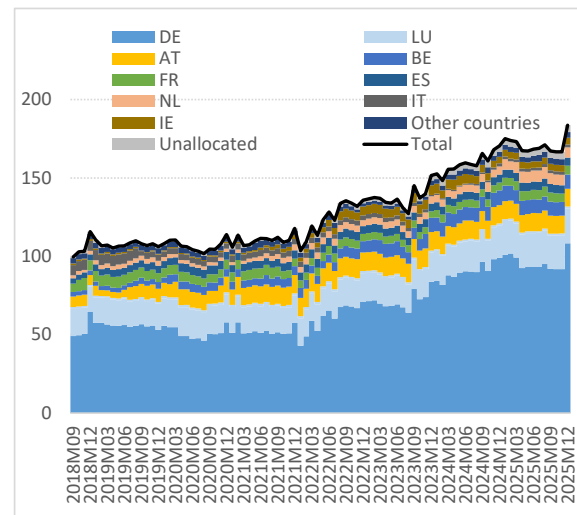


Chart 4.2: CFIs' loan stock by creditors' parent residence

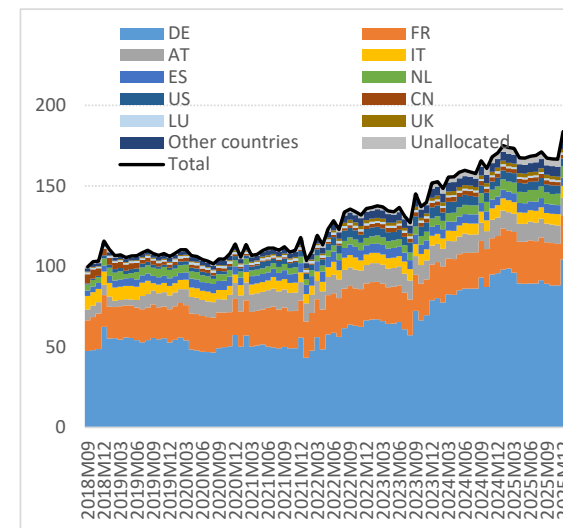


Chart 4.2:

- Most loans issued to LU CFIs are granted by foreign-controlled creditors (99% of total loan stock), especially creditors ultimately located in DE (65%) and FR (23%).

Breakdown of CFIs' Loan Positions

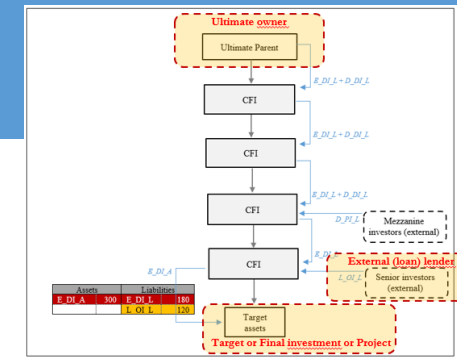
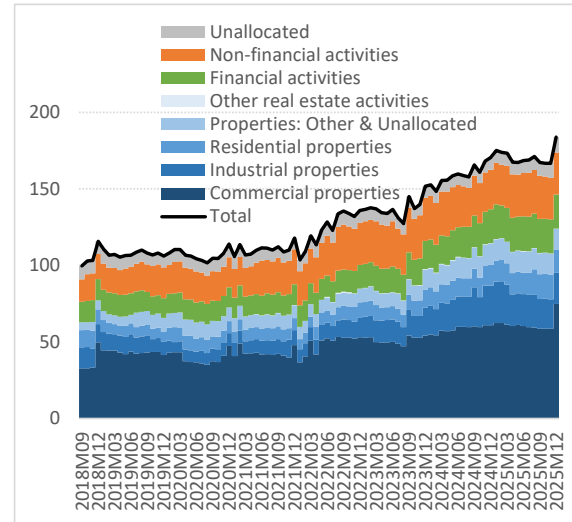
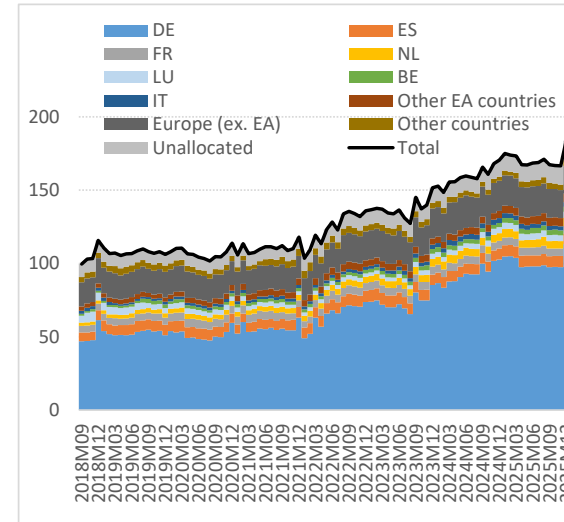


Chart 5.1: CFIs' loan stock by main activities of the final target



Source: AnaCredit, author's calculations. Unit: EUR bn

Chart 5.2: CFIs' loan stock by geographical area of the final target



Source: AnaCredit, author's calculations. Unit: EUR bn

Chart 5.1:

- 63% of the loans issued to CFIs finance the acquisition of real estate properties.
- especially commercial properties (38%), followed by industrial properties (10%) and residential properties (8%).
- The remainder finances non-financial activities (18%) and financial activities (12%).

Chart 5.2:

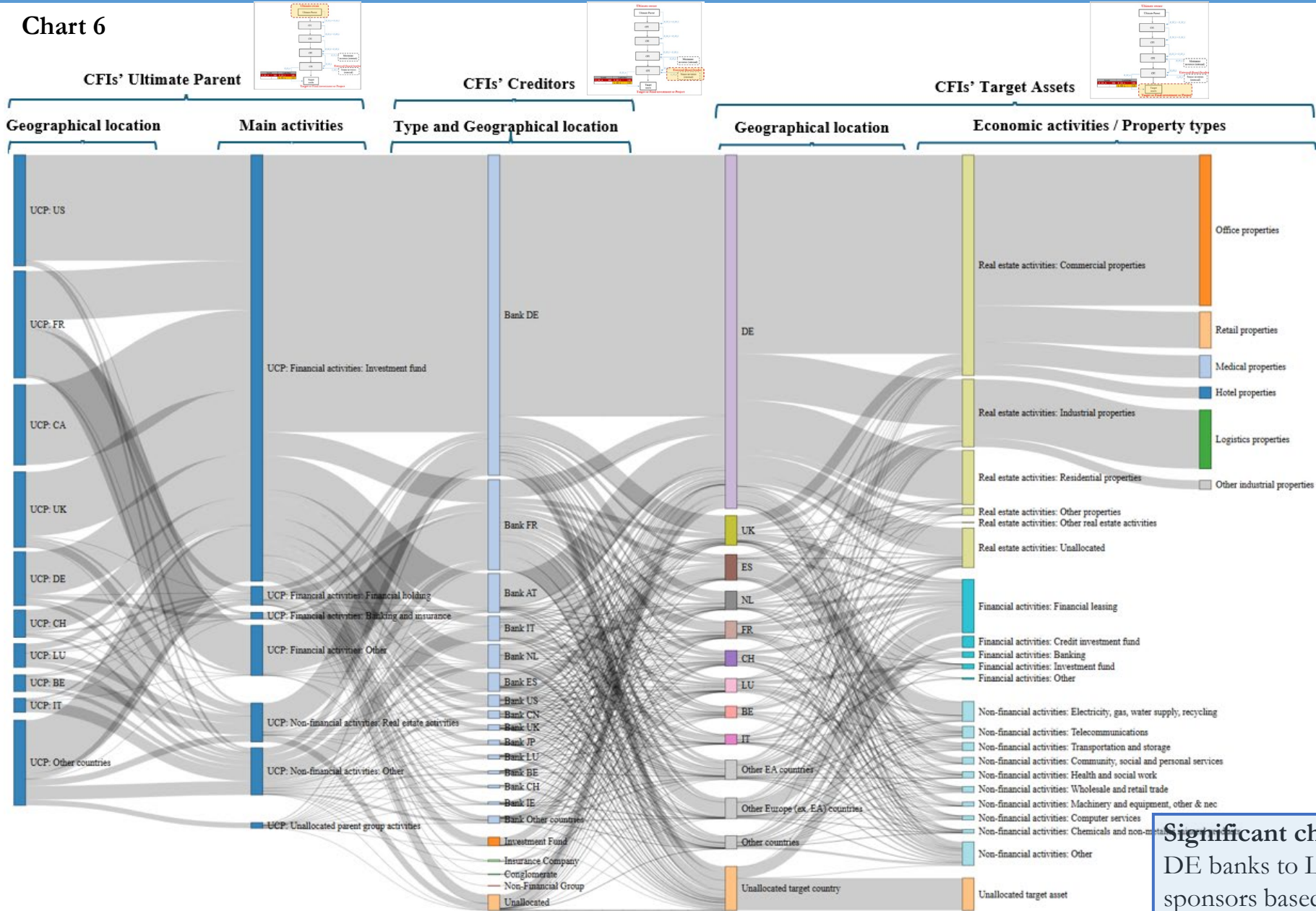
- Most loans granted to CFIs are used to finance assets located in the euro area (75%), especially in Germany (52%).

The proportion of loans that ultimately finance investments in Luxembourg is relatively low (less than 3% of the total loan stock).

=> Capital inflows in the form of loans as other investment are mainly channelled through LU-based CFIs to finance outward FDI.

Interlinkages between CFIs, external lenders, ultimate controlling parents and target assets

Chart 6



CFIs' Creditors ("CBS")

- Banks are the main creditors (95%).
- Mainly located outside LU (84%) and notably in DE (54%).

CFIs' Ultimate Parent

- Loans support mostly investments by real estate or private equity investment fund sponsors (72%), located in US, FR, CA, UK, DE, CH.

CFIs' Target Assets

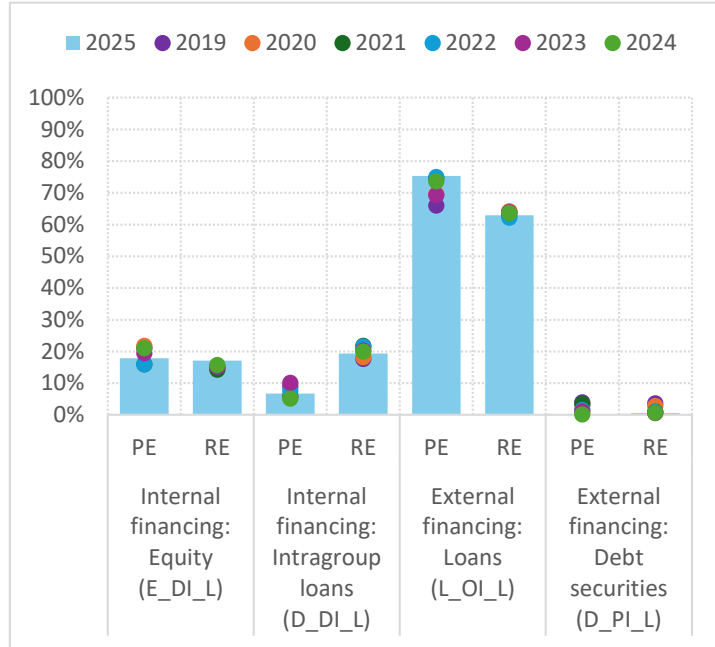
- Target assets are essentially located in EA (80%), notably DE (60%).
- Real estate properties (65%): especially commercial (60%), industrial (18%) and residential (14%)
- The remainder is used to purchase private companies or finance groups, and supports investments in non-financial activities (notably utility companies) and financial activities (notably financial leasing).

Significant channel of loan financing (30%): loans issued by DE banks to LU CFIs ultimately owned by investment fund sponsors based in US, CA, UK, FR, DE, CH to finance real estate properties (commercial, industrial, residential) in DE.

Source: AnaCredit, author's calculations. Units: Percent of total loan stock granted to Luxembourg-based CFIs. Period: 2025Q4.

CFIs' Funding Structure

Chart 7.1: Funding structure for CFIs using loans as a main financing source

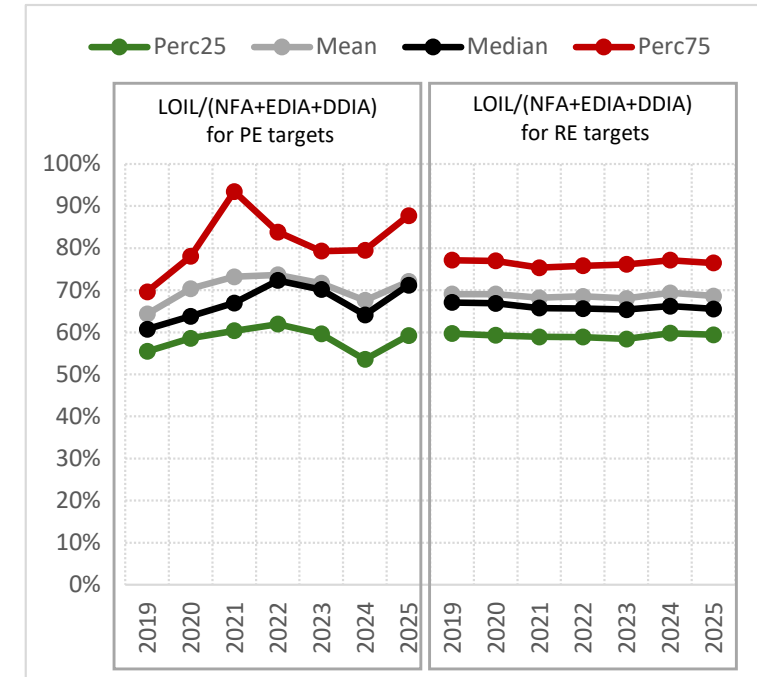


NB: Average ratio across CFIs with loans as a primary financing source.
PE (RE) refers to private equity (real estate).

CFIs funding structure (Chart 7.1)

- CFIs investing in **private companies (PE)** are financed on average 25% by internal funds and 75% by loans.
- CFIs investing in **real estate properties (RE)** are financed on average 35% internally and 65% by loans.
- CFIs that purchase private companies are slightly more leveraged than those that invest in real estate properties.

Chart 7.2: Loan-to-value ratio for CFIs



NB: Ratio $L_{OI_L}/(NFA+E_{DI_A}+D_{DI_A})$ across CFIs with loans as a primary financing source

CFIs LTV (Chart 7.2)

- The contribution of loan financing to the final investment can vary considerably for CFIs that rely mainly on loans for financing.
- The loan-to-value ratio appears to be more stable for real estate acquisitions than for acquisitions of private companies.

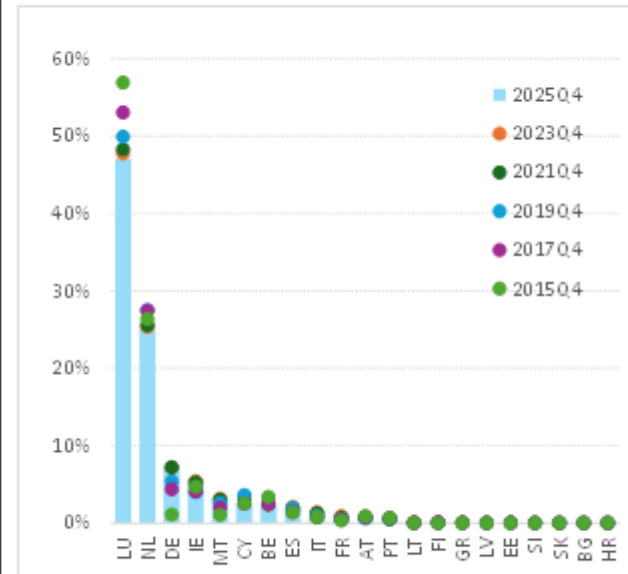
Reserve Slides

Distribution of CFIs' total financial assets across EA countries

In terms of CFIs' total financial assets (Chart A.1), LU represents the most important country gathering 48% of CFIs' total financial assets in the euro area, followed by NL with 25%, DE with 7%, IE with 6%, MT and CY with 3% each, and BE with 2%.

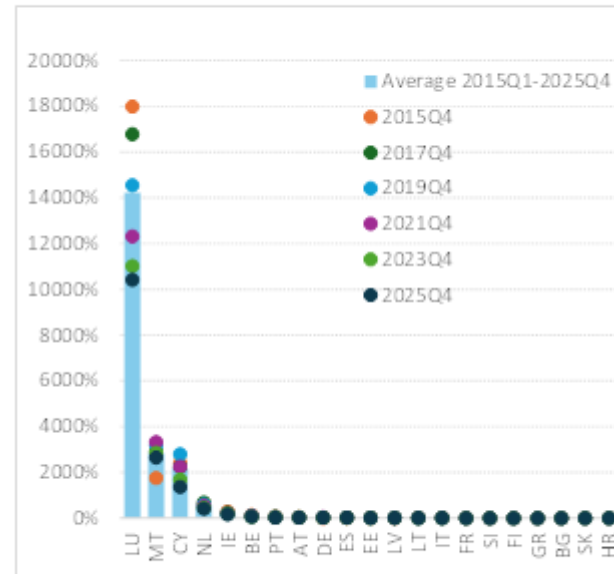
Chart A: Distribution of CFIs' total financial assets across euro area countries

Chart A.1: Total financial assets



Source: ECB-SDW, Quarterly Sector Accounts.
Units: Percent of total financial assets

Chart A.2: Total financial assets-to-GDP

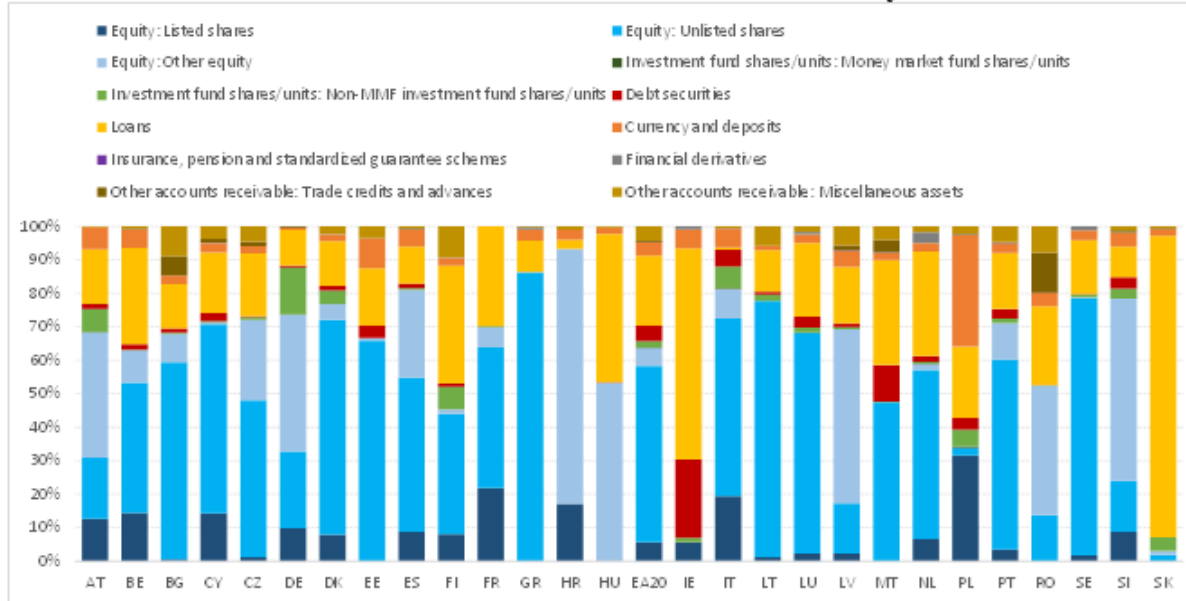


Source: ECB-SDW, Quarterly Sector Accounts.
Units: Total financial assets-to-GDP

When considering the countries' economic size, as measured by GDP (Chart A.2), CFIs' total financial assets are most important in LU, followed by MT, CY, NL and IE.

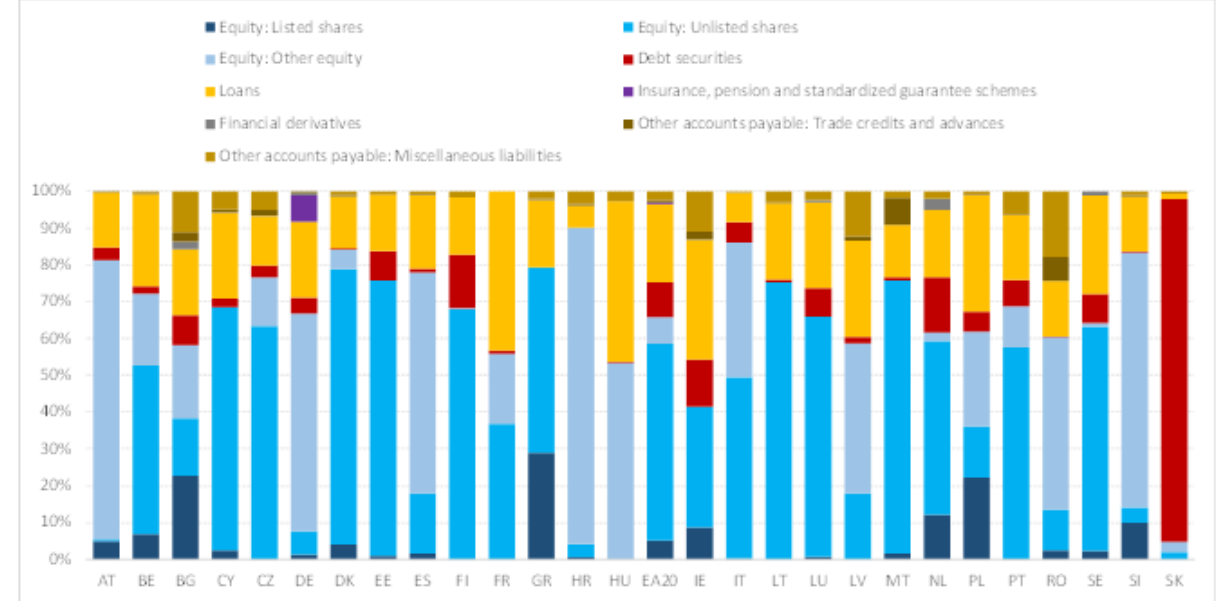
Breakdown of CFIs' total financial assets/liabilities

Chart 3.1: Breakdown of CFIs' total financial assets by instrument



Source: ECB-SDW, Quarterly Sector Accounts. Period: Q4 2025. Unit: Percent

Chart 3.2: Breakdown of CFIs' total financial liabilities by instrument



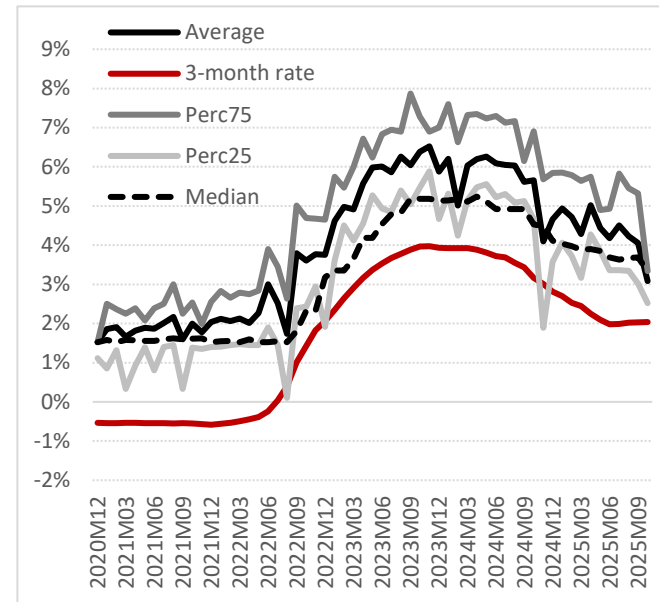
Source: ECB-SDW, Quarterly Sector Accounts. Period: Q4 2025. Unit: Percent

At the euro area level (EA20), the most significant assets over the period Q1 2015 - Q4 2025 are, on average, unlisted shares (57%), followed by loans (22%) and debt securities (4%). A similar observation prevails on the liability side, with unlisted shares again dominating at 53%, followed by loans at 24% and debt securities at 11%. This observation applies to most countries, where equity securities (especially, unlisted shares and other equity) represent the most significant asset and liability, followed by loans and debt securities.

Evolution of CFIs' Loan Rates

- CFIs loan rates follow the evolution of the monetary policy rate

Chart C: CFIs' loan rates



Source: AnaCredit, author's calculations. Unit: Percent



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Beyond residency

Integrating microdata to understand
MNE financing patterns in Ireland

Kiara Kennedy

Central Bank of Ireland

13th IFC Conference | Basel

20-21 August 2026

Why link resident microdata to multinational groups?

Ireland provides a compelling case because of the scale and complexity of multinational financing

Scale: Why Ireland?

- Foreign-owned MNE-dominated sectors accounted for **almost half** of Irish gross value added in 2024 (CSO).
- Ireland hosts many **financing subsidiaries and Special Purpose Entities (SPEs)** supporting multinational financing.

Complexity

- MNEs can have **complex ownership structures**, including intermediate parents and cross-border entities.
- It can be difficult to identify the **ultimate parent** and map entities to the same group.

Why this matters

- Residence-based statistics identify **where** financing is recorded, but not which multinational group is **ultimately associated** with that financing.
- Linking resident entities to their parent groups provides the **wider multinational context**.



Residence-based statistics identify where financing is recorded.
Linked microdata identifies the multinational group associated with that financing.



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Source: CSO (2024); OECD-UNSD MEIP.

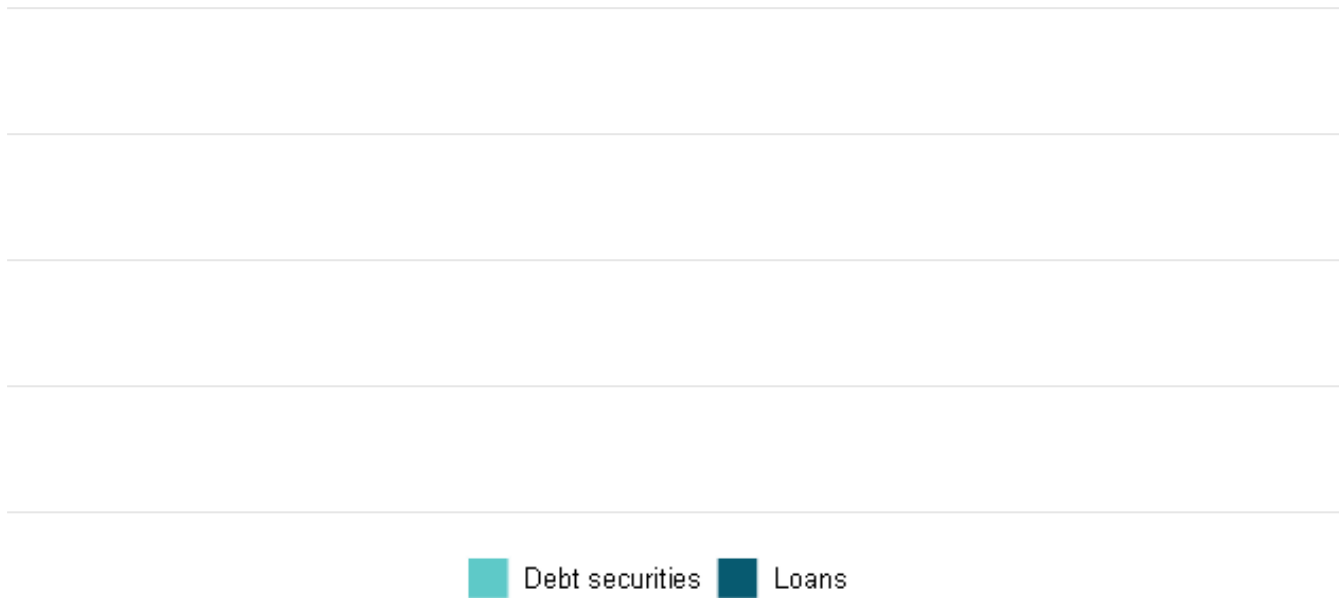
Note: MEIP includes both financial and non-financial multinational groups.

Creating the linked analytical dataset



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Financing linked to multinational groups increased markedly between 2019 and 2025

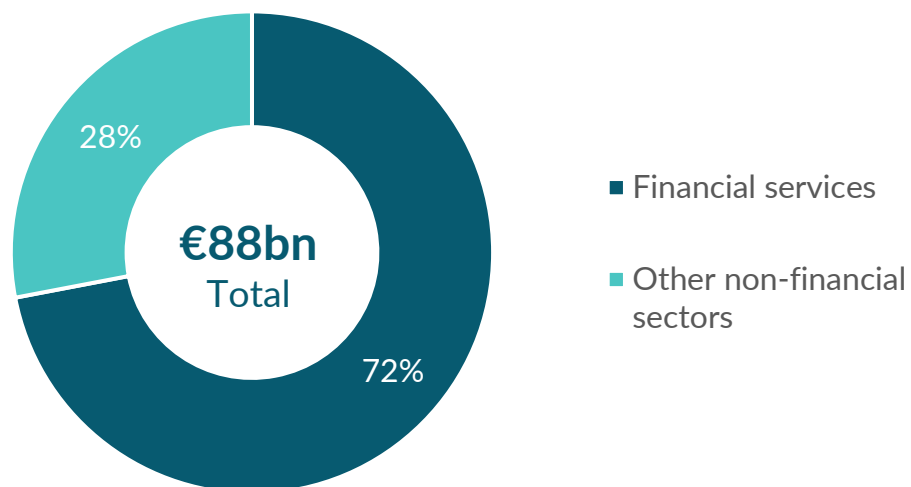


Looking beyond residency changes the interpretation

The same financing viewed through different lenses

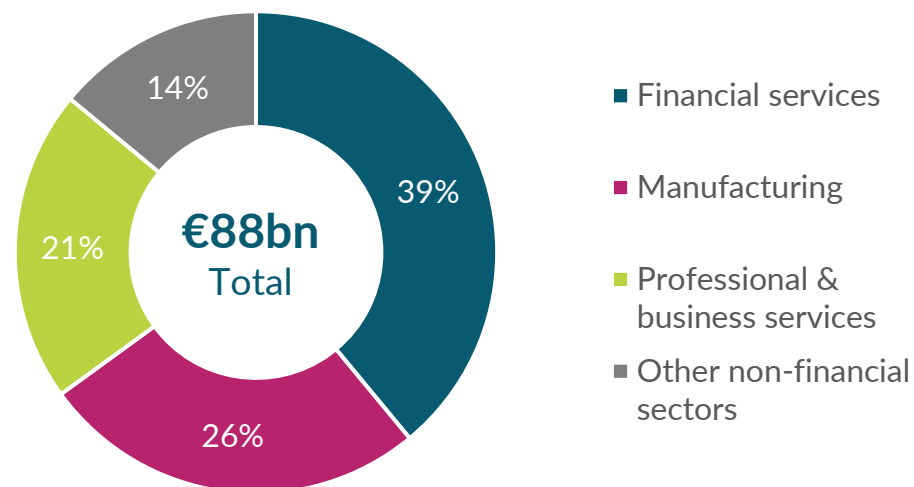
Resident view

Debt securities (Q4 2025)



Parent-group activity view

Debt securities (Q4 2025)



Resident view

Financing appears predominately financial.

Parent-group activity view

Manufacturing and professional services account for a much larger share.

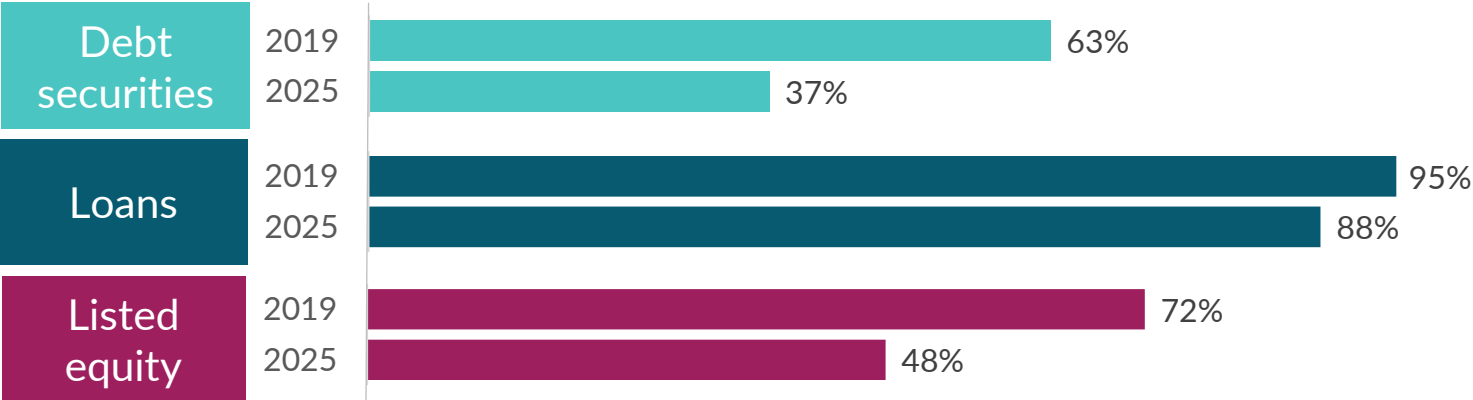
Why this matters

The parent-group view reveals the wider economic activity behind resident financing.

The linked dataset identifies concentration by parent group and parent country

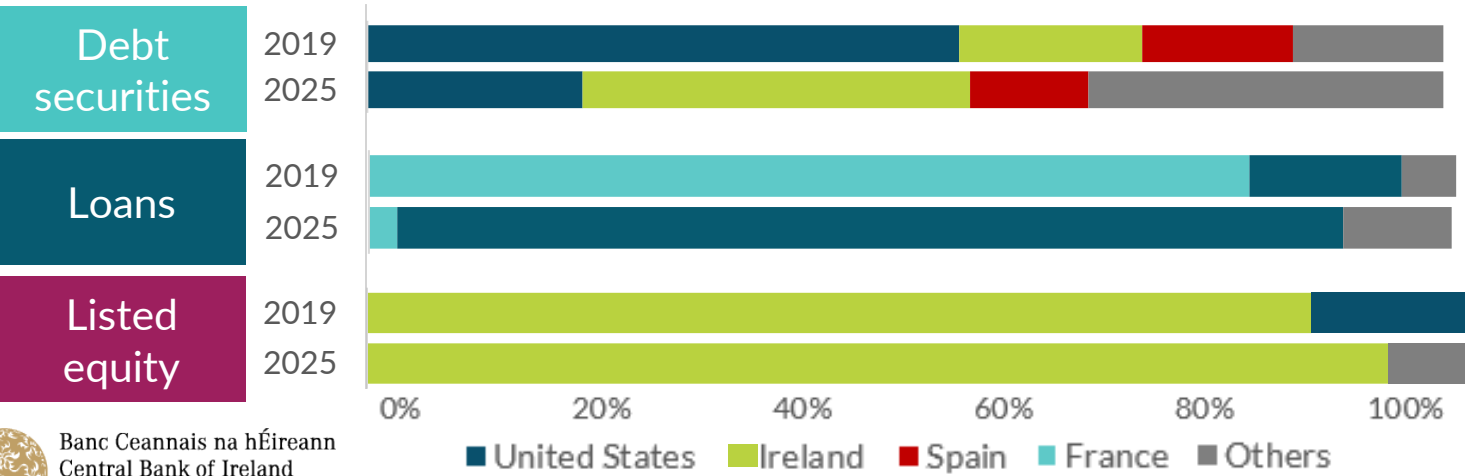
① Concentration by parent group

Share of instrument value accounted for by the three largest parent groups



② Financing by parent country

Share of instrument value by ultimate parent country



What the linked dataset reveals

Concentration by parent group

Financing became **less concentrated** among the three largest groups between 2019 and 2025.

Differences by parent country

Debt securities are **spread across several parent countries**, while loans and listed equity are **more concentrated in particular countries**.

Why this matters

Linking resident entities to their parent groups helps identify **concentrations beyond the resident view**.

Key messages

1. A reusable linked dataset

- Integrates **MEIP, AnaCredit, CSDB and RIAD** at entity and group level.
- Enables **ongoing monitoring and future analysis**.

2. What the analysis shows

- **Debt securities drove substantial** growth in MNE-linked financing, while listed equity rose markedly in market value.
- Financing became **less concentrated among the largest multinational groups**.
- Linking to parent groups shows the **economic activities and countries** associated with resident financing.

3. Why it matters

- Allows financing to be assessed across parent group, economic activity and country, alongside the residence-based view.
- Provides additional context for assessing concentrations relevant to **financial stability and policy analysis**.



Thank you



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