Alternative Distributions of Foreign Direct Investment Stocks: Evidence from Captive Financial Institutions affiliated to Private Equity and Real Estate Investment Funds in Luxembourg

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Abstract

This paper presents alternative distributions of foreign direct investment (FDI) stocks held by captive financial institutions (CFIs) affiliated to private equity and real estate investment funds in Luxembourg. The study focuses on CFIs with total assets larger or equal to 500 million euros. The paper breaks down FDI stocks by geographical location, sector and main economic activity. The analysis is undertaken on both the liabilities side and the assets side of CFIs' balance sheets. The paper considers four alternative counterpart concepts: the immediate counterpart country (traditionally favoured by international statistical standards), the sponsor (or capital manager) counterpart, the target (or capital recipient) counterpart and the client (or capital provider) counterpart. Results show that the traditional distribution of FDI stocks based on the immediate counterpart country differs substantially from the alternative distributions based on the sponsor/target/client counterparts. The alternative distributions provide two important improvements. First, the traditional distribution can be misleading as blurring the initial provider of capital and the final recipient of capital, but the alternative distributions can disentangle capital providers (clients), capital managers (sponsors) and final capital recipients (targets). Second, the alternative distributions can distinguish between FDI that effectively benefits the host country and FDI that transits *via* the host country to be invested in third countries. This second aspect is particularly important for countries hosting a financial centre such as Luxembourg.

Keywords: Capital flows, Foreign direct investment, Captive financial institutions and money lenders, Sector S127, Investment funds, Private equity investment funds, Real estate investment funds, Financial structuring

JEL codes: C80, C81, F23, F30, G23, G32

Contact: gabriele.difilippo@bcl.lu **Disclaimer:** This paper should not be reported as representing the views of the Banque centrale du Luxembourg or the Eurosystem. The views expressed are those of the author and may not be shared by other research staff or policymakers in the Banque centrale du Luxembourg or the Eurosystem. **Acknowledgements:** For their suggestions and comments, the author would like to thank Paolo Guarda, Kola Lendele, Sergio Marx, Frédéric Pierret, Jean-Pierre Schoder and Romain Weber. Any remaining errors are the sole responsibility of the author.

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Non-Technical Summary

This paper presents alternative distributions of foreign direct investment (FDI) stocks held by captive financial institutions (CFIs) affiliated to private equity and real estate investment funds in Luxembourg. The study focuses on CFIs with total assets larger or equal to 500 million euros. The paper breaks down FDI stocks by geographical location, sector and main economic activity. The paper considers four alternative counterpart concepts: the immediate counterpart country (traditionally favoured by international statistical standards), the sponsor (or capital manager) counterpart, the target (or capital recipient) counterpart and the client (or capital provider) counterpart.

Results show that the geographical breakdown of FDI stocks held by CFIs affiliated to private equity and real estate investment funds differs depending the considered counterpart. The immediate counterpart country shows that the assets and liabilities of CFIs are mostly *vis-à-vis* Luxembourg and the CFI sector. This suggests that most of the holding and acquisition structures used to purchase targets by investment funds involve CFIs resident in Luxembourg. The sponsor (or capital manager) counterpart highlights that the total liabilities of CFIs are mostly owned by sponsors located in the United States and the United Kingdom. The target (or capital recipient) counterpart shows that CFIs finance the acquisition of targets headquartered mainly in Western Europe (and notably the euro area) and to a lesser extent in North America. In addition, private equity and real estate investment funds diversify their investments by purchasing targets performing different types of economic activities. The client (or capital provider) counterpart shows that FDI stocks held by CFIs originate mostly from North America and Western Europe, with the United States being the most important capital provider. Clients are mainly institutional investors regrouping essentially pension funds, insurance companies, foundations, endowment funds, funds of funds and traditional financial institutions (*e.g.* investment banks).

The paper compares the traditional distribution of FDI stocks based on the immediate counterpart country to an alternative distribution based on the sponsor/target/client counterparts. These distributions differ substantially depending the considered counterpart. The alternative distributions provide two important improvements. First, the traditional distribution can be misleading as blurring the initial provider of capital and the final recipient of capital, but the alternative distributions can disentangle capital providers (clients), capital managers (sponsors) and final capital recipients (targets). Second, the alternative distributions can distinguish between FDI that effectively benefits the host country and FDI that transits *via* the host country to be invested in third countries. This second aspect is particularly important for countries hosting a financial centre such as Luxembourg.

Résumé Non Technique

Ce document présente des répartitions alternatives des stocks d'investissement direct étranger (IDE) détenus par les institutions financières captives (CFIs, secteur S127) résidentes au Luxembourg et affiliées à des fonds d'investissement spécialisés dans le capital-investissement (*private equity*) et l'immobilier. L'étude se concentre sur les CFIs dont le total des actifs est supérieur ou égal à 500 millions d'euros. Le document ventile les stocks d'IDE par zone géographique, secteur et principales activités économiques. Le document considère quatre concepts de contreparties alternatives: la contrepartie immédiate (traditionnellement privilégiée par les normes statistiques internationales), la contrepartie du promoteur (ou gestionnaire de capital), la contrepartie de la cible (ou bénéficiaire du capital) et la contrepartie du client (ou fournisseur de capital).

Les résultats montrent que la répartition géographique des stocks d'IDE des CFIs affiliées aux fonds d'investissement en capital-investissement et en immobilier diffère selon la contrepartie considérée. La contrepartie immédiate montre que les actifs et passifs des CFIs sont principalement vis-à-vis du Luxembourg et du secteur des CFIs. Cela suggère que la majeure partie des structures de détention et d'acquisition utilisées pour acheter les cibles par les fonds d'investissement regroupe des CFIs résidentes au Luxembourg. La contrepartie du promoteur (ou gestionnaire de capital) montre que le passif des CFIs est principalement détenu par des promoteurs situés aux États-Unis et au Royaume-Uni. La contrepartie de la cible (ou bénéficiaire du capital) montre que les CFIs financent l'acquisition de cibles principalement basées en Europe occidentale (et notamment en zone euro) et dans une moindre mesure en Amérique du Nord. En outre, les fonds d'investissement en capital-investissement et en immobilier diversifient leurs investissements en achetant des cibles entreprenant diverses activités économiques. La contrepartie des clients (ou fournisseurs de capitaux) montre que les stocks d'IDE des CFIs proviennent principalement d'Amérique du Nord et d'Europe occidentale, les États-Unis étant le principal fournisseur de capitaux. Les clients sont principalement des investisseurs institutionnels, regroupant essentiellement des fonds de pension, des compagnies d'assurance, des fondations, des fonds de dotation, des fonds de fonds et des institutions financières traditionnelles (en particulier les banques d'investissement).

Le document compare la répartition traditionnelle des stocks d'IDE basée sur la contrepartie immédiate à des répartitions alternatives basées sur les contreparties regroupant les promoteurs, les cibles d'investissement et les clients. Ces répartitions diffèrent sensiblement selon la contrepartie considérée. Les répartitions alternatives apportent deux améliorations importantes. En premier lieu, la répartition traditionnelle peut prêter à confusion car elle estompe le bailleur de fonds initial et le bénéficiaire final des capitaux. En revanche, les répartitions alternatives peuvent dissocier les fournisseurs de capital (clients), les gestionnaires de capital (sponsors) et les bénéficiaires finaux de capital (cibles). En second lieu, les répartitions alternatives peuvent distinguer entre les IDE dont bénéficie effectivement le pays d'accueil et les IDE qui transitent par le pays d'accueil pour être investis dans des pays tiers. Ce second aspect est particulièrement important pour les pays qui abritent une place financière comme le Luxembourg.

1. Introduction

In Luxembourg, captive financial institutions and money lenders (CFIs, sector S127) account for most of inward and outward foreign direct investment stocks.

Foreign direct investment (FDI) is a category of cross-border investment in which an investor resident in one economy establishes a lasting interest in and exerts a significant degree of influence over an enterprise resident in another economy. Statistical standards consider that an FDI relationship exists when a non-resident investor owns 10 percent or more of the voting power (or share capital) in a resident enterprise. Control or influence may be achieved directly by owning equity that gives voting power in the enterprise ("immediate" direct investment), or indirectly by having voting power in another enterprise that has voting power in the enterprise ("indirect" direct investment).

Foreign direct investment can take different forms (Ietto-Gillies (2019)). Mergers and acquisitions involve the consolidation of companies or their major business assets. A merger combines two business entities to form a new third entity. An acquisition refers to the purchase of one company from another. Greenfield investments involve investments where a foreign investor invests in the construction of new production and operational facilities from the ground up. Brownfield investments denote investments which add capacity to an entity featuring some established fixed capital. FDI also includes the control of ownership chains among affiliates in a corporate group. For example, in multinational enterprises (MNEs) the ownership structure usually takes the form of a parent institution (or headquarters) with direct or indirect control of several entities located in different jurisdictions and performing various operational activities. The parent is tied to its affiliates through one or several layers of equity ownership links, which determine its direct or indirect level of control.

Following international statistical standards (IMF (2009)'s BPM6), a country's Balance of Payments compiles FDI statistics based on the immediate counterpart country, either for the host country or for the investing country. However, in a world where multinational corporations have set up complex global ownership structures, the concept of immediate counterpart country can be misleading as it blurs the initial provider of capital (often located at the top of the ownership structure) and the final recipient of capital (at the end of the ownership structure). This issue is even more important for countries hosting global financial centres as in these jurisdictions, multinational corporations usually establish several intermediate affiliates to manage their business activities and structure their corporate investments in third countries. These intermediate affiliates may render difficult the identification of the initial provider of capital and the final recipient. This implies that FDI statistics for countries hosting global financial centres may differ substantially when being broken down by immediate counterpart country or by alternative counterparts such as the initial capital provider and the final capital recipient.

In addition, the concentration of MNE affiliates in financial centres can contribute to inflate the stock of FDI for the host country, making it difficult to understand the amount of FDI that actually benefits the host country. Therefore, indirect FDI (or transit FDI) - MNEs' ownership chains passing through financial centres before reaching their final destination in third countries - should be distinguished from direct FDI - the amount that is indeed invested in the country hosting a financial centre.

Against this background, this paper analyses the FDI stocks held by captive financial institutions in Luxembourg with total assets larger or equal to 500 million euros. By FDI stocks, the paper means the cumulated FDI flows by CFIs over a given period of time. The study focuses on CFIs affiliated to private equity and real estate investment funds. Several reasons justify this choice. First, Luxembourg hosts one of the most important investment fund industry in the world.[1] Second, the objective of private equity and real estate investment funds is to take control of a target: a corporation in the case of private equity funds, a real estate property in the case of real estate funds. Third, according to Hoor (2018), CFIs appear as a suitable tool for investment funds to structure their investments, notably in private equity or real estate.[2] The paper breaks down FDI stocks by geographical location, sector and main economic activities. The analysis is undertaken on both the liabilities side and the assets side of CFIs' balance sheets. The paper considers four alternative counterpart concepts: the immediate counterpart country (traditionally favoured by international statistical standards), the sponsor (or capital manager) counterpart, the target (or capital recipient) counterpart and the client (or capital provider) counterpart.

[1] In comparison to the overall size of Luxembourg investment funds, private equity and real estate investment funds represent about 6% of the net assets and about 20% in terms of number of fund units as of October 2022. For more information, see https://www.cssf.lu/en/2022/12/investment-policy-of-ucis/

[2] In Luxembourg, CFIs owned by private equity and real estate investment funds represent about 15% of the total assets held by resident CFIs and about 40% of the total number of resident CFIs, on average over the period 2014-2020 (Di Filippo and Pierret (2022a), Di Filippo (2022b)).

The remainder of the paper is organised as follows. Section 2 defines private equity and real estate investment funds. Section 3 presents the data and the methodology. Section 4 breaks down the stock of FDI in Luxembourg starting from a macroeconomic level to a more disaggregated level. Section 5 compares alternative distributions of FDI stocks and discusses their respective advantages and limitations. Section 6 is the conclusion.

2. Structure of private equity and real estate investment funds

2.1 Private equity investment funds

Private equity investment funds: a definition

A private equity (PE) fund invests in a portfolio of private companies not listed on the stock exchange market. The fund usually purchases a controlling stake - whether minor or major - in the companies' equity, to actively manage these companies with the objective of making a profit by later selling these companies for more than was initially invested.

The structure of PE funds can include limited partnerships or closed-end funds. While the former are popular in the United States, the latter prevail in Europe.

The limited partnership involves two types of partners: the General Partner and the Limited Partners. The General Partner (GP) is the manager of the fund. It selects the target companies to be included in the portfolio of the fund. The GP charges the partnership a management fee[3] and has the right to receive carried interests.[4] The Limited Partners (LPs) are the main investors of the fund. They provide investment capital into the fund. The LPs' liability is limited to the amount of money they invest. LPs can regroup different types of institutional investors, including pension funds, investment funds, endowment funds, insurance companies, investment banks, family offices/high net worth individuals (HNWI) and funds of funds. The PE fund managers invest as well in the fund, but commit to lower amounts compared to the LPs.

[3] The fund investors - the LPs - pay a management fee to the manager of the fund based on the amount of capital committed up to the end of the investment period (see Gilligan and Wright (2020)).
[4] If the fund achieves returns above a minimum threshold, then the General Partner takes a preferential share of the return in the form of so-called "carried interest" (see Gilligan and Wright (2020)).

A closed-end fund is somewhat different as it typically involves a newly created entity where institutional investors pool capital. A management firm signs a management contract with the newly created entity. The compensation scheme remains similar to that of GP-LPs structures. The management company takes care of portfolio management and risk management.[5]

PE funds feature an investment horizon spanning five to ten years (excluding the fundraising period). A first step involves the collection of funds amongst investors. This fundraising period lasts between two months and three years, depending the reputation of the fund and investors' demand. A second step features the investment period. The duration can last from three to five years, during which the managers research investment opportunities and identify the target companies. Once the investee companies have been selected, this stage proceeds with the negotiation by the fund managers of the acquisition and the financial structuring of the investment transactions, in accordance with the multiple objectives of the various counterparties involved in the deal. The final stage relates to the harvest or disinvestment period. It can last from two to five years as the maximization of profits from companies' sales rests on the determination of the most profitable timing to sell a business. Indeed, PE funds generate capital profits from the sale of investments rather than income from dividends, fees and interest payments. The optimal timing depends on the economic cycle, market volatility and the quest for potential acquirers willing to buy the companies at the best price. Once the entire portfolio of companies is disinvested, the fund closes and all proceeds are distributed among the GP and LPs in a partnership structure or among investors and the management company in a closed-end fund.

At the end of the investment period, exit strategies feature different options. Funds can sell the target in private markets to other investors (including PE funds) or introduce the target in public markets *via* an Initial Public Offering (IPO). Funds can also favour carve-out strategies (by selling parts of their target).[6] Eventually, a fund can sell a target to itself.[7]

[5] In Luxembourg, the management firm can take the form of an AIFM (Alternative Investment Fund Managers).
[6] A carve-out corresponds to a partial divestiture of a business unit in which a parent sells a minority interest of an affiliate to investors outside the group. An equity carve-out describes the process by which a company separates a business division as a standalone company for financial or strategic reasons.
[7] Self-selling strategies occur during periods of depressed activity in the mergers and acquisitions market where funds may face difficulties to find a suitable buyer. Although this investment strategy emerged before the COVID-19 outbreak, its use has been ignited by the pandemic.

Portfolio of target companies

The manager of the fund (or GP) optimises the fund's portfolio of companies by researching and selecting companies to be included in it. The portfolio allocation can feature different characteristics.

Funds can target companies operating in different business activities or specialise their investments in companies operating in a specific business activity. The portfolio can regroup companies featuring different development stages or a specific development stage: venture or young companies (early stage), established or mature companies (maturity stage) or distressed companies (final stage). A fund can acquire a company that undertakes activities in a specific country or favour corporations featuring activities in different jurisdictions worldwide. A fund can purchase a whole group or only a specific business branch of a group. The target acquisition can involve one sponsor or several PE funds regrouped in a club deal. The shareholding of a fund in a specific target may vary over time. A fund can acquire minority shares in an initial deal and then increase its shareholding in the target over time, by purchasing the shares held by other PE funds for example. Moreover, funds can build up groups by acquiring subsequently different targets and merge them together to benefit from economies of scope and of scale. Funds can also repurchase a target that was previously owned and sold.

Holding and acquisition structure

To finance the acquisition of the target company, PE funds create a holding and acquisition structure. The latter allows the necessary funds from the PE fund's investors (GP and LPs) to be raised as well as funds from external investors (*e.g.* banks, funds, *etc.*). Diagram 1 presents a stylised structure of a private equity fund.[8]

The structure regroups one or several new companies, often labelled as NewCos. The cascade of new companies allows investors to achieve the structural subordination or the required priority concerning the payoff return of the various sources of funding. An investor can obtain a

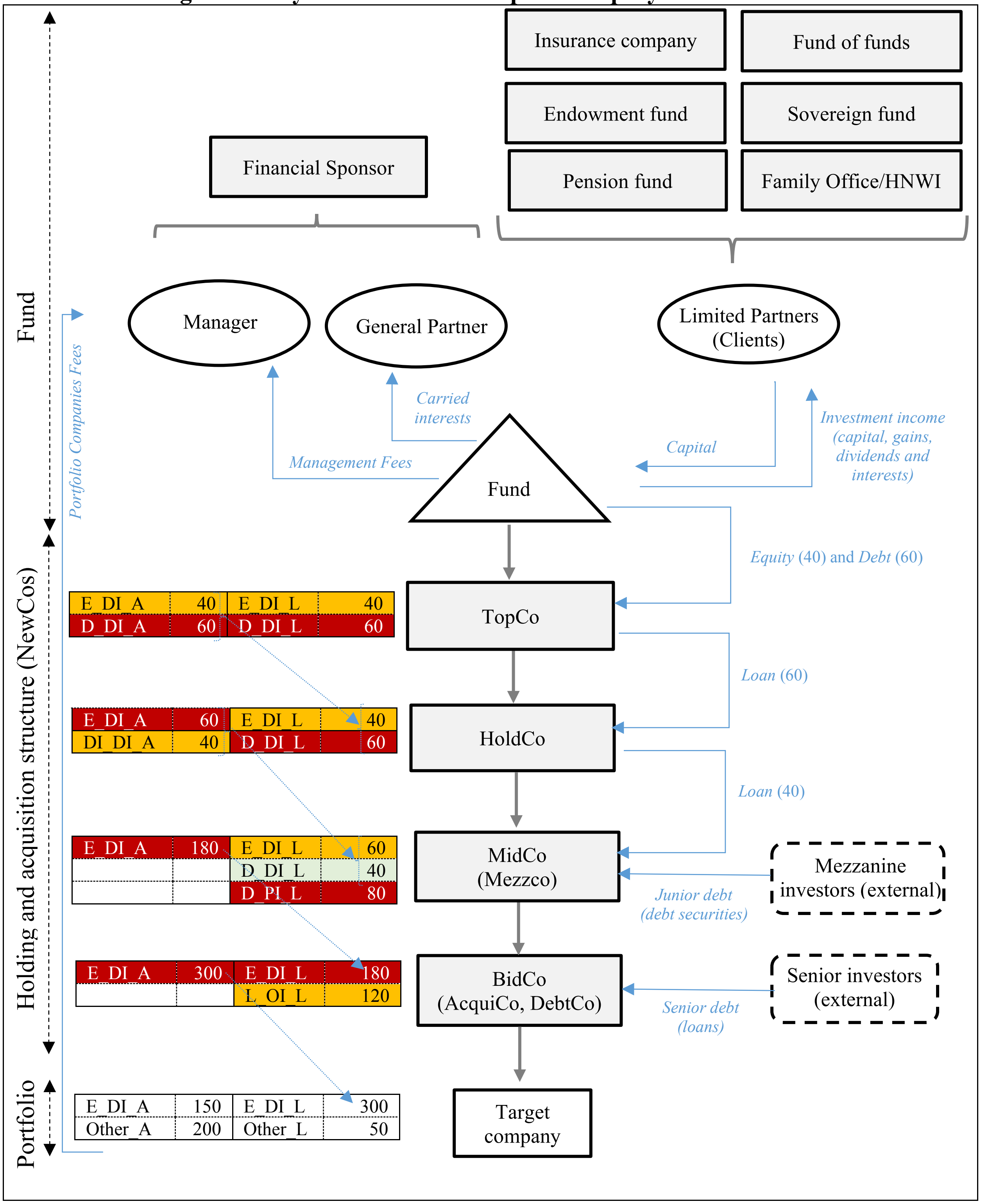
[8] For more information about the structure of investment funds, the reader can refer to Hudson (2014) and Gilligan and Wright (2020).

payoff priority either contractually or structurally. In a contractual subordination, an agreement prevails between the various counterparties regarding who is repaid, in what order, and what rights the investors have, in case of investment failure. This is the inter-creditor agreement.

An alternative to contractual subordination is structural subordination. The latter involves the creation of a cascade of NewCos in a holding and acquisition structure.[9] Indeed, the more an investor invests funds in entities located at the bottom of the structure, the more the investor will have priority in terms of payoff, compared to other investors who will have invested in entities located in the upper structure. The structure comprises different layers of financing brought by internal investors (GP, LPs) and external investors (*e.g.* banks, funds, *etc*.). The layers of financing feature different types of instruments (*e.g.* equity, debt, hybrid instruments, *etc*.). The recourse to debt by PE funds, in addition to equity, plays the role of financial leverage to increase the return on investments.

[9] For more information, see Gilligan and Wright (2020).

Diagram 1: Stylised structure of a private equity investment fund



Source: adapted from Hudson (2014) and Gilligan and Wright (2020). NB: the colours red/yellow/green in the balance sheet of the NewCos reflect the relative predominance of their respective balance sheet items and thus the type of CFI (for more information, see Di Filippo and Pierret (2020a, 2022a)).

In Diagram 1, the holding and acquisition structure regroups a cascade of NewCos covering the following entities: a TopCo, a HoldCo, a MidCo and a BidCo. These companies are usually classified in the sector S127 as captive financial institutions and money lenders.[10]

In this stylised example, PE fund investors provide equity capital (E_DI_L) and a loan (D_DI_L) to the TopCo. This finances the acquisition of shares (E_DI_A) in the HoldCo and the provision of intragroup loans to the HoldCo (D_DI_A) at arm's length. The TopCo suits the prototype balance sheet of an intragroup lending company in the typology of CFIs (Di Filippo and Pierret (2020a)).

The HoldCo relies on shares (E_DI_L) and loans (D_DI_L) from the TopCo to hold equity capital (E_DI_A) and provide intragroup loans to the MidCo (D_DI_A) at arm's length. The HoldCo can be considered as a mixed structure sharing the features of a holding company and an intragroup lending company in the typology of CFIs (Di Filippo and Pierret (2020a)).

The MidCo (or MezzCo) sources equity financing (E_DI_L) and intragroup loans (D_DI_L) from the HoldCo to own equity capital (E_DI_A) in the BidCo. The MidCo also benefits from additional external financing. Indeed, (external) debt typically enters the holding and acquisition structure at the MidCo level. The (external) debt can take the form of debt securities as portfolio investment (D_PI_L). Given the second-to-last position of the MidCo within the holding and acquisition structure, the (external) debt shares the features of a junior (or subordinated or mezzanine) debt, as opposed to the senior debt. The junior debt is a debt subordinated to the repayment of a senior debt. Indeed, in case of default, the repayment of the junior debt cannot take

[10] Luxembourg offers several investment vehicles to structure a fund. These vehicles differ in terms of regulatory constraints and investment restrictions. The choice of the structure depends upon several factors and notably investors' preferences, time-to-market (*i.e.* the time necessary for the structure to be operational), the class of asset (in particular their risk) and the exit strategies. Regulated vehicles regroup UCITS (Undertaking for Collective Investment in Transferable Securities or Part I UCI) and Part II UCI. Lightly regulated vehicles cover specialised investment funds (*fonds d'investissement spécialisés*, FIS) and investment companies in risk capital (*société d'investissement en capital à risque*, SICAR). Unregulated investment vehicles include Reserved Alternative Investment Funds (RAIF), wealth-management companies (*société de gestion de patrimoine familial*, SPF), securitisation vehicles, Luxembourg limited partnerships (*société en commandite simple*, SCS / *société en commandite spéciale*, SCSp), non-regulated ordinary commercial companies (*société de participations financières*, SOPARFI). For private equity investments, the fund can take the form of a SICAR, a SIF, a RAIF or a SCS/SCSp. For real estate investments, the fund can take the form of a SIF, a RAIF or a SCS/SCSp. The NewCos within the holding and acquisition structure can take the form of non-regulated ordinary commercial companies (or SOPARFIs) as the latter can perform holding and financing activities.

place until the senior debt is paid in full. Because of this, junior debt tends to be riskier for investors, and thus carries higher interest rates than senior debt from the same issuer. The MidCo suits the balance sheet of a conduit in the typology of CFIs (Di Filippo and Pierret (2020a)).

The BidCo (or AcquiCo or DebtCo) sources equity capital (E_DI_L) from the MidCo to hold a controlling stake of equity in the target company (E_DI_A). The BidCo also benefits from additional financing by external investors. The external financing usually takes the form of a loan from a bank or from a group of banks in the case of a syndicated loan (L_OI_L). Given the last position of the BidCo within the holding and acquisition structure, the (external) debt can be considered as senior secured debt. Senior debt is issued with a higher priority for repayment than junior debt, in case of default. In addition, secured debt is backed or secured by a collateral to reduce the risk associated with lending. If the borrower defaults on repayment, the bank seizes the collateral, sells it, and uses the proceeds to pay back the debt. Because of this, senior debt tends to be less risky for investors, and thus carries lower interest rates than junior debt from the same issuer. In the typology of CFIs (Di Filippo and Pierret (2020a)), the BidCo fits the prototype balance sheet of a holding company with extra-group loan origination.

Overall, the holding and acquisition structure regroups different layers of financing, in the form of equity and debt, necessary to fund the acquisition of the target company. The organisation of the structure allows the required subordination or priority of return of the various sources of funding provided by investors to be achieved, according to their reward/risk profiles.

As shown in Diagram 1, in the specific example considered here, to finance the target company worth 300, the fund relies on a combination of internal and external financing based on equity and debt instruments. Equity amounts to 40 (*e.g.* 35 from LPs and 5 from the GP in TopCo). Debt amounts to 260 and is granted by internal investors (*i.e.* 60 from LPs in TopCo) and external investors (80 from a mezzanine investor in MidCo and 120 from a senior investor - *e.g.* a bank - in BidCo). In other words, for a target company worth 300, the share of equity amounts to 13% (40/300) and that of debt to 87% (260/300) with external debt representing 67% (200/300). The share of external debt is larger than that of internal financing to create a leverage effect which amplifies investment returns.

2.2 Real estate investment funds

Real estate investment funds: a definition

Real estate (RE) investment funds typically invest in real estate assets. They can manage the complete investment cycle of real estate, from acquisition, restructuring, management, repositioning and eventually the sale of the assets. In general, funds investing in real estate can be organised as Real Estate Private Equity (REPE) funds, Real Estate Investment Management (REIM) companies, Real Estate Investment Trusts (REITs) and Real Estate Investment Funds (REIF).

Like PE funds, real estate investment funds are classified in the sector S124 regrouping non-money market funds (non-MMF) investment funds,[11] although they can use CFIs (sector S127) to structure their investments.

Real Estate Private Equity (REPE) funds raise capital from LPs to acquire, develop, operate, improve and sell buildings in order to generate returns for their investors. The business is similar to that of private equity, except that the target asset is real estate. REPE funds raise capital from private investors, the LPs. The capital is allocated to specific funds that target specific types of real estate investments, according to investors' preferences. REPE funds are generally structured as closed-end funds. In other words, the fund features a specific investment duration so that investors expect to get their capital and payoff after a specified time frame, usually comprised between five and ten years.

Real Estate Investment Management (REIM) firms raise capital from LPs to acquire, develop, operate, improve and sell buildings in order to generate returns for their investors. Thus, the activities of REIM firms mirror those of REPE funds: raising capital, screening investment opportunities, acquiring or developing properties, managing properties and selling properties. A difference between REPE funds and REIM firms may lie in their structure. Indeed, while REPE funds often favour closed-end funds, REIM firms lean towards open-end funds. In the latter, the

[11] According to statistical standards (ESA2010), the following financial intermediaries are classified in sector S124 regrouping non-MMF investment funds: (a) open-ended investment funds whose investment fund shares or units are, at the request of the holders, repurchased or redeemed directly or indirectly out of the undertaking's assets; (b) closed-ended investment funds with a fixed share capital, where investors entering or leaving the fund must buy or sell existing shares; (c) real estate investment funds; (d) investment funds investing in other funds ("funds of funds"); (e) hedge funds covering a range of collective investment schemes, involving high minimum investments, light regulation, and a range of investment strategies.

fund features no specific investment duration, contrary to closed-end funds. While this delineation generally holds, some investment firms that manage both closed-end and open-ended funds will describe themselves as REPE funds while others will present themselves as REIM firms.

Real estate investment trusts are structures for groups that buy, own, operate, manage, renovate, develop, finance or manage real estate assets. Real estate assets can cover real estate properties (equity REITs), mortgages (mortgage REITs) or hybrid assets materialised by a mix between real estate properties and mortgages (hybrid REITs).[12] In the sample analysed in this paper, most of real estate investment trusts owning CFIs deal with equity REITs (henceforward, REITs). The latter can invest across a wide range of property sectors. They generate portfolio return by leasing space and collecting rents on their real estate assets. They typically pay out all of their income as dividends to shareholders. REITs include traded REITs and non-traded REITs. Traded REITs trade on a public stock exchange, making them liquid and open to all types of investors. Non-traded REITs are not traded in a public stock exchange and are thus illiquid. Non-traded REITs regroup public non-traded REITs and private non-traded REITs. While the former are open to all types of investors including non-accredited investors, the latter require accredited investors (*e.g.* institutional investors).

Real Estate Investment Funds (REIFs) are a type of mutual fund that invests in securities offered by real estate companies, including REITs, REIM firms or REPE funds. While REITs provide value to their shareholders by paying regular dividends, REIFs provide value to their shareholders through appreciation of their shares.

Portfolio of real estate investments

Real estate investment funds can invest in a wide scope of real estate properties. The main segments of real estate investments are residential real estate, commercial real estate and industrial real estate. Residential real estate covers properties used as homes or for non-professional purposes. It includes single-family residences, multi-family residences, student accommodations, condominiums, planned unit developments, *etc*. Commercial real estate regroups properties used for business purposes. It includes office spaces (*e.g.* co-working spaces), retail centres (*e.g.* shopping malls, gaming properties), hotels and restaurants, medical facilities (*e.g.* nursing and

[12] For more information, the reader can refer to Hudson (2014), Gatti (2019) and Parker (2021).

retirement homes, hospitals, medical clinics, *etc*.), museums, car parks, storage spaces, *etc*. Industrial real estate comprises properties used for manufacturing and production such as factories, plants and warehouses. It includes logistics centres, wind farms, solar plants, dams, vineyards, forests, farmland, *etc*. Most real estate investment funds focus on a particular type of property, but some hold multiple types of properties to diversify their portfolios.

Real estate investments entail a geographical dimension as investment funds can invest in domestic properties, foreign properties or both. In addition, real estate investments can focus on specific locations (large or medium cities, seaside resorts, mountain resorts, *etc*.).

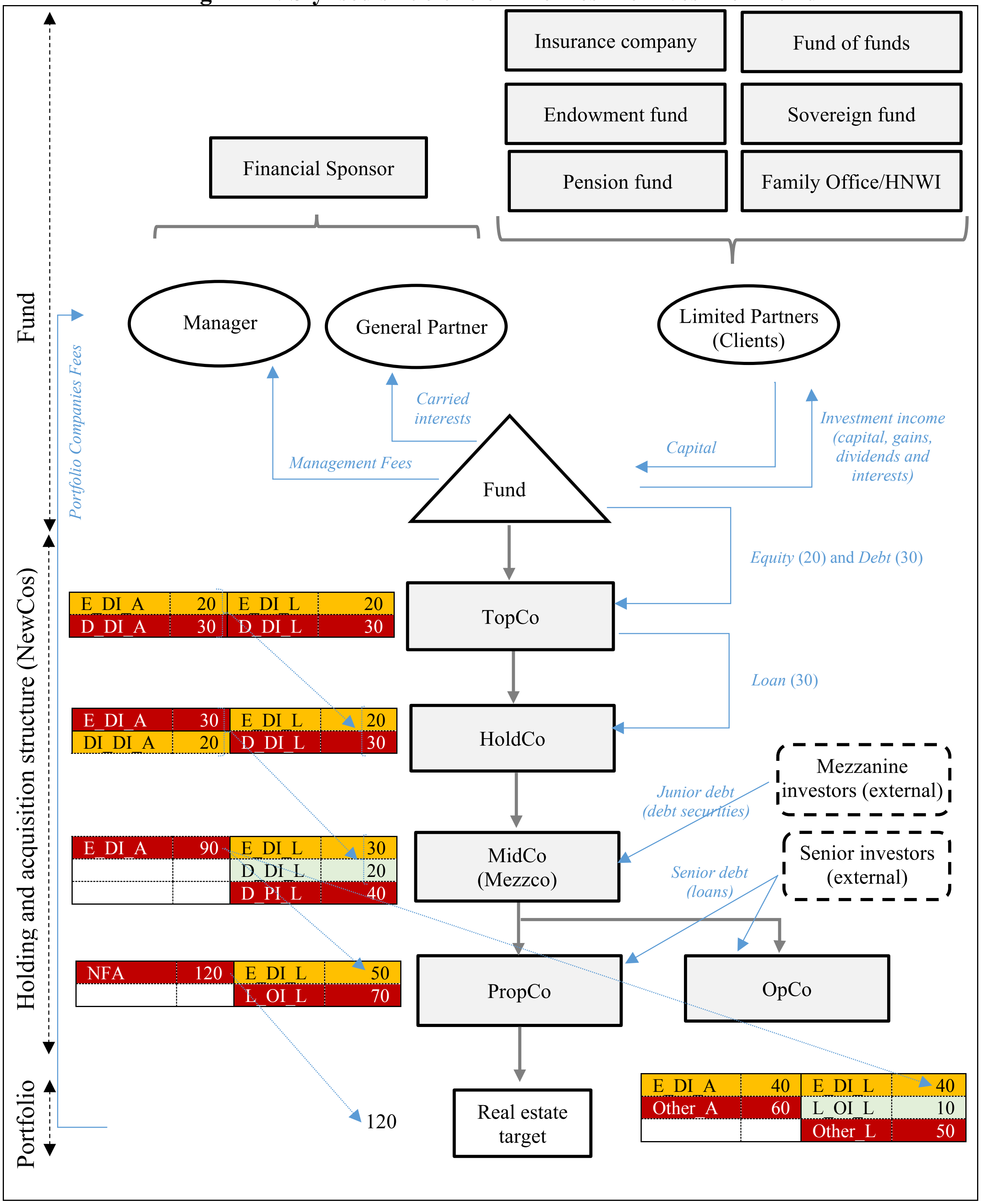
Investment strategies by real estate funds usually cover four main categories. Core real estate investments is the safest strategy. It targets secure income-producing real estate. This investment favours major cities with high credit score tenants on long-term leases. This strategy does not envisage property refurbishments. It boils down to a buy-and-hold strategy whose earnings rely on rental income and capital gain. Rents are collected from tenants and guarantee predictable income over a medium to long-term lease. Capital gains relate to the appreciation of the property or market timing between the acquisition and sale of the property. Core-plus real estate investments share similar features as core strategies instead that they target properties of slightly lower quality that can necessitate minor improvements. In addition, the conditions are less strict on the reliability of the tenants compared to core strategies. Value-added real estate investments are riskier as they involve more capital than core and core-plus investments. Value-added strategies target distressed properties that need to be refurbished. Investors renovate and redesign the property, secure tenants and then sell the property. Earnings comes more from the appreciation of the property by improving its physical structure and management structure than from income-producing rents granted by tenants as the building can feature low occupancy rates during the renovation period. Opportunistic real estate investments is similar to value-added real estate investments instead that it is riskier. This strategy targets buildings that are in worse state than in value-added strategies. In addition, the real estate asset may require more capital for its refurbishment and can feature a lower occupancy rate or can even be vacant during the refurbishment period.

Holding and acquisition structure

To finance the acquisition of the target property, real estate investment funds resort to a network of lenders and investors, including banks, insurance companies, pension funds, debt funds, mezzanine funds, mortgage REITs, family offices, hedge funds, *etc*.

Diagram 2 presents a stylised structure of a real estate investment fund. The holding and acquisition framework regroups a cascade of NewCos including the following entities: a TopCo, a HoldCo, a MidCo, a PropCo and an OpCo. These companies are usually classified in the sector S127 as captive financial institutions and money lenders. The use of CFIs enables the structural subordination in the group of investors to be determined. This structural subordination organises the required priority of return of the various different sources of funding provided by investors, according to their reward/risk profile. The structure comprises different layers of equity and debt financed by internal investors (GP, LPs) as well as external investors (*e.g.* banks, mortgage REITs, *etc*.). The recourse to debt in addition to equity plays the role of financial leverage to increase the return on investments.

Diagram 2: Stylised structure of a real estate investment fund



Source: adapted from Hudson (2014) and Gilligan and Wright (2020). NB: the colours red/yellow/green in the balance sheet of the NewCos reflect the relative predominance of their respective balance sheet items and thus the type of CFI (for more information, see Di Filippo and Pierret (2020a, 2022a)).

Thus, fund investors provide equity capital (E_DI_L) and a loan (D_DI_L) to the TopCo. This finances the acquisition of shares (E_DI_A) in the HoldCo and the provision of intragroup loans to the HoldCo (D_DI_A) at arm's length. The TopCo suits the prototype balance sheet of an intragroup lending company in the typology of CFIs (Di Filippo and Pierret (2020a)).

The HoldCo relies on shares (E_DI_L) and loans (D_DI_L) from the TopCo to hold equity capital (E_DI_A) and provide intragroup loans to the MidCo (D_DI_A) at arm's length. The HoldCo can be considered as a mixed structure sharing the features of a holding company and an intragroup lending company in the typology of CFIs (Di Filippo and Pierret (2020a)).

The MidCo sources equity (E_DI_L) and intragroup loans (D_DI_L) from the HoldCo to provide equity capital (E_DI_A) to the PropCo and the OpCo. The MidCo also benefits from additional external financing in the form of debt securities as portfolio investment (D_PI_L). Given the second-to-last position of the MidCo within the holding and acquisition structure, the (external) debt shares the features of a junior debt subordinated to the repayment of a senior debt. The MidCo suits the balance sheet of a conduit company in the typology of CFIs (Di Filippo and Pierret (2020a)).

The holding and acquisition structure separates the target property into two entities: a PropCo (property company) and an OpCo (operating company).

The PropCo owns the tangible assets (or non-financial assets, NFA), *i.e.* the real estate property. It also benefits from an external senior secured loan from a bank (L_OI_L). The PropCo leases the property to the OpCo under a lease agreement at arm's length. The OpCo thus operates the property, collects the rents and pays the lease to the PropCo. The PropCo uses the lease income from the OpCo to service the loan granted by the bank. The senior secured loan granted by the bank features a higher priority for repayment than the junior debt. It is also backed by a collateral. Hence, if the PropCo defaults on the loan, the bank seizes the property, sells it, and uses the proceeds to pay back the loan. The PropCo is typically a CFI with predominantly non-financial assets in the typology of CFIs (Di Filippo and Pierret (2020a)).

The OpCo owns the non-tangible assets *i.e.* the business activity related to the use of the real estate asset (also known as the goodwill). The OpCo is essentially an operating/trading company that owns all the other assets of the real estate property, such as contracts, licences, *etc*. The OpCo runs the accounts of the property. It collects the revenues (in the form of rents, Other_A) and pays the expenses relating to suppliers, utilities and staffing costs (Other_L). The OpCo then pays the collected rents to the PropCo for the lease of the property and pays the dividends and/or repayment of any equity injection to the ultimate owner.

Overall, the use of CFIs within the holding and acquisition structure of real estate investment funds enables the creation of a structural subordination between the different counterparties taking part in the investment project, based on their respective reward/risk preferences. As a matter of fact, the separation of the target property between a PropCo and an OpCo better suits the different risk appetites of property investors and non-property investors than relying on a unique structure comprising both tangible and non-tangible assets. In turn, this allows for a more efficient capital allocation from debtors, to get an optimal (*i.e.* lower) borrowing cost.

As shown in Diagram 2, to finance the acquisition of a real estate project worth 160 (120 for the real estate property and 40 for the OpCo), the fund relies on a combination of internal and external financing based on equity and debt instruments. Equity amounts in this example to 20 (*e.g.* 18 from LPs and 2 from the GP in TopCo). Debt amounts to 140 and is granted by internal investors (*i.e.* 30 from LPs in TopCo) and external investors (*i.e.* 40 from a mezzanine investor - *e.g.* a mortgage REIT - in MidCo and 70 from a senior investor - *e.g.* a bank - in PropCo). In other words, for a real estate target worth 160, the share of equity amounts to 13% (20/160) and that of debt to 88% (140/160) with external debt representing 70% (110/160). The share of external debt is larger than that of internal financing to create a leverage effect which amplifies investment returns.

3. Data

3.1 Holding and acquisition structure

The holding and acquisition structure mainly involves captive financial institutions whose role is to hold participations and finance the target acquisition. Databases on captive financial institutions in Luxembourg include the BCL reporting framework (BCL (2014)) and the new database based on EGR-SBR-CBSR developed by Di Filippo and Pierret (2022a).

3.1.1 BCL reporting framework *versus* new database based on EGR-SBR-CBSR

BCL reporting framework

The BCL reporting framework (BCL (2014)) collects balance sheet data for CFIs whose total assets are larger or equal to 500 million euros. The collection is thus limited to a sub-population of CFIs. As of Q3 2022, this sub-sample represents about 5% of the total number of CFIs in Luxembourg, and about 90% of the total assets held by CFIs in Luxembourg. Data are available in monthly frequency from December 2014 to September 2022. The sample period begins in December 2014, as data starting from this period onwards comply with the revised international statistical standards of the IMF (2009)'s BPM6.

The BCL reporting framework provides a breakdown of balance sheet items by maturity, currency and geographical counterparts. The geographical counterpart corresponds to the immediate counterpart country, either for the host country or for the investing country. This follows international statistical standards as defined in the approach for the compilation of Balance of Payments statistics (IMF (2009)'s BPM6).

New database based on EGR-SBR-CBSR

The new database on CFIs developed by Di Filippo and Pierret (2022a) enhances the data coverage of CFIs in Luxembourg. It includes not only CFIs with total assets larger or equal to 500 million euros as in the BCL reporting framework but also CFIs with total assets lower than 500 million euros. This new database combines information from three sources: the EuroGroups

Register (EGR) managed by Eurostat, the Statistical Business Register (SBR) managed by STATEC (the National Institute of Statistical and Economic Studies of Luxembourg) and the Central Balance Sheet Register (CBSR) managed by STATEC. Data are available in annual frequency over the period 2011-2020.

The selection of CFIs resident in Luxembourg relies on vintage NACE codes from EGR and current NACE codes from the SBR. In accordance with statistical standards, the NACE codes fall under the categories 64.20 ("activities of holding companies") and 64.305 ("wealth management companies" or *société de gestion de patrimoine familial*).

The building of CFIs' balance sheets relies on accounting data from the standardised chart of accounts, available in electronic format in the Central Balance Sheet Register. This register retrieves information from the annual accounts deposited by resident companies on the electronic platform of the National Business Register.[13]

Overall, the BCL reporting framework reports monthly data over the period December 2014-September 2022 while the new database only provides annual data over the period 2011-2020. Hence, the BCL reporting framework features shorter delays concerning data updates and a higher frequency than the new database. In addition, contrary to the BCL reporting framework, the new database does not include a breakdown of balance sheet items by geographical counterpart. The latter counterpart is useful to draw a distribution of FDI stocks according to international statistical standards, *i.e.* by immediate counterpart country. As a result, this paper uses data from the BCL reporting framework.

3.1.2 Accounting information

The balance sheet of CFIs taking part to the holding and acquisition structure takes the following form:

[13] These annual accounts comprise a balance sheet, a profit and loss account and a standardised chart of accounts. While companies can deposit a complete or an abridged version of the balance sheet and of the profit and loss account, a complete version of the standardised chart of accounts is mandatory, hence the use of this latter accounting document to build CFIs' balance sheets in the new database based on EGR-SBR-CBSR.

Table 1: Balance sheet of CFIs

		Assets (A)	Liabilities (L)
Non-Financial Assets		*NFA*	
Direct investment	**Equity**	*E_DI_A*	*E_DI_L*
	Debt	*D_DI_A*	*D_DI_L*
Portfolio investment	**Equity**	*E_PI_A*	*E_PI_L*
	Debt	*D_PI_A*	*D_PI_L*
Other investment	**Loans**	*L_OI_A*	*L_OI_L*
	Currency & Deposits	*CD_OI_A*	
Financial derivatives		*Deriv_A*	*Deriv_L*
Other liabilities			*Other_L*
Total		**Total assets**	**Total liabilities**

Source: Di Filippo and Pierret (2020a)

On the assets side, the total assets of CFIs regroup non-financial assets (NFA) and financial assets. Financial assets cover direct investment (*E_DI_A*, *D_DI_A*), portfolio investment (*E_PI_A*, *D_PI_A*), financial derivatives (*Deriv_A*) and other investment (*L_OI_A*, *CD_OI_A*). Direct investments include intragroup financing materialised by equity as direct investment (*E_DI_A*) - provided that the shareholding is larger or equal to 10% of the capital held in sub-affiliates - and debt as direct investment (*D_DI_A*). This latter item mainly features intragroup loans and to a lesser extent, non-hybrid debt securities that are not negotiable on financial markets. Portfolio investments cover investments in equity securities (*E_PI_A*) - provided that the shareholding is lower than 10% of the capital held in sub-affiliates - and in debt securities (*D_PI_A*). Other investments regroup extra-group loans (*L_OI_A*) and currency and deposits (*CD_OI_A*).

On the liabilities side, the items include direct investment (*E_DI_L*, *D_DI_L*), portfolio investment (*E_PI_L*, *D_PI_L*), derivatives (*Deriv_L*) and other investment (*L_OI_L*, *Other_L*). Direct investment entails intragroup financing illustrated by equity as direct investment (*E_DI_L*) - provided that the equity share is larger or equal to 10% of the company's equity - and debt as direct investment (*D_DI_L*). This latter item mainly includes intragroup loans and to a lesser extent, non-hybrid debt securities that are not negotiable on markets. Portfolio investments cover investments in equity securities (*E_PI_L*) - provided that the equity share is lower than 10% of the company's equity - and in debt securities (*D_PI_L*). Other investments regroup loans sourced from entities outside the group (*L_OI_L*) and other liabilities (*Other_L*).

3.2 Sponsor (capital manager)

The fund sponsor (or fund initiator or fund promoter) is the person, group of persons or institution taking the initiative to set up an investment fund and determining its terms and conditions. They can be deemed as the capital managers, *i.e.* those who allocate the capital in majority provided by the limited partners.

Data on fund sponsors are available from Di Filippo and Pierret (2020b) and Di Filippo (2022b), who developed a methodology to identify the sponsor based exclusively on publicly available information. The identification of the sponsor is equivalent to finding the parent (or headquarters) of a CFI affiliated to an investment fund. This boils down to climbing up the ownership chain of entities composing the holding and acquisition structure of the investment fund, until reaching the parent.

Thus, to identify a sponsor, the paper primarily uses information in the National Business Register, including the CFI shareholders and the annual accounts. The paper also considers additional publicly available sources such as the EDGAR database managed by the US Securities and Exchange Commission and other data providers (*e.g.* Bloomberg).

The paper also provides the nationality of the sponsors. The nationality corresponds to the geographical location of the operational headquarters of the sponsor.

3.3 Target (capital recipient)

The identification of the target boils down to climbing down the ownership chain of the holding and acquisition structure of the investment fund, until the target is reached. To this aim, the paper exploits information that is exclusively publicly available.

Investigations primarily rely on information from CFIs' annual accounts available in the National Business Register. Given that the holding and acquisition structures often feature several entities, the paper identifies the sub-affiliates of a given CFI in the item "*Shares in affiliated undertakings*" of the annual accounts. This enables to descend the ownership chain until reaching the last CFI that ultimately owns the target. This last CFI may mention the name of the target under the item "*Shares in affiliated undertakings*".

In addition to the annual accounts, the paper also exploits information provided by the sponsors on their websites. The latter often disclose their acquisitions along with their main characteristics: purchase date, purchase price, main economic activities undertaken by the target, geographical location of the target (or headquarters), *etc*.

In addition to the above resources, the paper also relies on the financial literature that is publicly available (*e.g.* Reuters, Bloomberg, the Wall Street Journal, the Financial Times, and specialised journals/websites dealing with private equity and real estate investments). Public information on acquisitions by PE investment funds may also be released by Competition and Market Authorities.[14,15]

The paper also identifies the nationality of the target. This allows understanding in which countries PE and RE investment funds acquire their targets. When PE funds invest in complex structures such as multinational corporations, the paper considers the geographical location of the operational headquarters to assign the nationality of the target. When PE funds invest in targets featuring simple structures, the nationality of the target is the location of the final investment. This is notably the case of real estate investments (*e.g.* residential lots, building towers, shopping centres, hospitals, *etc*.) or infrastructure investments (*e.g.* transportation infrastructure, telecommunication infrastructure, solar plants, wind farms, *etc*.).

Eventually, the paper also informs about the main economic activities performed by the targets. This enables to understand in which category of business activities PE and RE investment funds allocate their investments.

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[14] In the European Union, these reports are released in the Official Journal of the European Union (https://eur-lex.europa.eu/) by the Directorate-General for Competition of the European Commission (https://ec.europa.eu/competition/elojade/isef/index.cfm?clear=1&policy_area_id=3).

[15] Competition and Market Authorities ensure control and release clearance for mergers and acquisitions provided that they comply with antitrust laws and do no threaten competition in a given market or industry. Indeed, acquisitions by PE funds may raise several concerns with regard to antitrust rules. For instance, roll-up strategies by PE funds involve the acquisition of multiple small players in an industry in order to create a single large player. Antitrust authorities must control whether roll-up strategies does not lessen competition and lead to a monopoly. Another example of antitrust concern relates to whether an acquisition by a PE fund led a target to focus on short-term financial gains while shunning product quality or innovation. In addition, antitrust rules also prohibits interlocking directorates. This may occur when representatives of the same PE fund serve as board members in two competing firms in the same market. Eventually, antitrust regulation must avoid club bidding, that is, collusion between multiple PE firms competing to purchase a target, and ensure a fair price for the target acquisition.

3.4 Client (capital provider)

Within the structure of an investment fund, the majority of capital is brought by the clients of the sponsor *i.e.* the Limited Partners. The latter provide investment capital into the fund. International statistical standards register these capital flows as portfolio investments.

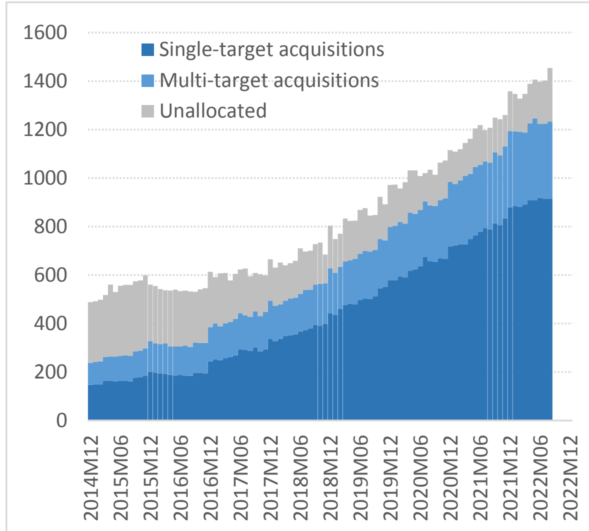
Several databases provide information about the clients of the sponsors. This paper relies on Bloomberg. The latter informs about the clients of the sponsors, their respective share in the fund, the type of investors (*e.g.* pension funds, endowment funds, insurance companies, funds of funds, *etc*.) and the nationality of the investors (*i.e.* the geographical location of their respective operational headquarters).

3.5 Database on CFIs affiliated to PE and RE investment funds: a first glance

This section provides a first glance at the database on CFIs affiliated to PE and RE investment funds. Chart 1 presents the results of the investigations regarding the identification of the targets. The total assets of CFIs affiliated to PE and RE investment funds are decomposed into three categories: single-target acquisitions, multi-target acquisitions and unallocated. Single-target acquisitions feature CFIs purchasing a single target. Multi-target acquisitions feature CFIs investing in several targets. The unallocated category represents CFIs whose target cannot be identified based on available information.

The analysis considers only CFIs purchasing a single target. It rules out CFIs investing in multiple targets, due to the difficulty of statistical treatment. Indeed, contrary to CFIs owning multiple targets, the total assets held by single-target CFIs can easily be allocated to its immediate counterpart country, its target counterpart (including the geographical location and main economic activities) and its sponsor counterpart (including the geographical location and main economic activities).

Chart 1: Total assets held by CFIs affiliated to investment funds



Unit: EUR billion

Chart 2 presents the total assets held by single-target CFIs affiliated to PE and RE investment funds (right-hand scale), over the period December 2014-September 2022. The considered single-target CFIs are those for which the full ownership structure has been identified, given available data. The full ownership structure must comprehend the clients (or Limited Partners), the sponsor (or General Partner), the fund, the holding and acquisition structure and the target. Chart 2 also presents the number of target acquisitions per month and the deal value (or acquisition price of the target) on the left-hand scale, over the period January 2001-September 2022.

Chart 2 shows that the total assets held by single-target CFIs affiliated to PE and RE investment funds increased over the period December 2014-September 2022. These dynamics coincide with the evolution of the number of acquisitions per month and the acquisition price of the targets. Indeed, the correlation between the latter two series and the total assets held by single-target CFIs affiliated to PE and RE investment funds is positive and significant.

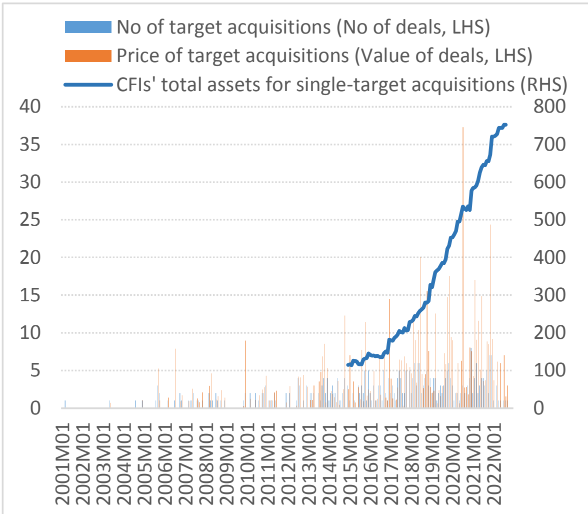
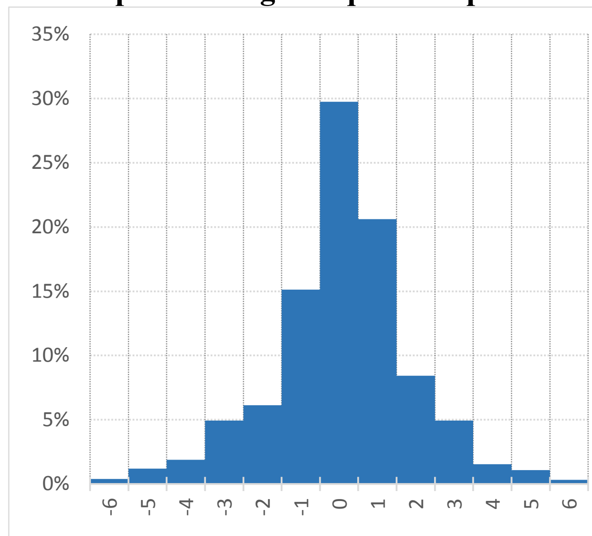
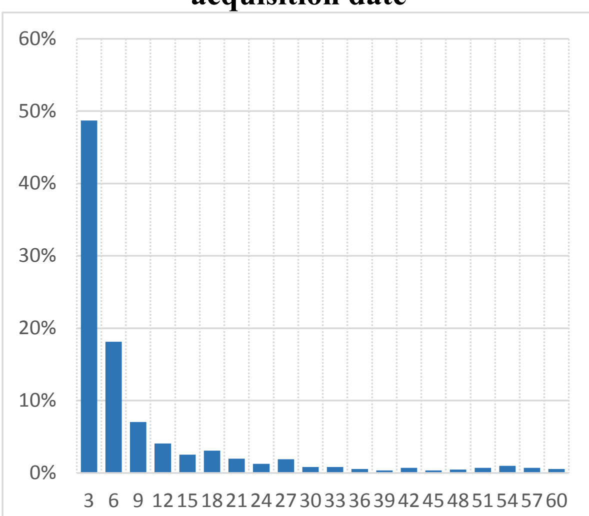
Chart 2: CFIs’ total assets, number of target deals and acquisition prices	**Chart 3: Distribution of the difference between CFIs’ total assets and their respective target acquisition price**
	
Unit: Number for No of target acquisitions (LHS), EUR billion for Price of target acquisition (LHS), EUR billion for CFIs’ total assets (RHS)	Unit: Percent (y-axis), EUR billion (x-axis)

Chart 3 presents the distribution of the difference between the total assets of CFIs and the acquisition price of their respective target. In most cases, the difference is close to zero, suggesting that the acquisition price of the target is close to the total assets held by the CFIs used to acquire this target. In other words, the total assets held within the holding and acquisition structure (or CFIs) owned by PE and RE investment funds can reflect the acquisition price of their investment target. This provides empirical evidence for the theoretical examples presented in section 2, whether for private equity funds (Diagram 1) and for real estate funds (Diagram 2).

Any differences between CFIs’ total assets and the target’s acquisition price can relate to different factors. On the one hand, the characteristics of the holding and acquisition structure can explain negative differences (*i.e.* a higher acquisition price of the target than the total assets held by CFIs). In this case, this implies that the analysis is missing some CFIs within the ownership chain. This can be explained by two reasons. First, missing CFIs in the ownership chain may feature total assets below the threshold of 500 million euros (this paper considers only CFIs with total assets larger or equal to 500 million euros). Second, missing CFIs in the ownership chain may be located in other jurisdictions than Luxembourg (this paper considers only CFIs resident in Luxembourg). On the other hand, financial factors can explain positive differences. Indeed, during the investment period following the target acquisition, investors can proceed to additional investments through capital injections within the holding and acquisition structure. These additional investments can finance specific projects to develop the business activities of the target (organic growth) or finance the acquisition of additional companies by the target *via* mergers and acquisitions (external growth). These additional investments aim to increase the potential selling value of the target. In this case, the total assets held by CFIs will be larger than the acquisition price of the target, leading to a positive difference.

Chart 4 presents the distribution of the difference between the creation date of CFIs and the acquisition date of their respective target.

Chart 4: Distribution of the difference between CFIs' creation date and target acquisition date



Unit: Percent (y-axis), Duration in months (x-axis)

We observe that the time length between the target acquisition and the creation date of CFIs owning this target ranges mostly within 1 and 6 months. In other words, the purchasing date of the target coincides in most cases with the creation date of CFIs owning this target. Hence, in most cases, the creation date of the holding and acquisition structure used by PE and RE investment funds reflects the acquisition date of the target.

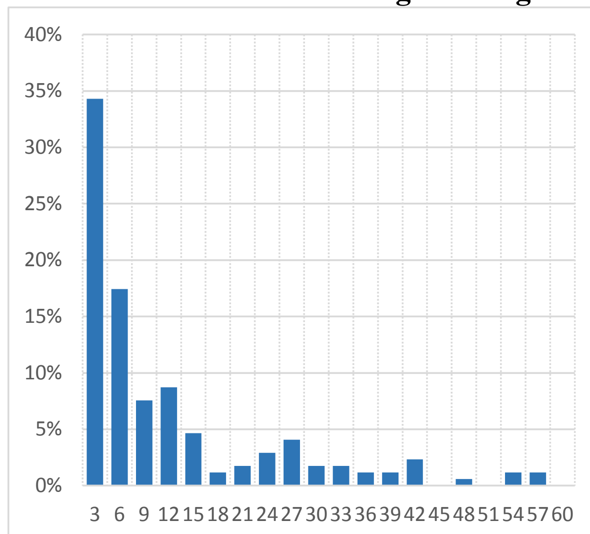
In turn, this suggests that the time-to-market may be an important factor to consider for PE and RE investment funds. The time-to-market is the time required to build up the holding and acquisition structure that suits the preferences of the different stakeholders in the deal (whether investors or investees).[16]

[16] The time-to-market is an important dimension for PE and RE investment funds. Indeed, PE and RE investment funds often compete with other groups – be they their peers or other, including non-financial groups – concerning the acquisition of a target. In such a competitive environment, the structuring and financing of the deal in due time is a crucial hurdle for a PE/RE investment fund potential bid to succeed. For example, PE and RE investment funds often need to raise billions of capital in delays as short as three weeks. As a result, the time required to set up the holding

Chart 5 presents the distribution of the difference between the cessation date of CFIs and the selling date of their respective target.

We observe that the time length between the selling date of the target and the cessation date of CFIs ranges mostly within 1 and 12 months. In other words, the selling date of the target coincides in most cases with the cessation date of CFIs owning this target. Hence, in most cases, the end of the holding and acquisition structure used by PE and RE investment funds reflects the selling date of the target.

Chart 5: Distribution of the difference btw CFIs' cessation date and target selling date



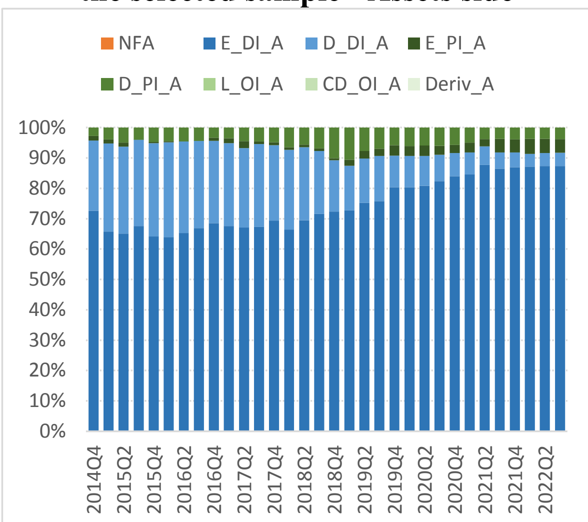
Unit: Percent (y-axis), Duration in months (x-axis)

CFIs featuring a longer time length between the selling date of the target and the cessation date of CFIs may reflect the fact that some PE funds may keep a minority share in the target once they sell their majority share to another acquirer.

and acquisition structure and the ability to rely on flexible financing tools that suit investors' preferences are key factors for PE and RE investment funds when choosing the location to establish the entities that frame the holding and acquisition structure.

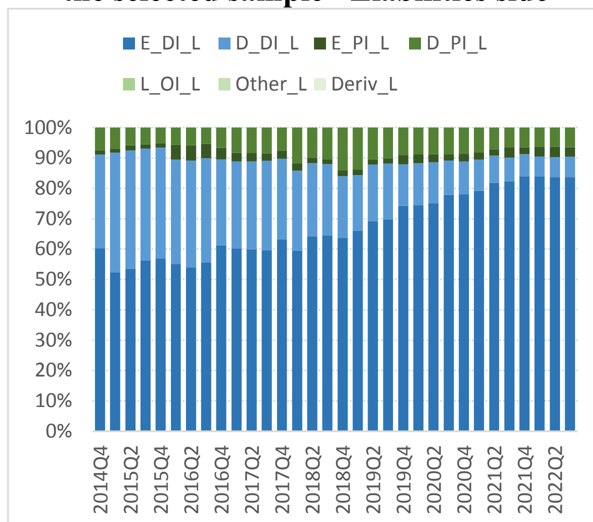
Charts 6.1 and 6.2 decomposes the balance sheet of CFIs affiliated to PE and RE investment funds by category of investment and by instrument (see section 3.1.2).

Chart 6.1: Balance sheet items of CFIs in the selected sample - Assets side



Unit: Percent of total assets. Average over the period Q4 2014 – Q3 2022

Chart 6.2: Balance sheet items of CFIs in the selected sample - Liabilities side



Unit: Percent of total liabilities. Average over the period Q4 2014 – Q3 2022

On the assets side and on average over the period Q4 2014-Q3 2022, direct investment represents 95% of the total assets held by CFIs affiliated to PE and RE investment funds. The share amounts to 85% on the liabilities side. This suggests that internal financing in the form of equity and intragroup loans represents the bulk of the aggregate balance sheets of CFIs affiliated to PE and RE investment funds. In other words, FDI stocks of CFIs mainly deal with direct investment in the form of equity (*E_DI*) and intragroup loans (*D_DI*).

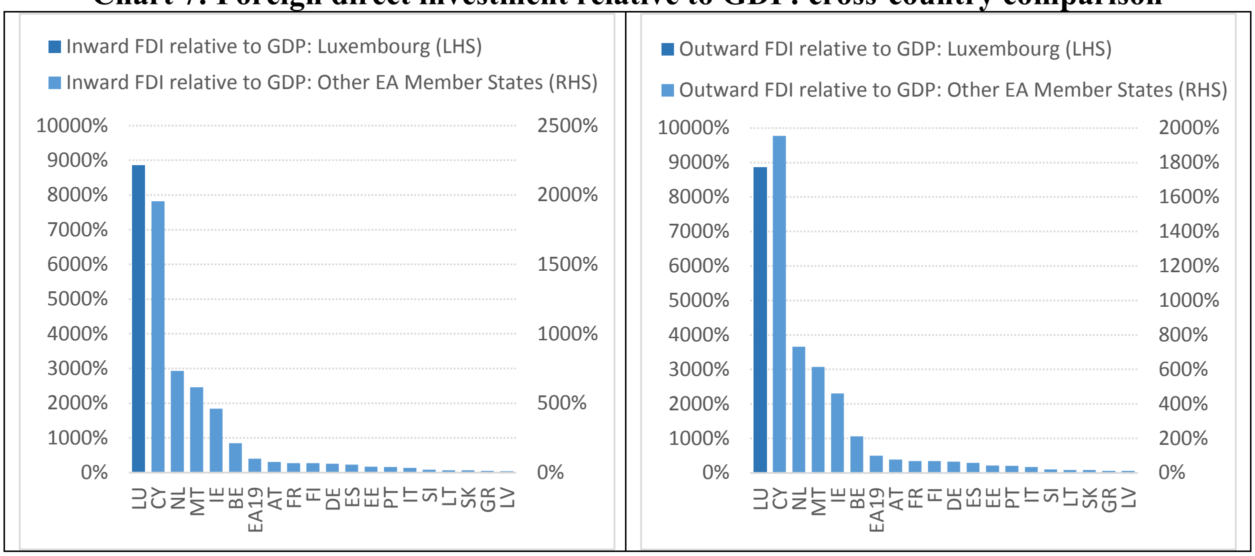
4. Decomposition of the stock of FDI in Luxembourg

This section decomposes the stock of FDI in Luxembourg starting from an aggregate macroeconomic level to a more disaggregated level.

4.1 Stock of FDI relative to GDP: cross-country comparison

Chart 7 presents the stocks of inward and outward FDI relative to GDP, across euro area (EA) jurisdictions. The inward FDI stock is the value of non-resident investors' equity in and net loans to enterprises resident in the reporting economy (hence residents' liabilities). The outward FDI stock is the value of resident investors' equity in and net loans to enterprises in foreign economies (hence residents' assets).

Chart 7: Foreign direct investment relative to GDP: cross-country comparison



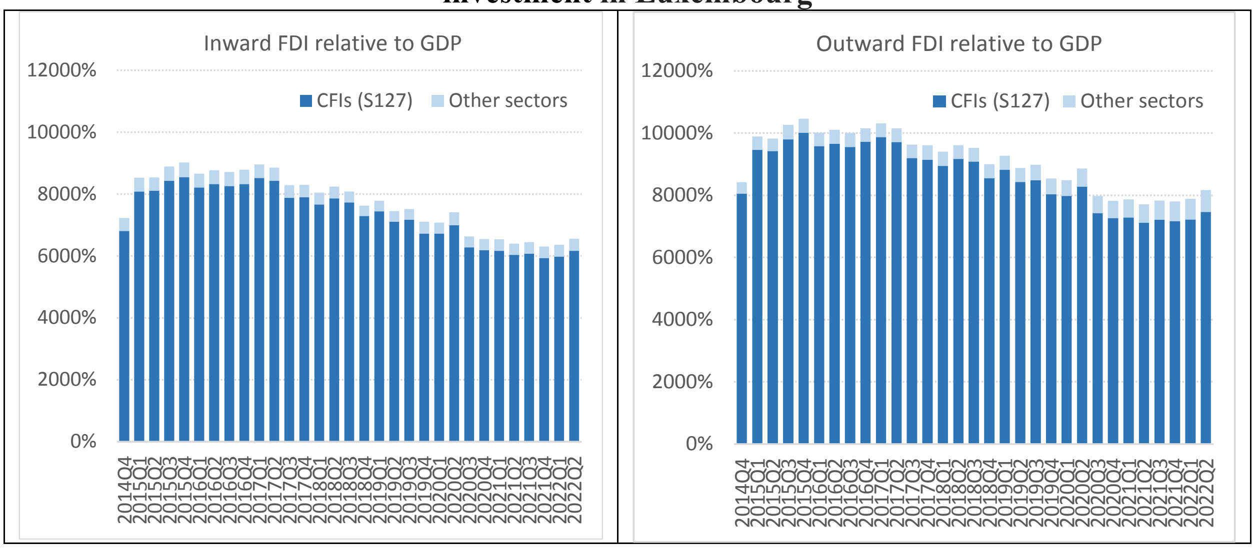
Source: ECB-SDW. Unit: Percent, average Q4 2014 – Q2 2022

In comparison to other EA countries, Luxembourg features the most important stocks of inward and outward FDI relative to GDP.

4.2 Stock of FDI relative to GDP in Luxembourg: sectoral decomposition

Chart 8 focuses on Luxembourg and decomposes the stocks of inward and outward FDI relative to GDP by sector. Figures show that captive financial institutions (CFIs, sector S127) account for most of the inward and outward stocks of FDI compared to the other sectors. On average over the period Q4 2014 – Q2 2022, the share held by CFIs amounts to 95% on the liabilities side (inward FDI) and on the assets side (outward FDI). This reflects the fact that Luxembourg acts as a global financial hub for multinational enterprises, which use CFIs to manage their business activities and structure their corporate investments.

Chart 8: Sectoral decomposition of inward and outward stocks of foreign direct investment in Luxembourg

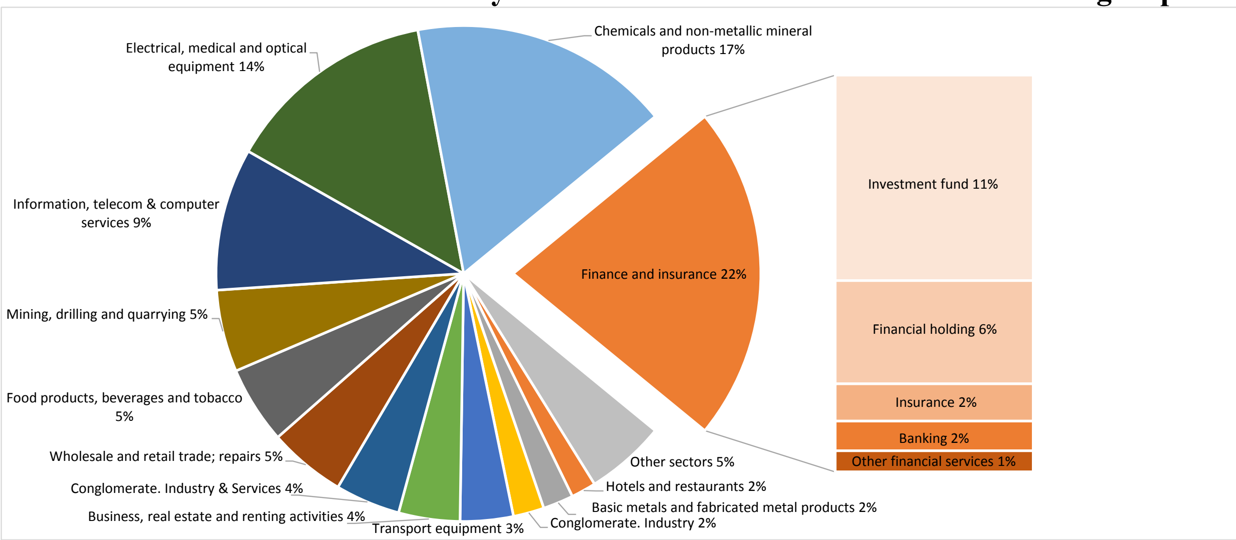


Source: BCL. Unit: Percent

4.3 Total assets of CFIs: breakdown by main economic activities of affiliated groups

Chart 9 focuses on CFIs resident in Luxembourg and breaks down their total assets by main economic activities performed by their respective affiliated group.

Chart 9: Total assets of CFIs by main economic activities of their affiliated group



Source: BCL. Unit : Percent, average Q4 2014 – Q3 2022

On average, over the period Q4 2014 – Q3 2022, total assets held by CFIs are mostly affiliated with groups active in "Finance and insurance" (22%), "Chemicals and non-metallic mineral products" (17%), "Electrical, medical and optical equipment" (14%), "Information, telecommunications and computer services" (9%), "Mining, drilling and quarrying" (5%), "Food products, beverages and tobacco" (5%) and "Wholesale and retail trade; repairs" (5%). Altogether, groups in these activities account for about 80% of the total assets held by CFIs in Luxembourg. The remaining 20% represent groups involved in other economic activities.

Across activities, groups performing finance and insurance activities represent the largest share of total assets held by CFIs. Within this category of activities, the Luxembourg investment fund industry owns most of the total assets held by CFIs (Chart 9). This relates to the fact that Luxembourg hosts one of the most important fund industries in the world. Its investment fund industry hold assets worth EUR 5,859 billion in Q4 2021 (EFAMA (2022)), placing Luxembourg as the leading investment fund centre in Europe and the second largest at the global level, behind the United States where the fund industry hold assets equal to EUR 30,156 billion in Q4 2021.[17] In particular, most CFIs in groups performing finance and insurance activities are affiliated with investment funds targeting private company and real estate acquisitions. Indeed, according to Hoor (2018), CFIs appear as a suitable tool for investment funds to structure their investments, notably in private equity or real estate.

4.4 Geographical breakdown of total assets held by CFIs affiliated to PE and RE investment funds

Charts 10.1 to 10.4 provide alternative geographical breakdowns of the total assets and total liabilities held by CFIs affiliated to PE and RE investment funds according to different counterparts.

Charts 10.1 and 10.2 consider the immediate counterpart country, the one traditionally favoured by international statistical standards (IMF (2009)'s BPM6). Charts 10.3 and 10.4 consider respectively, the sponsor counterpart and the target counterpart. More precisely, Charts 10.3 and 10.4 show the geographical location of the operational headquarters of the sponsors and of the targets, respectively.

[17] See EFAMA (2022), Table 5 "Total net assets excluding funds of funds by the type of funds", millions of euro, end of quarter, Q4 2021 p. 14.

Chart 10: Geographical breakdown of CFIs' total assets by different counterparts

Chart 10.1: CFIs' total liabilities by immediate counterpart country

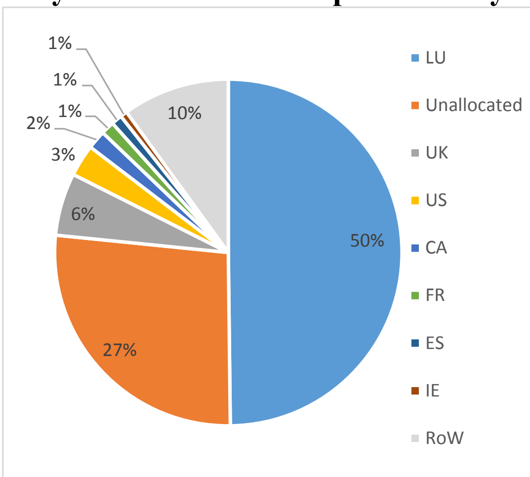


Chart 10.2: CFIs' total assets by immediate counterpart country

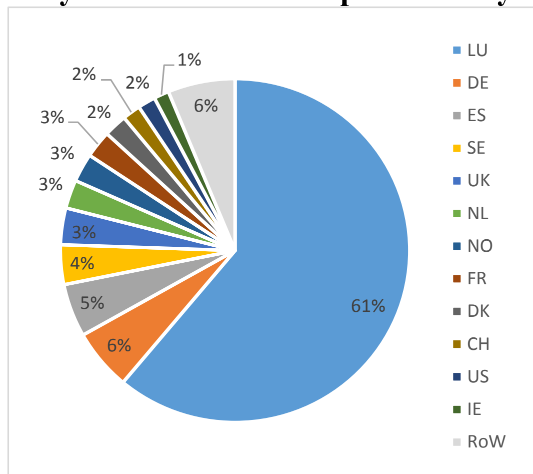


Chart 10.3: CFIs' total liabilities by sponsor counterpart

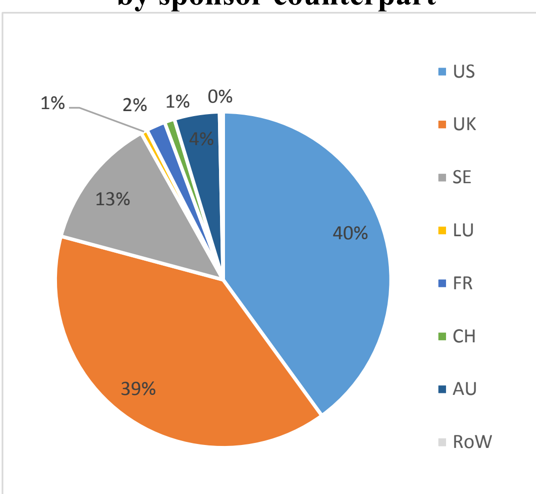
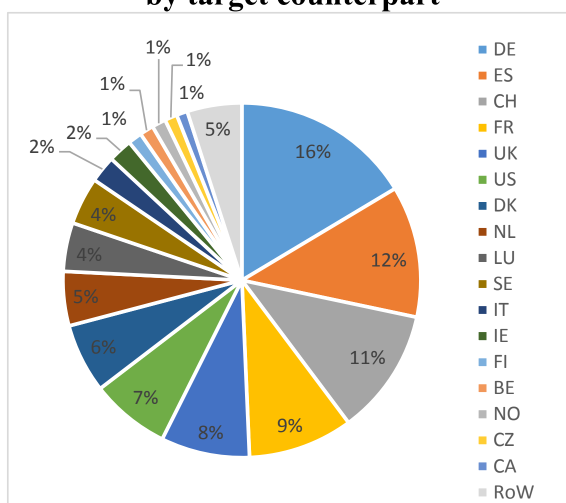


Chart 10.4: CFIs' total assets by target counterpart



Unit: Percent of total assets (respectively, total liabilities) held by CFIs affiliated to PE and RE investment funds. Average Q4 2014 – Q3 2022

Chart 10 shows that the geographical breakdown of total assets and total liabilities held by CFIs affiliated to PE and RE investment funds differs substantially depending the considered counterpart.

The immediate counterpart country shows that the total assets and total liabilities held by CFIs affiliated to PE and RE investment funds are mostly *vis-à-vis* Luxembourg.[18] This suggests

[18] The "unallocated" pie slice on the liabilities side (Chart 10.1) relates to the item debt securities (2-003000 in the BCL reporting framework) as no geographical allocation is required for this specific item.

that most of the ownership chain of CFIs within the holding and acquisition structure is located in Luxembourg.

The sponsor counterpart highlights that the total liabilities held by CFIs affiliated to PE and RE investment funds are mostly against the United States and the United Kingdom. This suggests that fund managers owning CFIs in Luxembourg are investment funds headquartered in the United States and the United Kingdom.

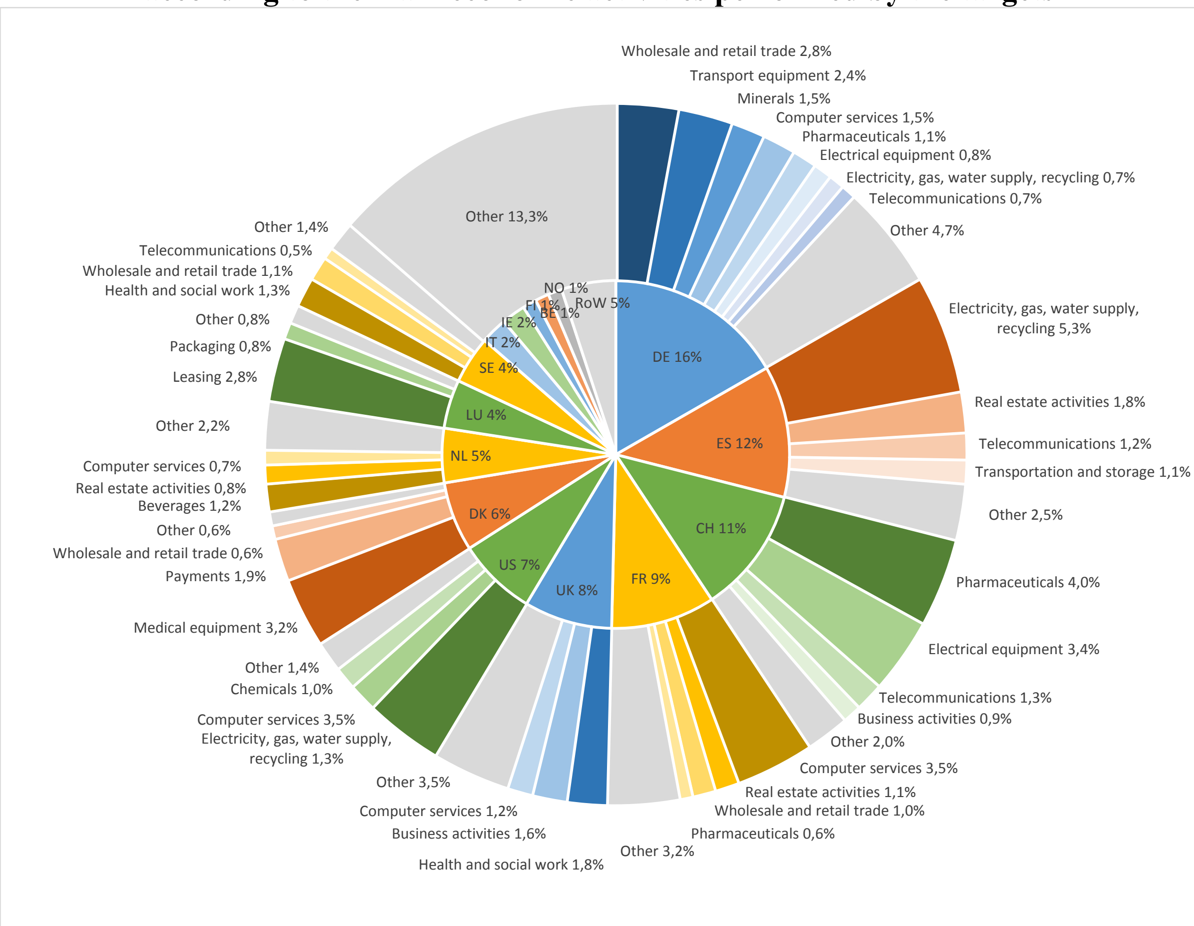
The target counterpart shows that the total assets held by CFIs affiliated to PE and RE investment funds are mostly *vis-à-vis* Germany (16%), Spain (12%), Switzerland (11%), France (9%), the United Kingdom (8%), the United States (7%), Denmark (6%), the Netherlands (5%), Luxembourg (4%), Sweden (4%), Italy (2%), Ireland (2%), Finland (1%), Belgium (1%), Czech Republic (1%) and Canada (1%). Altogether these countries account for 95% of the total assets held by CFIs affiliated to PE and RE investment funds. It is worth noting that this geographical breakdown of the targets is representative only of the specific sample considered in this analysis *i.e.* single-target CFIs resident in Luxembourg with total assets larger or equal to 500 million euros and affiliated to PE and RE investment funds.

With hindsight, the network of FDI stocks held by CFIs affiliated to PE and RE investment funds in Luxembourg is rather concentrated. Indeed, a small number of countries accounts for most of the sponsors (Chart 10.3). On the other hand, target investments are more evenly distributed across advanced economies (Chart 10.4). Within this network, Luxembourg acts as a financial platform (Chart 10.1 and 10.2), where capital flows from fund providers (mainly clients) to final fund recipients (targets). Altogether, Charts 10.1 to 10.4 provide a full overview of the ownership chain of FDI stocks in terms of geographical counterparts, from the sponsor to the target, *via* the holding and acquisition structure.

4.5 Breakdown of total assets held by CFIs affiliated to PE and RE investment funds across main economic activities undertaken by the targets

Chart 11 presents both a geographical and sectoral breakdown by target counterpart of the total assets held by CFIs affiliated to PE and RE investment funds according to the main economic activities performed by the targets.[19]

Chart 11: Breakdown of total assets held by CFIs affiliated to PE and RE investment funds according to the main economic activities performed by the targets



Unit: Percent of total assets held by CFIs affiliated to PE and RE investment funds. Average Q4 2014 – Q3 2022

[19] Chart 11 ranks the geographical and sectoral shares by size. Thus, in the considered sample, Switzerland (CH) is the third country in terms of investment size, representing 11% of total assets held by CFIs, behind Germany (DE) with 16% of total assets and Spain (ES) with 12% of total assets. In Switzerland, investments funds target companies performing activities in the following business areas: pharmaceuticals (4.0%), electrical equipment (3.4%), telecommunications (1.3%), business activities (0.9%) and other (2.0%).

PE and RE investment funds invest in targets that perform different economic activities, depending their geographical location. The relative share of the categories of main economic activities differ depending the considered country. Once again, this geographical and sectoral breakdown of the targets prevails for the specific sample considered in this paper, *i.e.* single-target CFIs resident in Luxembourg with total assets larger or equal to 500 million euros and affiliated to PE and RE investment funds. As a matter of fact, in Chart 11, the share of real estate property acquisitions is lower than the share of company acquisitions. This reflects the characteristics of the sample of CFIs analysed in this study. Indeed, the sample covers CFIs with total assets larger or equal to 500 million euros. These CFIs target mostly the acquisition of large multinational corporations and to a lesser extent the acquisition of real estate properties.[20]

5. Distribution of FDI stocks: immediate counterpart country *versus* sponsor/target/client counterparts

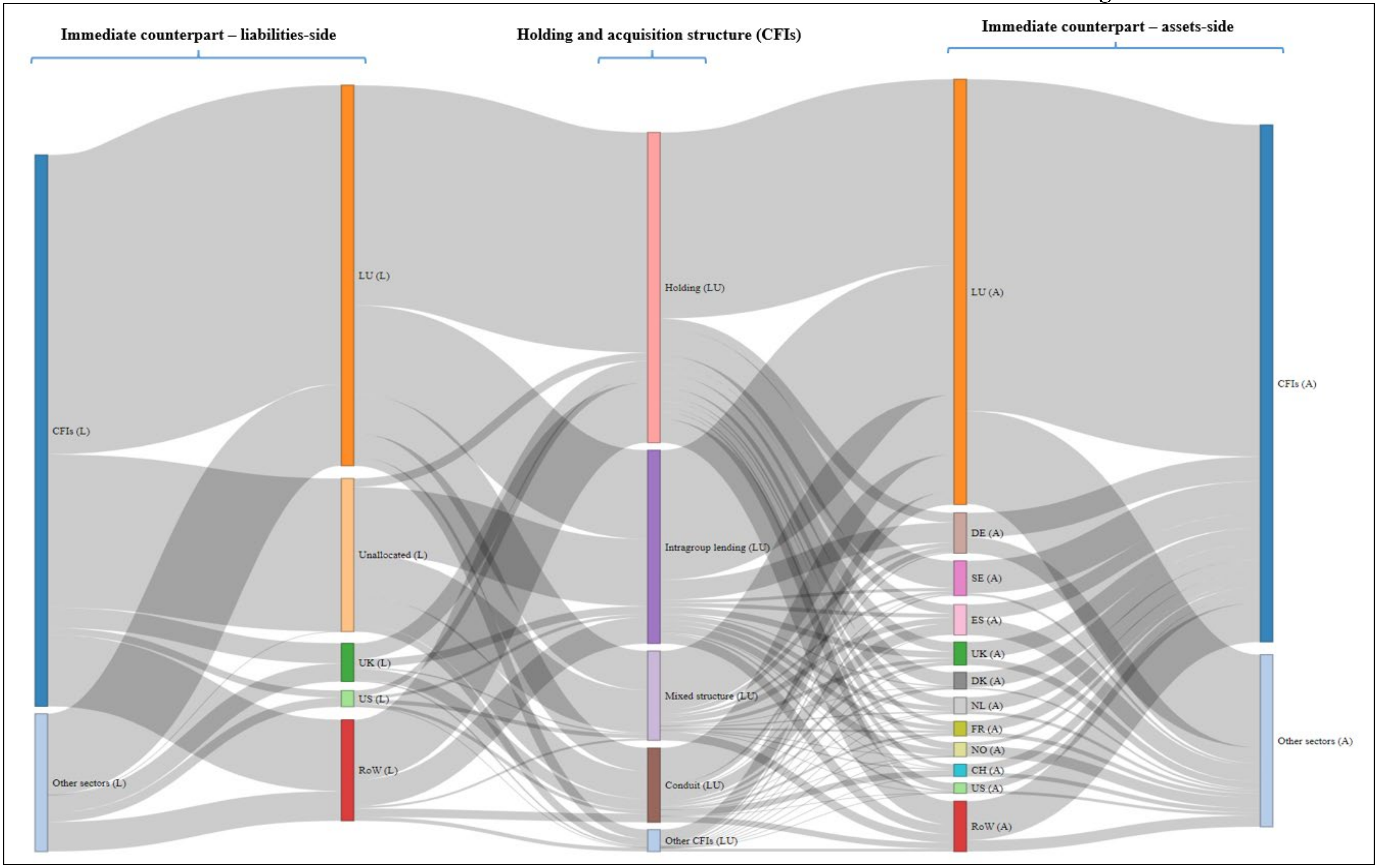
This section presents alternative distributions of FDI stocks and discusses some implications concerning the registration of FDI statistics.

5.1 Traditional distribution of FDI stocks by immediate counterpart country

Chart 12 draws a traditional distribution of FDI stocks held by CFIs affiliated to PE and RE investment funds by considering the immediate counterpart country, the one traditionally favoured by international statistical standards (IMF (2009)'s BPM6). The distribution covers the liabilities side and the assets side of CFIs' balance sheets, respectively.

[20] Analysing whether the share of real estate property acquisitions increases when considering CFIs with balance sheet size below 500 million euros goes beyond the scope of this paper.

Chart 12: Traditional distribution of FDI stocks by immediate counterpart country: Evidence from CFIs affiliated to PE and RE investment funds in Luxembourg



Unit: Total assets over the period Q4 2014-Q3 2022. NB: This distribution is representative only of the specific sample considered in the analysis *i.e.* single-target CFIs resident in Luxembourg with total assets larger or equal to 500 million euros and affiliated to PE and RE investment funds.

On the liabilities side, CFIs are the most important sector counterpart (80%). The other sectors hold 20%. Moreover, Luxembourg is the most important geographical counterpart (62%). The remainder amounts to 23% for foreign countries and 22% for the unallocated category.[21]

On the assets side, CFIs account for 75% of the sector counterpart while other sectors hold 25%. In addition, Luxembourg features the most important geographical counterpart (62%). The foreign countries counterpart amounts to 38%.

Altogether, the immediate counterpart country suggests that on the liabilities side, most of capital originates from CFIs (sector S127) located in Luxembourg. In addition, on the assets side, most of capital is held towards CFIs located in Luxembourg. The predominance of resident CFIs on the liabilities side and on the assets side suggests that most of the ownership chain of CFIs within the holding and acquisition structures used by investment funds is located in Luxembourg.

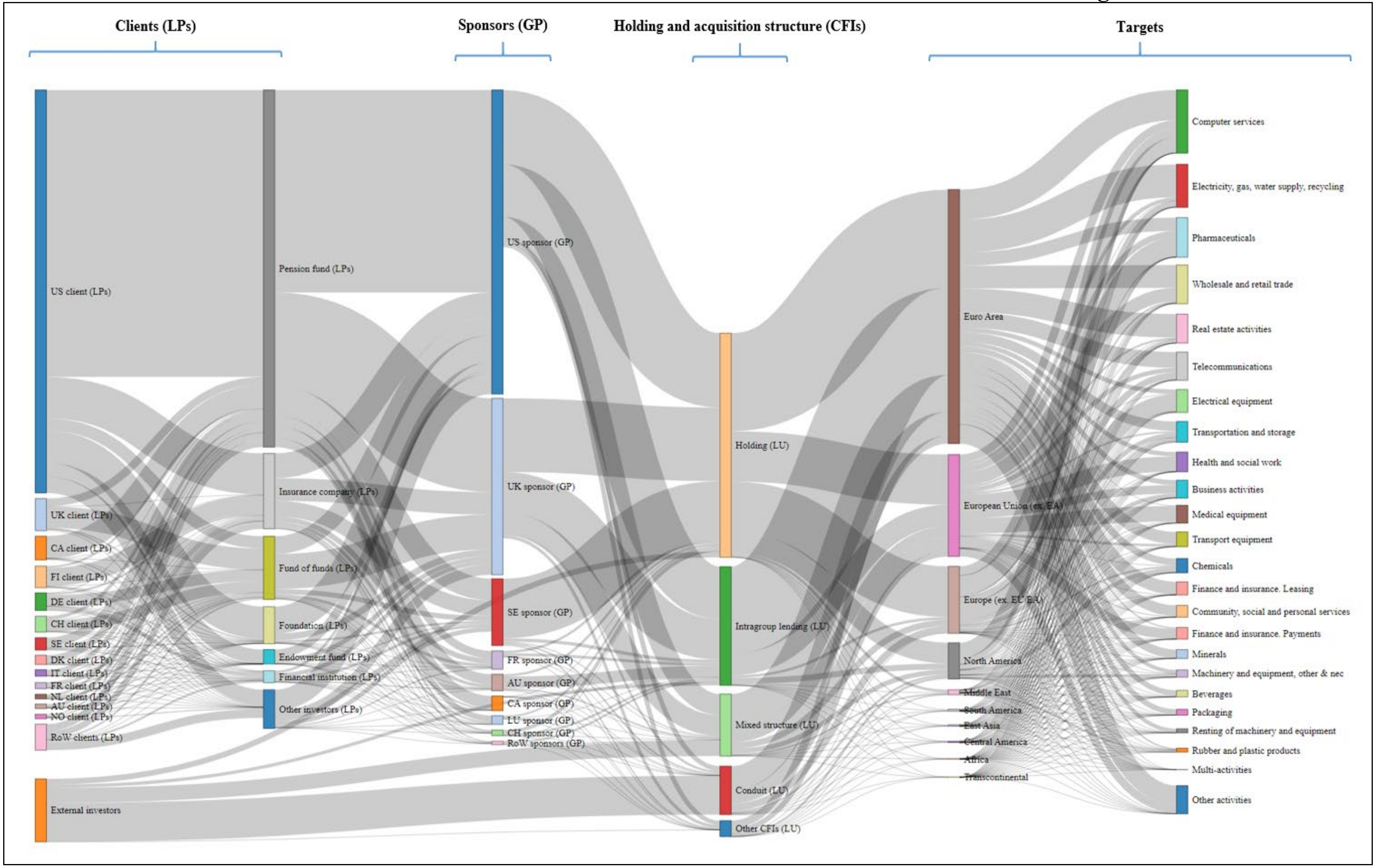
5.2 Alternative distributions of FDI stocks by sponsor/target/client counterparts

Chart 13 presents alternative distributions of FDI stocks held by CFIs affiliated to PE and RE investment funds by considering the following counterparts: sponsor (or capital manager), target (or capital recipient), client (or capital provider). The distributions cover the liabilities side and the assets side of CFIs' balance sheets, respectively.

Capital brought by the limited partners and invested in PE and RE investment funds are usually registered as portfolio investment by international statistical standards. Capital managed by sponsors and used to build the holding and acquisition structure in order to own the targets are registered as direct investment by international statistical standards provided that the ownership links are larger or equal to 10% of the voting power (or share capital) in the affiliates.

[21] The "unallocated" bar on the liabilities side relates to the item debt securities (2-003000 in the BCL reporting framework) as no geographical allocation is required for this specific item.

Chart 13: Alternative distributions of FDI stocks by sponsor/target/client counterparts: Evidence from CFIs affiliated to PE and RE investment funds in Luxembourg



Unit: Total assets over the period Q4 2014-Q3 2022. NB: This distribution is representative only of the specific sample considered in the analysis *i.e.* single-target CFIs resident in Luxembourg with total assets larger or equal to 500 million euros and affiliated to PE and RE investment funds.

On the liabilities side, capital originates as portfolio investment and is invested in PE and RE investment funds by Limited Partners (LPs). By order of importance, LPs include pension funds, insurance companies, funds of funds, foundations, endowment funds and financial institutions (*e.g.* investment banks). Regarding the geographical origin, funds arise mostly from North America and Western Europe, with the United States being the most important capital provider. Overall, pension funds headquartered in the United States are the most important contributor. This result is in line with the literature (Prowse (1998), Firzli (2014), Talmor and Vasvari (2014)). Indeed, as pension funds typically feature longer durations on their liabilities side than other institutional investors (such as financial institutions (*e.g.* investment banks) or insurance companies), they can afford investments requiring long holding periods such as private equity and real estate investments. Hence, although pension funds have traditionally invested in two main asset classes (listed equities and bonds), they diversified their investments in recent decades allocating their portfolio to alternative asset classes including private equity, real estate and infrastructure (Prowse (1998), Firzli (2014), Talmor and Vasvari (2014)).

Funds provided by LPs are managed essentially by sponsors headquartered in the United States and the United Kingdom. At the sponsor level, funds received by sponsors from clients (or LPs) are larger than funds provided by sponsors to CFIs resident in Luxembourg. This can be explained by two main arguments. First, the paper considers only CFIs with total assets larger or equal to 500 million euros. As a result, the analysis misses target investments financed *via* resident CFIs whose total assets are below 500 million euros. Second, the paper considers only CFIs resident in Luxembourg. As a result, the analysis misses target investments financed *via* CFIs located in third countries.

Funds then flow from sponsors to the liabilities side of CFIs resident in Luxembourg. CFIs mainly feature holding companies, intragroup lending corporations and mixed structures. External investors also contribute to the liabilities of resident CFIs, but only account for a minor share compared to the Limited Partners. This observation is in line with Chart 6.2, which shows the importance of internal financing as opposed to external financing, within the aggregate balance sheet of resident CFIs. Moreover, the contribution of external investors to CFIs depends on the type of CFI. Hence, external investors contribute more in conduit corporations than in holding companies and intragroup lending corporations. This result is in line with the typology of CFIs (Di Filippo and Pierret (2020a)).

On the assets side of CFIs, funds finance the acquisition of targets performing various economic activities and mainly located in Western Europe (especially the euro area) and to a lesser extent in North America (notably, the United States). The targets in turn use these funds to finance projects and develop business activities (organic growth) or acquire companies (external growth).[22]

Overall, the distributions of FDI stocks differ substantially depending the considered counterpart: immediate counterpart country (Chart 12) *versus* sponsor/target/client counterparts (Chart 13).

On the liabilities side of CFIs, the sponsor/client counterparts appear as a more suitable tool than the immediate counterpart country to observe the distribution of capital inflows. These capital inflows mostly represent inward FDI by sponsors in the holding and acquisition structure and, more upstream, portfolio investment inflows by clients in the fund. Thus, while the immediate counterpart country only identifies intermediary investment vehicles that take part of the holding and acquisition structure used by PE and RE investment funds, the sponsor/client counterparts points to the main manager of capital (sponsors) and the main providers of capital (clients or Limited Partners).

On the assets side of CFIs, the target counterpart appears as a more suitable tool than the immediate counterpart country to analyse the distribution of capital outflows, mostly represented by outward FDI. Indeed, while the immediate counterpart country only identifies intermediary investment vehicles that take part of the holding and acquisition structure used by PE and RE investment funds, the target counterpart points to the final recipient of capital. The target counterpart thus shows the actual final destination of outward FDI.

[22] To ease the reading of Chart 13, the paper does not represent the flows of capital between CFIs within the holding and acquisition structure but represent the direct exposure *vis-à-vis* the target. Empirically, capital should flow from holding companies to intragroup lending corporations *via* mixed structures or conduits for example, before reaching the final recipient (target), as exposed in Diagrams 1 and 2 of section 2.

Altogether, the sponsor/target/client counterparts provide a more economically meaningful distribution of FDI stocks than the immediate counterpart country. Since investment funds use intermediate entities in their holding and acquisition structures, the concept of immediate counterparty can be misleading, as it blurs the initial provider of capital (often located at the top of the ownership structure) and the final recipient of capital (at the end of the ownership structure). However, the distribution based on the sponsor/target/client counterparts can disentangle capital providers (clients or LPs), capital managers (sponsors or GP) and final capital recipients (targets).

Multinational corporations create global holding and acquisition structures relying on intermediate affiliates established in financial centres, where they can contribute to inflate the stock of FDI for the host country. This is especially the case in Luxembourg (Chart 7). These intermediate affiliates make it difficult to understand the amount of FDI that actually benefits the host country. Therefore, we distinguish indirect FDI (or transit FDI) - corresponding to the ownership chains of multinational corporations (including investment funds) passing through financial centres before reaching their final destination in third countries - from direct FDI - relating to the amount of FDI that is indeed invested in the country hosting a financial centre (Charts 10.4, 11 and 13).[23] Unlike the traditional distribution of FDI stocks based on the immediate counterpart country, the alternative distributions based on the sponsor/target/client counterparts can distinguish FDI that targets economic activity in the country hosting the financial centre from FDI transiting *via* the financial centre and invested in third countries.

6. Conclusion

This paper analyses the stocks of FDI held by CFIs affiliated to private equity and real estate investment funds in Luxembourg. FDI stocks of CFIs mainly involve direct investment in the form of equity and intragroup loans. The study focuses on CFIs with total assets larger or equal to 500 million euros. The paper breaks down FDI stocks by geographical location, sector and main economic activities. The analysis is undertaken both on the liabilities side and the assets side of CFIs' balance sheets. The paper considers four alternative counterpart concepts: the immediate counterpart country (traditionally favoured by international statistical standards), the sponsor (or

[23] In Chart 13, Luxembourg is included in the rectangle "Euro Area", within the "Targets" brace character.

capital manager) counterpart, the target (or capital recipient) counterpart and the client (or capital provider) counterpart.

Results show that the geographical breakdown of FDI stocks held by CFIs affiliated to private equity and real estate investment funds differs depending the considered counterpart. The immediate counterpart country shows that the assets and liabilities of CFIs are mostly *vis-à-vis* Luxembourg and the CFI sector. This suggests that most of the holding and acquisition structures used to purchase targets by investment funds involve CFIs resident in Luxembourg. The sponsor (or capital manager) counterpart highlights that the total liabilities of CFIs are mostly owned by sponsors located in the United States and the United Kingdom. The target (or capital recipient) counterpart shows that CFIs finance the acquisition of targets headquartered mainly in Western Europe (and notably the euro area) and to a lesser extent in North America. In addition, private equity and real estate investment funds diversify their investments by purchasing targets performing different types of economic activities. The client (or capital provider) counterpart shows that FDI stocks held by CFIs originate mostly from North America and Western Europe, with the United States being the most important capital provider. Clients are mainly institutional investors regrouping essentially pension funds, insurance companies, foundations, endowment funds, funds of funds and traditional financial institutions (*e.g.* investment banks).

Overall, the network of FDI stocks held by CFIs affiliated to private equity and real estate investment funds in Luxembourg is rather concentrated. Indeed, a small number of countries accounts for most of the sponsors. On the other hand, target investments are more evenly distributed across countries and across sectors. Within this network, Luxembourg acts as a financial platform, where capital flows from fund providers (mainly clients) to the final fund recipients (targets).

The paper compares the traditional distribution of FDI stocks based on the immediate counterpart country to an alternative distribution based on the sponsor/target/client counterparts. These distributions differ substantially depending the considered counterpart. Since investment funds use intermediate entities in their holding and acquisition structures, the concept of immediate counterparty can be misleading, as it blurs the initial provider of capital (often located at the top of the ownership structure) and the final recipient of capital (at the end of the ownership structure). However, the distribution based on the sponsor/target/client counterparts can disentangle capital providers (clients), capital managers (sponsors) and final capital recipients (targets).

Multinational corporations create global holding and acquisition structures relying on intermediate affiliates established in financial centres, where they can contribute to inflate the stock of FDI for the host country. This is especially the case in Luxembourg. These intermediate affiliates make it difficult to understand the amount of FDI that actually benefits the host country. Therefore, we distinguish indirect FDI (or transit FDI) - corresponding to the ownership chains of multinational corporations (including investment funds) passing through financial centres before reaching their final destination in third countries - from direct FDI - relating to the amount of FDI that is indeed invested in the country hosting a financial centre. Unlike the traditional distribution of FDI stocks based on the immediate counterpart country, the alternative distributions based on the sponsor/target/client counterparts can distinguish FDI that targets economic activity in the country hosting the financial centre from FDI transiting *via* the financial centre and invested in third countries.

References

Banque Centrale du Luxembourg (BCL), 2014, "Definitions and Concepts for the Statistical Reporting of Financial Companies", p. 1-43, December 2014
https://www.bcl.lu/en/Regulatory-reporting/Societes_financieres/Instructions/Definitions_Concepts_FC_2014_EN.pdf

Di Filippo Gabriele, Pierret Frédéric, 2020a, "A Typology of Captive Financial Institutions and Money Lenders (sector S127) in Luxembourg", BCL Working Paper, No. 146, July 2020
http://www.bcl.lu/fr/Recherche/publications/cahiers_etudes/146/BCLWP146.pdf

Di Filippo Gabriele, Pierret Frédéric, 2020b, "Key Feature of Captive Financial Institutions and Money Lenders (sector S127) in Luxembourg", BCL Working Paper, No. 150, December 2020
http://www.bcl.lu/fr/Recherche/publications/cahiers_etudes/150/BCLWP150.pdf

Di Filippo Gabriele, Pierret Frédéric, 2022a, "A Typology of Captive Financial Institutions in Luxembourg: Lessons from a New Database", BCL Working Paper, No. 157, February 2022
https://www.bcl.lu/fr/publications/cahiers_etudes/157/BCLWP157.pdf

Di Filippo Gabriele, 2022b, "An Analysis of the Ownership Structure of Captive Financial Institutions (CFIs) in Luxembourg: Lessons from a New Database", July 2022, mimeo

European Fund and Asset Management Association (EFAMA), 2022, "International Quarterly Statistics: Worldwide Regulated Open-ended Fund Assets and Flows: Trends in the Fourth Quarter of 2021", March 2022
https://www.alfi.lu/getmedia/37337004-c01e-4ef5-8b95-f4706f92afb7/international-statistical-release-q4-2021.pdf

Firzli Nicolas J., 2014, "The New Drivers of Pension Investment in Private Equity", Revue Analyse Financière, Q3 2014, Issue No. 52

Gatti Stefano, 2019, "Project Finance in Theory and Practice - Designing, Structuring, and Financing Private and Public Projects", Third Edition

Gilligan John, Wright Mike, 2020, "Private Equity Demystified: an Explanatory Guide", Institute of Chartered Accountants in England and Wales (ICAEW) Corporate Finance Faculty, Third Edition, December 2020

Hoor Oliver R., 2018, "Transfer Pricing in Luxembourg", Legitech, Editions Juridiques et Fiscales, Edition 2018

Hudson Matthew, 2014, "Funds: Private Equity Hedges and All Core Structures", Wiley Finance Series, John Wiley & Sons Ltd

Ietto-Gillies Grazia, 2019, "Transnational Corporations and International Production: Concepts, Theories and Effects", Edward Elgar Publishing

International Monetary Fund (IMF), 2009, "Balance of Payments and International Investment Position Manual", Sixth Edition (BPM6), Washington D.C.
https://www.imf.org/external/pubs/ft/bop/2007/pdf/bpm6.pdf

Parker David, 2021, "The Routledge REITs Research Handbook", edited by David Parker, Routledge International Handbooks, p. 1-322, June 2021

Prowse Stephen D., 1998, "The Economics of the Private Equity Market", Economic Review, Federal Reserve Bank of Dallas, 1998
https://www.dallasfed.org/~/media/documents/research/er/1998/er9803c.pdf

Talmor Eli, Vasvari Florin, 2014, "The Extent and Evolution of Pension Funds' Private Equity Allocations", Adveq Applied Research Series, Coller Institute of Private Equity, 2014