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## WHY IS THE RATIO OF DEBT-TO-GDP SO LARGE FOR NON-FINANCIAL COMPANIES IN LUXEMBOURG?

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# Why is the Ratio of Debt-to-GDP so Large for Non-Financial Companies in Luxembourg?

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## Abstract

The debt-to-GDP ratio for non-financial companies (NFCs) in Luxembourg is large compared to other EU countries. The paper argues that this large ratio stems from a structural characteristic of Luxembourg pertaining to its role as a global financial center. Indeed, the country hosts a large number of NFCs and notably foreign-controlled NFCs (including large multinational enterprises) that benefit from Luxembourg as a financial platform to manage their business activities and structure their corporate investments. In addition, debt issued by foreign-controlled companies predominates over debt issued by national NFCs. On the liability side, the financing channel mainly relies on loans granted by NFCs (notably, intra-group loans) and by captive financial institutions and money lenders. On the asset side, these resources finance the purchase of unlisted shares or the granting of long-term loans to NFCs and to captive financial institutions and money lenders. While the ratio of debt-to-GDP places Luxembourg NFCs as the largest holders of debt across EU countries, alternative indicators suggest the opposite result. This is notably the case of the ratio of debt-to-financial assets, as Luxembourg NFCs hold the largest stock of financial assets across EU countries. These features should be taken into consideration to avoid any misinterpretation of the large ratio of NFC debt-to-GDP.

**Keywords:** Non-Financial Companies, Debt, Global financial center, Multinational Enterprises

**JEL codes:** F21, F23, F34

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## **Non-Technical Summary**

The ratio of gross debt-to-GDP for non-financial corporations (NFCs) is often used to assess corporate indebtedness. Across European Union (EU) countries, Luxembourg holds the largest ratio. A natural question that arises is whether there should be any concern in terms of excessive debt build-up for NFCs in Luxembourg. Against this background, the paper analyses the underlying characteristics of NFC debt in Luxembourg. It undertakes a macroeconomic and a firm-level analysis. It explores the debt components, their counterparts and the type of NFCs that contribute to the debt. The paper comes up with alternative and complementary indicators aimed to provide a finer assessment of NFC debt in Luxembourg.

The macroeconomic analysis shows that the main components of NFC debt in Luxembourg are loans granted whether from resident NFCs or from resident/non-resident captive financial institutions and money lenders. On the asset side, debt mainly finances corporate investments in the form of unlisted shares (to resident NFCs and resident/non-resident captive financial institutions and money lenders) or loans (to resident/non-resident NFCs or to resident captive financial institutions and money lenders).

The firm-level analysis shows that debt issued by foreign-controlled NFCs predominates over debt issued by national NFCs. In other words, debt issued by foreign-controlled NFCs represents the major part of NFC debt at the macroeconomic level. The largest component of debt for foreign-controlled NFCs are intra-group loans. Another important observation is that between types of NFCs, debt is not equally distributed across firms. This is particularly true for foreign-controlled NFCs. This suggests that some companies contribute more than others to the large ratio of debt-to-GDP.

Altogether, the macroeconomic and firm-level analyses provide evidence that the large ratio of NFC debt-to-GDP for Luxembourg compared to other EU jurisdictions stems from a structural feature of Luxembourg that pertains to its role as a global financial center. Indeed, the country hosts a large number of NFCs and notably foreign-controlled NFCs (including large multinational enterprises) that benefit from Luxembourg as a financial platform to manage their business activities and structure their corporate investments.

While the ratio of debt-to-GDP places Luxembourg NFCs as the largest holders of debt across EU countries, alternative indicators suggest the opposite result. This is notably the case of the ratio of debt-to-financial assets at the macroeconomic level as Luxembourg NFCs hold the largest stock of financial assets across EU countries. A similar observation holds for the ratio of debt-to-total assets whether for foreign-controlled NFCs, national NFCs or when considering the sector of NFCs as a whole.

## Résumé Non Technique

Le ratio dette-sur-PIB est souvent utilisé comme indicateur d'endettement des sociétés non-financières (SNF). Parmi les pays de l'Union européenne (UE), le Luxembourg détient le ratio le plus élevé. Cela implique-t-il pour autant que les SNF luxembourgeoises font l'objet d'un endettement excessif ? Dans ce contexte, le document analyse les caractéristiques sous-jacentes à la dette des SNF au Luxembourg. Il entreprend une analyse au niveau macroéconomique et au niveau des entreprises individuelles. Il explore les composantes de la dette des SNF, leurs contreparties et le type d'entreprises contribuant à la dette. Le papier propose des indicateurs alternatifs et complémentaires visant à fournir une évaluation plus fine de la dette des SNF au Luxembourg.

L'analyse macroéconomique montre que la principale composante de la dette des SNF au Luxembourg est constituée de prêts, qu'ils soient fournis par des SNF résidentes ou par des institutions financières captives et prêteurs non institutionnels résidents ou non-résidents. Du côté de l'actif, la dette finance principalement des investissements en actions non cotées (auprès de SNF résidentes et d'institutions financières captives et prêteurs non institutionnels résidents ou non-résidents) et des prêts (envers des SNF résidentes/non-résidentes ou des institutions financières captives et prêteurs non institutionnels résidents).

L'analyse au niveau des entreprises individuelles montre que la dette émise par les SNF sous contrôle étranger prédomine sur la dette émise par les SNF nationales. En d'autres termes, la dette émise par les SNF sous contrôle étranger représente la majeure partie de la dette au niveau macroéconomique. Les prêts intragroupes sont la principale composante de la dette contractée par les SNF sous contrôle étranger. Une autre observation importante est que la dette n'est pas répartie de manière égale entre les entreprises. Cette observation prévaut davantage pour les SNF sous contrôle étranger que pour les SNF nationales. Cela implique que certaines entreprises contribuent plus que d'autres à l'important ratio dette-sur-PIB.

Au total, les analyses macroéconomiques et microéconomiques montrent que le ratio élevé de dette des SNF-sur-PIB au Luxembourg par rapport aux autres juridictions de l'UE peut en grande partie s'expliquer par une caractéristique structurelle propre au Luxembourg. Cette caractéristique a trait à son rôle de centre financier mondial. En effet, le pays héberge un grand nombre de SNF, notamment des SNF sous contrôle étranger (y compris de grandes entreprises multinationales) qui bénéficient du Luxembourg en tant que plate-forme financière pour gérer leurs activités et structurer leurs investissements.

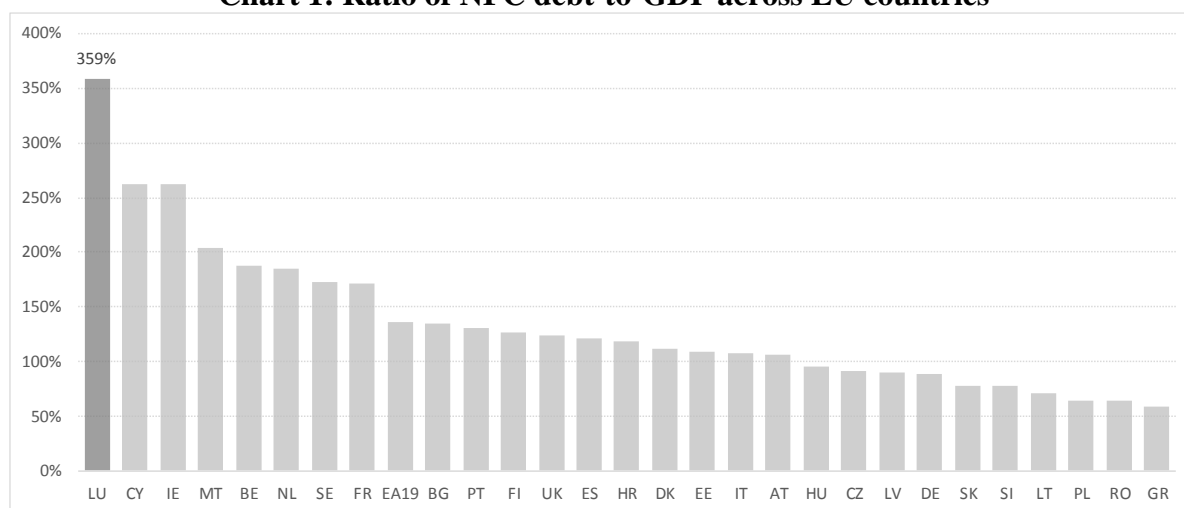
Enfin, alors que le ratio dette-sur-PIB place les SNF luxembourgeoises en tant que plus importants détenteurs de dette par rapport aux autres pays de l'UE, d'autres indicateurs suggèrent un résultat opposé. C'est notamment le cas du ratio dette des SNF-sur-actifs financiers au niveau macro-économique, puisque le secteur des SNF au Luxembourg détient le stock le plus élevé d'actifs financiers parmi les pays de l'UE. Une observation similaire prévaut pour le ratio dette des SNF-sur-actif total, que ce soit pour les SNF sous contrôle étranger, les SNF nationales ou l'ensemble du secteur des SNF.

## 1. Introduction

The ratio of gross debt-to-GDP for non-financial corporations (NFCs) is used to assess corporate indebtedness. This metric is often considered by national or international surveillance bodies to identify potential adverse debt build-up developments. The European Central Bank (ECB), the European Systemic Risk Board (ESRB) and the Bank for International Settlements (BIS) use this ratio for economic and financial stability analyses<sup>1</sup>. The European Commission considers the private sector debt for both households and NFCs in the macroeconomic imbalance procedure (MIP) surveillance mechanism (EC (2016)). Other institutions involved in country surveillance also utilize this ratio to highlight harmful debt built-ups (e.g. IMF (Article IV consultations, Financial Soundness Indicators (FSI)), OECD (Country report, Financial Dashboard)). To prevent and address the emergence of debt imbalances that could adversely affect economic and financial stability, monitoring bodies can alert about any debt developments deemed as excessive and, if needed, suggest policy recommendations. Some may even impose policy measures to needy countries.

In Luxembourg, the ratio of NFC debt-to-GDP reaches 359% in 2018Q4 (Chart 1); the largest amount across EU countries.

**Chart 1: Ratio of NFC debt-to-GDP across EU countries**



Source: ECB-SDW. Period: 2018Q4. NFC debt is measured in non-consolidated terms. Units: Percent of GDP.

A natural question that arises is whether there should be any concern in terms of excessive debt build-up for NFCs in Luxembourg<sup>2</sup>.

<sup>1</sup> For a definition of the metrics used by these monitoring bodies, see *supra*, section 2.2.

<sup>2</sup> NFC debt can be subject to several risks: solvency risk, liquidity mismatch, foreign exchange risk, interest rate risk, etc. The paper is devoted to the analysis of excessive debt build-up for NFCs, hence solvency risk.

To address this question and avoid any misinterpretation of the large ratio of NFC debt-to-GDP in Luxembourg, the paper analyses the underlying characteristics of NFC debt in Luxembourg. The investigation is undertaken at the macroeconomic level and at the firm level. The paper thus explores the debt components, their counterparts and the types of NFCs that contribute to the debt. The paper comes up with alternative and complementary indicators aimed to provide a finer assessment of NFC debt in Luxembourg.

The remainder of the paper is organized as follows. Section 2 describes the key features of NFCs in Luxembourg and defines NFC debt. Section 3 analyses the characteristics of NFC debt from a macroeconomic perspective and identifies its main counterparts. Section 4 investigates NFC debt based on firm-level data and highlights which type of companies contribute the most to NFC debt in Luxembourg. Section 5 discusses the results obtained from the macroeconomic and firm-level analyses and put forward several alternative and complementary NFC debt indicators aimed to provide a finer and more accurate assessment of NFC indebtedness in Luxembourg. Section 6 concludes.

## **2. Data**

### **2.1 NFCs in Luxembourg: key features**

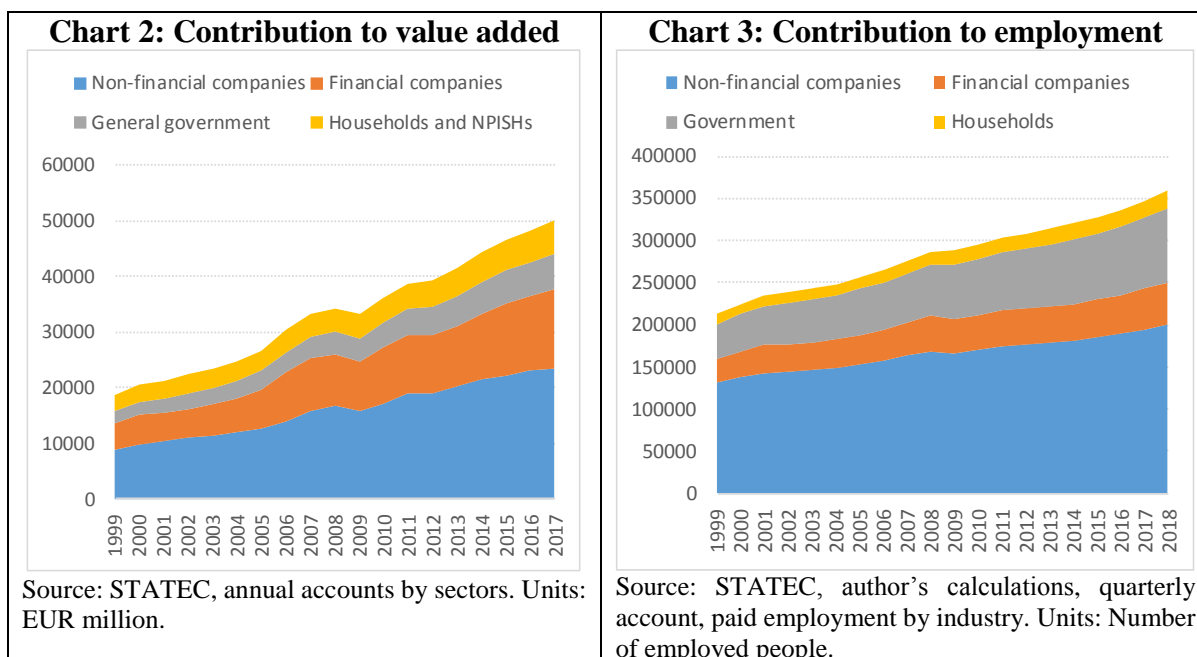
Non-financial corporations (NFCs, sector S11 in the European System of Accounts ESA2010) consist of all private and public corporations whose principal activity is the production of goods and non-financial services (EC (2013)<sup>3</sup>).

In Luxembourg, NFCs are a major contributor to value added (Chart 2) and employment (Chart 3). On average, over the period 1999-2017, NFCs produce 48% of the total gross value added. The rest of the value added is created by financial companies (27%), households and non-profit institutions serving households (13%) and general government (12%). NFCs employ 63% of the total paid employees, in majority in the services sector (44%). The rest of the paid employees is employed by general government (20%), financial companies (12%) and households (5%).

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<sup>3</sup> See EC (2013), p. 34-35 or IMF (2018b).





Non-financial corporations regroup national public NFCs, national private NFCs and foreign-controlled NFCs. National public NFCs (S11001) include all resident NFCs and quasi-corporations under the control of general government. National private NFCs (S11002) include all resident non-financial corporations and quasi-corporations, which are not controlled by units of government or by non-resident institutional units. Foreign-controlled NFCs (S11003) include all resident NFCs and quasi-corporations, which are controlled by non-resident institutional units<sup>4</sup>.

Compared to other EU jurisdictions, foreign-controlled NFCs play a prominent role in Luxembourg. Indeed, foreign-controlled NFCs contribute about 40% to value added and to employment in Luxembourg in the non-financial business economy (Chart 4). Given that NFCs account for 48% of the total gross value added (Chart 2), this implies that foreign-controlled NFCs contribute to about 20% of the total gross value added while national public and private NFCs contribute to about 28% of the total gross value added.

<sup>4</sup> For more information, see EC (2013), p. 35 or IMF (2018b).

**Chart 4: Share of value added and employment accounted for by foreign-controlled NFCs in the non-financial business economy: a comparison across EU countries**



Source: Eurostat, Foreign Affiliates Statistics (FATS). Figures are stable since 2012. Period: 2016 (based on available data).

Foreign-controlled NFCs resident in Luxembourg are in majority controlled or owned by large foreign multinational enterprises (MNEs). They settle in Luxembourg directly or *via* the establishment of branches, either for production purposes or for financial purposes, or both. Indeed, numerous MNEs benefit from the place of Luxembourg as a financial hub to manage their business activities and structure their corporate investments at the regional or global levels.

## 2.2 Definition of NFC debt

### 2.2.1 Data source to measure NFC debt

Macroeconomic measures of debt are based on the financial accounts of a country. The latter provide broad and comprehensive quarterly data on the financial assets and liabilities of an economy, broken down by institutional sector (*i.e.* households, non-financial corporations, financial corporations and government). The financial accounts register all transactions involving financial assets (or financial investments) and liabilities (or funding sources) between resident institutional sectors and their resident/non-resident counterparts. The financial accounts show by which sector, for which sector and in what form, financial resources are made available for the acquisition of assets in an economy (Brito (2009)).

In the EU, financial accounts are compiled according to the concepts and definitions laid down by the European System of Accounts 2010 (ESA2010, see EC (2013)), which

ensures comparability across countries and allows compiling aggregates for the euro area as a whole (ECB (2015, 2018b)).

Quarterly financial accounts provide information about the evolution of the structure of owned financial assets and the volume of financial indebtedness of economic entities. This information serves two main purposes not solely at the EA level but also across EA member states. On the one hand, it supports the Eurosystem for the definition and implementation of the single monetary policy, as it notably allows assessing the transmission mechanism of the single monetary policy (ECB (2015)). On the other hand, financial accounts help monitoring financial stability as it supports the assessment of financial vulnerabilities and the interconnectedness between institutional sectors, whether resident or not.

In Luxembourg, the Law of 10 July 2011 states that the compilation of the financial accounts is a joint responsibility of the National Institute for Statistics and Economic Studies (STATEC) and the Banque centrale du Luxembourg (BCL)<sup>5</sup>. More precisely, the STATEC remains responsible for the transmission of the annual financial accounts to Eurostat, while the BCL is responsible for the quarterly transmission to the ECB<sup>6</sup>. Indeed, the ECB's guideline ECB/2002/7 on statistical reporting requirements for quarterly financial accounts obliges national central banks to report statistical data on financial assets and liabilities on a quarterly basis (ECB (2015))<sup>7</sup>.

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<sup>5</sup> This formal agreement was signed by both institutions on 18 December 2009. See section 1.1 p. 2 in Brito (2009). See also Law of 10 July 2011 on the organization of the National Institute for Statistics and Economic Studies - STATEC (*Institut National de la Statistique et des Etudes Economiques*), Chapitre 1<sup>er</sup> - Attributions (Chapter 1 - Powers), p. 2742.

Available at: <http://data.legilux.public.lu/file/eli-etat-leg-memorial-2011-156-fr-pdf.pdf>. (French version) or at <https://statistiques.public.lu/en/actors/statec/missions/loistatec.pdf> (English version)

More precisely, Chapter 1, Article 2 states that one of the STATEC's remit is "*to draw up, jointly with the Central Bank of Luxembourg, the balance of payments and the financial accounts and to guarantee their methodological consistency in accordance with European and international rules, the terms and conditions of the collaboration being the subject to an agreement between the Government and the Central Bank of Luxembourg;*".

<sup>6</sup> In practice, STATEC compiles financial accounts for the sectors S11 (non-financial corporations), S126 (financial auxiliaries) and S13 (general government) and sends them to the BCL, while the BCL compiles all the other sectors. STATEC also sends to the BCL the sectoral net lending/net borrowing (B9) and the change in pension reserves (D8) on an annual basis for all sectors. The BCL integrates everything into a fully consistent set of financial accounts. The annual accounts are computed as the sum of the quarters. This is technically possible because the financial accounts follow a full whom-to-whom approach for all instruments, in addition to compute at a level of sector and instrument, details sufficient to serve both quarterly and annual requirements.

<sup>7</sup> The requirement is quarterly because annual data, although useful for structural analysis, are of little value for monetary policy or financial stability purposes. For further details regarding the methodological soundness and statistical procedures of the quarterly financial account, the reader can refer to ECB (2015, 2018a).

NFC debt can be retrieved from the quarterly financial accounts. Indeed, the latter provide the financial liabilities of NFCs. In this category, while the equity item can act as a buffer to absorb negative shock affecting NFCs, adverse effects on the other liability items may affect a company's sustainability negatively (Hertkorn (2014)). Hence, NFC debt is often defined as liabilities *minus* equity. Different definitions of NFC debt exist. The broadest measure of debt includes the following items: loans, debt securities, trade credit and advances, pension entitlements, claims of pension funds on pension managers and entitlements to non-pension benefits<sup>8</sup>.

In addition, NFC debt can be analyzed using either consolidated or non-consolidated data. From a conceptual point of view, the choice between consolidated and non-consolidated debt measurements is not clear-cut and can serve different analytical purposes (Hertkorn (2014), ECB (2014b, 2018b)).

### **2.2.2 Non-consolidated debt**

Non-consolidated debt can be regarded as the broadest measure of debt as it includes both inter-sectoral and intra-sectoral financing. Inter-sectoral debt positions represent the debt between NFCs and other sectors (*e.g.* mainly, captive financial institutions and money lenders, credit institutions, money market funds, government). Conversely, intra-sectoral liabilities represent the debt of NFCs *vis-à-vis* other NFCs. They thus include loans extended by resident and non-resident NFCs to resident NFCs. Loans between NFCs cover not solely intra-group loans *i.e.* loans extended between corporations belonging to the same company group<sup>9</sup>, but also inter-group loans *i.e.* loans between corporations belonging to different groups (*i.e.* without a significant capital link). The latter may be granted for a number of reasons, such as to support a supplier or for pure investment purposes.

According to Hertkorn (2014), a main criticism of non-consolidated debt is that it includes, indistinguishably both intra-group financing and financing between NFCs belonging to different groups. The two are very different in nature and pose different issues concerning debt sustainability. For countries acting as global financial centers, intra-group lending can be

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<sup>8</sup> The appendix defines each of these components. Notice that the definitions of NFC debt exclude financial derivatives or other accounts payable (such as taxes, dividends, rents, wages and salaries, and social contributions), given that the recording of such liabilities is not fully comparable across countries (Hashimoto and Kinoshita (2016) p. 6). Any "off-balance sheet" positions are also ruled out, as they are not recorded in the national accounts (ECB (2016)).

<sup>9</sup> Intra-group loans imply the granting of loans between related entities. The economic rationale underlying intra-group loans is justified by the fact that a group member company will finance a subsidiary or the parent company under more favorable conditions than when resorting to commercial banks or to financial markets.

very substantial, leading to large cross-country heterogeneity. Hence intra-group lending should ideally be analyzed separately from debt owed to unrelated creditors. However, a distinction between intra-group financing and extra-group financing is not foreseen in the statistical standards. Indeed, internationally comparable and comprehensive data allowing this separation is unavailable.

As intra-sectoral lending can be very substantial for specific economies and notably those acting as financial platforms for large multinational companies (*e.g.* BE, CY, IE, LU, MT, NL; see Cussen and O’Leary (2013), ECB (2014b)), economies sharing this structural characteristic often feature large NFC debt-to-GDP ratios. In turn, the latter characteristic can lead to an overstatement of the burden of NFC debt in the latter economies, compared to other jurisdictions. This has led several papers to analyze intra-sectoral NFC debt positions separately and to favor a consolidated version of NFC debt.

### **2.2.3 Consolidated debt**

Consolidated debt measures the amount of funds received by a sector from all other sectors (both resident and non-resident). Empirically, only the loans component of debt is available in either consolidated or unconsolidated form<sup>10</sup>. The consolidation is only done between resident NFCs, but not between resident and non-resident NFCs. In other words, the consolidation can only be done for sectors within the country. Cross-border intra-group loans cannot be consolidated.

More precisely, two types of consolidations prevail: within the sector and within the group. Consolidation within the sector essentially consists of netting out domestic loans between NFCs. This is the consolidation used by the European Commission’s Macroeconomic Imbalance Procedure and by the ESRB to proxy domestic intercompany loans. In other words, this means that intra-group loans are proxied by a consolidation within the sector although a consolidation within the group would have been more accurate. However, consolidation within the group (including foreign parent and subsidiary companies) is more difficult to estimate as there are no available data that would lead to proper netting out. One solution to assess the relative importance of intra-group loans (or loans granted to NFCs by affiliated undertakings) is to resort to firm-level balance sheet data (see *supra*, section 4).

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<sup>10</sup> According to ECB (2018b), debt securities are not yet consolidated, as intra-NFC holdings data are not yet available with sufficient backdata.

## 2.2.4 Impact of Special Purpose Entities (SPEs) on NFC debt

The presence of Special Purpose Entities (SPEs) in the sector of NFCs can also alter the size of corporate debt<sup>11</sup>. SPEs are entities whose role is to facilitate the internal financing of a multinational enterprise but that have little or no physical presence in an economy (EC (2013), OECD (2015))<sup>12</sup>. The literature has so far not reached a consensus on the definition of SPEs (ECB-Eurostat-OECD (2013), IMF (2017, 2018a)). SPEs can be understood as conduits for investments (Bolwijn *et al.* (2018))<sup>13</sup>. According to ESRB (2019), large proportions of SPEs' activities, including their lending and indebtedness practices, are often not related to the domestic market. Countries with a relevant presence of resident SPEs - in particular countries acting as financial platforms for large multinational companies (CY, HU, IE, LU, MT and NL)<sup>14</sup> - can feature large NFC debt-to-GDP ratios. This is the case of Luxembourg which hosts a large number of SPEs. SPEs can for example take the form of central treasury entities set up by multinational groups in countries acting as regional treasury centers to manage their internal financing. The most centralized and sophisticated model of treasury centralization is often called an "in-house bank". In turn, the latter characteristic can lead to an overstatement of the burden of NFC debt in these economies, compared to other jurisdictions. However, while the presence of SPEs can swollen the ratio of NFC debt-to-GDP, the risks implied by SPEs for the domestic country are often mitigated as these entities are only used as conduits in the domestic country for investments in foreign countries.

A potential way to correct NFC debt for SPEs in Luxembourg is to rely on firm-level data. However, no precise statistical definition of SPEs exist and statisticians are currently working on a common definition for special purpose entities (ECB-Eurostat-OECD (2013), IMF (2017, 2018a)). As a result, no separate balance sheet data exist between NFCs classified as SPEs and NFCs classified as non-SPEs (IMF (2017, 2018a)). This implies that SPEs are often consolidated within the balance sheet of NFCs, making it difficult to distinguish which

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<sup>11</sup> For example, the ratio of NFC debt-to-GDP used in the ESRB Risk Dashboard includes amounts relating to SPEs (see ESRB (2019)).

<sup>12</sup> For further details about SPEs, see EC (2013), p. 29.

<sup>13</sup> According to the IMF (2009), a conduit is an entity that raises funds on open financial markets often from unaffiliated enterprises for passing on to direct investors or other affiliated enterprises. Often, the conduit's liabilities are guaranteed by a parent company. If a conduit issues new financial instruments, which could be debt securities, shares or partnership interests, that represent a claim on the conduit, it is acting as a captive financial institution. Conduits are a case of "pass-through funds". A conduit can be thus used as an intermediary vehicle to transit FDI between two or more countries. From example, an investment by a North American firm in Asia to start a new production plant may be channeled through a financial platform hosting SPEs in Europe (Bolwijn *et al.* (2018)). This investment will have productive-asset-creating effects in Asia. By contrast, this investment can have very little real economic impact in countries that act as investment hubs or as conduits.

<sup>14</sup> See Charts B.3 and B.4 in appendix B.

part of the balance sheet belongs to SPEs or to non-SPEs. This leads to the existence of NFCs endowed with an internal finance structure, often labelled as NFCs with in-house banking or NFCs with in-house finance.

As the macroeconomic and firm-level databases used in this paper do not allow to disentangle between NFCs classified as SPEs or as non-SPEs (or operating units), the assessment of NFC debt undertaken in this paper includes the debt of NFCs classified as or endowed with a special purpose entity.

### **2.2.5 Various measures of NFC debt across surveillance bodies**

To assess the relative burden of NFC debt across countries, surveillance bodies consider different definitions of NFC debt, depending on the choice of the frequency (annual *versus* quarterly), on the debt components or on whether NFC loans are consolidated or not.

In its Macroeconomic Imbalance Procedure Scoreboard compiled by Eurostat, the European Commission's MIP uses the ratio of private debt-to-GDP calculated on a yearly basis. The numerator includes debt securities and loans granted to NFCs, households and non-profit institutions serving households (NPISHs). NFC loans exclude intra-sectoral loans so that debt is consolidated. In its quarterly Risk Dashboard<sup>15</sup>, the ESRB defines NFC debt as the sum of consolidated loans, debt securities and pension liabilities. The ECB's Economic Bulletin<sup>16</sup> defines NFC debt as the sum of unconsolidated loans, debt securities, trade credit and advances and pensions liabilities. The BIS provides statistics on the credit granted by all sectors to the non-financial sector as a whole and across non-financial sectors (general government, NFCs, households and NPISHs)<sup>17</sup>. The BIS decomposes credit granted to the private non-financial sector as total credit granted by all sectors to the private non-financial sector (broad definition of credit) and credit granted by domestic banks to the private non-financial sector (narrow definition of credit). The latter series are notably used for the calculation of the credit-to-GDP gap (BIS (2019)). In spite of the differences regarding the definition of NFC debt, monitoring bodies generally compare the level of NFC debt across countries by dividing NFC debt with GDP as this allows for an easy, quick and standardized comparison of the burden of NFC debt across jurisdictions thanks to the harmonization of statistical standards prevailing across countries' quarterly financial accounts and countries' GDP.

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<sup>15</sup> See ESRB Risk Dashboard\2. Macro risk\2.11 NFC debt-to-GDP ratio.

<sup>16</sup> See ECB Economic Bulletin, Statistics\3. Economic activity\3.7 Summary accounts for households and non-financial corporations.

<sup>17</sup> See <https://www.bis.org/statistics/totcredit.htm?m=6%7C380%7C669>

Notice also that other institutions involved in country surveillance can also utilize this ratio to highlight any adverse NFC debt built-ups. This is notably the case of the IMF and the OECD. The IMF compiles statistics about Financial Soundness Indicators (FSI) across countries (IMF (2003, 2006))<sup>18</sup>. For NFCs, the latter database includes total debt, total debt-to-equity, return-on-equity, earnings-to-interest and principal expenses, net foreign exchange exposure-to-equity and the number of bankruptcy proceedings initiated. The OECD's Financial Dashboard regroups the following debt indicators for NFCs across countries: unconsolidated debt-to-GDP, unconsolidated debt-to-gross operating surplus, financial net worth-to-GDP, consolidated debt-to-gross operating surplus, the ratio of short-term financial assets-to-short-term liabilities, debt-to-equity and debt-to-total financial assets<sup>19</sup>.

Although the ratio of NFC debt-to-GDP is often used to assess NFC indebtedness, several limits surround this metric. This is notably the case for small and open economies featuring a large financial sector, such as Luxembourg<sup>20</sup>. On the side of the numerator, non-consolidated debt could overstate the burden of debt due to the presence of large MNEs benefiting from Luxembourg as a financial platform to manage their business activities and structure their corporate investments; notably *via* intra-group loans (Hoor (2018)). On the side of the denominator, the use of GDP can also overstate the burden of debt. Indeed, large MNEs often benefit from financial centers as conduits to finance their greenfield investments abroad<sup>21</sup>, *i.e.* outside the financial center. As a result, the real value added generated by MNEs in countries used as investment hubs to transit FDI remains thus relatively lower compared to the stock of financial liabilities. This automatically increases the ratio of NFC debt-to-GDP. By contrast, the most important beneficiary of the value added from this transiting FDI is obviously the country hosting the greenfield investment (often a foreign country). As a result, other denominators - such as total financial assets held by NFCs instead of GDP - can be considered to give a finer assessment of NFC debt for countries acting as financial hubs (Cussen and O'Leary (2013)).

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<sup>18</sup> See IMF statistics (<https://data.imf.org/>)\Financial Sector\Financial Soundness Indicators. Unfortunately, data are missing for several countries, including Luxembourg.

<sup>19</sup> See OECD.stat (<https://stats.oecd.org/>)\National Accounts Financial Dashboard\Financial Indicators - Stocks.

<sup>20</sup> See section 1.4 p. 11 in Brito (2009).

<sup>21</sup> A greenfield investment is an investment that have a real impact on the economy and hence on GDP.

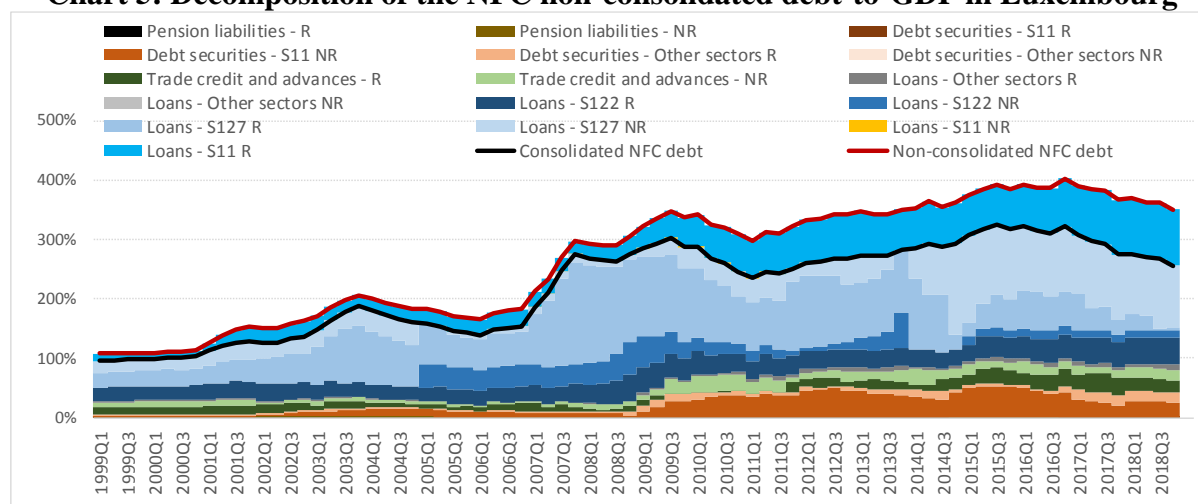


### 3. Analysis of NFC debt: a macroeconomic perspective

#### 3.1 The case of Luxembourg

Chart 5 presents the evolution of the ratio of NFC debt-to-GDP over time in Luxembourg both in non-consolidated (black line) and in consolidated terms (red line)<sup>22</sup>.

**Chart 5: Decomposition of the NFC non-consolidated debt-to-GDP in Luxembourg**



Source: BCL and STATEC, financial accounts. Period: 1999Q1-2018Q4. Sectors: deposit-taking corporations except central bank (S122); captive financial institutions and money lenders (S127); non-financial corporations (S11). Other sectors regroup mainly non-money market funds investment funds (S124) and general government (S13). R (NR) stands for the resident (non-resident) counterpart. Units: Percent of GDP.

Over the period 1999Q1-2018Q4, the ratio of NFC debt-to-GDP has been trending upwards in Luxembourg, whether in consolidated or in non-consolidated terms. Based on non-consolidated data, the ratio peaked at 403% in 2016Q4 and then decreased slightly to reach 350% in 2018Q4<sup>23</sup>. A similar evolution prevails for the consolidated data instead that the amounts are relatively lower; attaining 255% in 2018Q4.

##### 3.1.1 Non-consolidated debt versus consolidated debt

The ratios of NFC non-consolidated and consolidated debt-to-GDP evolve similarly over time. However, the share of domestic intercompany loans (*i.e.* the difference between non-consolidated and consolidated debt) is increasing over time. While domestic intercompany

<sup>22</sup> Given that debt is a stock and GDP is a flow and given that both series are available in quarterly frequency, the ratio is defined as follows:  $Ratio_t = NFC\ debt_t / (4 \times GDP_t)$ . An alternative definition can be:  $Ratio_t = NFC\ debt_t / (GDP_t + GDP_{t-1} + GDP_{t-2} + GDP_{t-3})$ .

<sup>23</sup> A similar decrease in the ratio of NFC non-consolidated debt-to-GDP is observed for BE, CY, IE, LU and NL starting from 2015Q1 onwards. This decrease is more pronounced for CY, IE and LU than for BE and NL.

loans represented on average 12% of the ratio of non-consolidated debt-to-GDP in 1999Q1-2007Q4, the share increased substantially after the 2007-2008 global financial crisis, from 8% in 2008Q1 to 27% of the ratio of non-consolidated debt-to-GDP in 2018Q4. Domestic intercompany loans represent loans granted between resident NFCs. Consolidation is done within the sector and essentially consists of netting out domestic loans between resident NFCs. Domestic intercompany loans can thus include both inter-company loans (*i.e.* loans between NFCs belonging to different groups) and intra-group loans (*i.e.* loans between NFCs belonging to the same group) given that there are no available data concerning debt consolidation within the group (see *infra*, section 2.2.3). According to Hertkorn (2014), corporate balance sheets typically show significant amounts of loans extended between resident corporations belonging to the same enterprise group *i.e.* between resident companies with a significant capital link. This suggests that domestic intercompany loans may include in majority intra-group loans. Firm-level data obtained from the BCL and the STATEC's Central Balance Sheet Office validate this suggestion as loans granted to NFCs by affiliated undertakings<sup>24</sup> represent the majority of loans when analyzing firm-level balance sheets<sup>25</sup>.

### **3.1.2 Decomposition of the ratio of NFC non-consolidated debt-to-GDP**

Chart 5 also decomposes the ratio of NFC non-consolidated debt-to-GDP by items. The scope of this decomposition is to understand which components contribute the most to the large ratio of NFC debt-to-GDP.

In Luxembourg, loans (depicted in various shades of blue) represent the bulk of non-consolidated debt. In 2018Q4, they account for 77% of NFC debt (or equivalently 270% of GDP). The shares of the other components amount to 12% for debt securities (or 43% of GDP), 11% for trade credit and advances (or 38% of GDP) and 1% for pension liabilities (or 0.2% of GDP).

Loans can further be split according to their sectoral counterparts. In 2018Q4, the most important counterpart are captive financial institutions and money lenders (sector S127), followed by NFCs (sector S11), commercial banks (sector S122) and other sectors.

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<sup>24</sup> By definition, affiliated undertakings are two or more companies which are connected in such a way that one or more undertakings control another or the other undertakings.

<sup>25</sup> See *supra*, section 4.3.1 (Chart 10, intercompany loans) and section 4.3.2 (Chart 11, amounts owed to affiliated undertakings).

Captive financial institutions and money lenders<sup>26</sup> (sector S127) are the most important providers of loans to NFCs with a share of 40% of total loans granted to NFCs (or equivalently 108% of GDP) in 2018Q4. Their share increased substantially in the wake of the 2007-2008 financial crisis on account of non-residents mainly. Indeed, while the share of resident sector S127 decreased constantly after the 2007-2008 financial crisis and especially after 2014Q1, the share of non-resident sector S127 increased substantially to represent the majority of loans granted by sector S127 to resident NFCs, from 2014Q1 to 2018Q4 (Chart 5).

The share of loans provided by resident NFCs<sup>27</sup> (or domestic intercompany loans) is also relatively important as it amounts to 35% of total loans granted to NFCs (or 95% of GDP) in 2018Q4. Domestic intercompany loans have been increasing substantially following the 2007-2008 global financial crisis (Chart 5).

Monetary and financial institutions (MFIs, sector S122) hold a share of 22% in total loans granted to NFCs (or 58% of GDP) in 2018Q4. Resident counterparts represent the majority of NFC loans provided by MFIs over the sample period (on average 74% of total loans granted by MFIs, over the period 1999Q1-2018Q4). The relative share of MFI loans has been trending downward all over the period. In particular, NFC loans granted by MFIs (whether resident or not) feature a substantial fall in the wake of the 2007-2008 global financial crisis.

Other sectors represent 3% of total loans granted to NFCs in 2018Q4 (or 8% of GDP). They mainly include resident non-money market funds (sector S124 R) and resident general government (sector S13 R). The share of resident non-money market funds increased markedly after the 2007-2008 financial crisis while the share of the resident general government decreased.

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<sup>26</sup> According to IMF (2009), captive financial institutions and money lenders consist of institutional units providing financial services, where most of either their assets or liabilities are not transacted on open financial markets. They include entities transacting within only a limited group of units (such as with subsidiaries) or subsidiaries of the same holding corporation or entities that provide loans from own funds provided by only one sponsor. Examples cover: (a) institutional units with the function of simply holding assets, such as trusts, estates, agencies accounts, and some “brassplate” companies. Examples are holding corporations that hold only the assets (owning controlling-levels of equity) of a group of subsidiary corporations and whose principal activity is owning the group without providing any other service to the enterprises in which the equity is held, that is, they do not administer or manage other units; (b) institutional units that provide financial services exclusively with own funds, or funds provided by a sponsor to a range of clients and incur the financial risk of the debtor defaulting. Examples are money lenders and corporations engaged in lending (*e.g.* student loans, import and export loans) from funds received from a sponsor such as a government unit or nonprofit institution; (c) pawnshops that predominantly engage in lending; (d) financial corporations, such as Special Purpose Entities, that raise funds in open markets to be used by affiliated corporations; and (e) conduits, intragroup financiers and treasury functions when these functions are undertaken by a separate institutional unit. See also the ESA2010 definition in EC (2013) p. 29.

<sup>27</sup> Because the consolidation in the financial accounts can only be done between resident entities (section 2.2), only the resident counterpart is available for loans granted by NFCs to resident NFCs. It is thus obvious that the resident counterpart of loans granted to resident NFCs represents 100% of intra-sectoral loans all over the period.

Altogether, the shares of the respective components of the NFC debt-to-GDP ratio have been evolving over time. This suggests that the funding preferences of NFCs or the access to funding for NFCs have changed over time (ECB (2007, 2012a, 2013, 2014a, 2016), EIB (2015)).

For example, after the 2007-2008 global financial crisis, resident NFCs relied increasingly on specific funding sources, and notably domestic intercompany loans, loans from non-resident captive financial institutions and money lenders and debt securities purchased by non-resident NFCs to the detriment of loans granted by MFIs, lowering the relative dependence of NFCs on bank lending<sup>28</sup>. At the end of the sample period, the ratio of NFC debt-to-GDP trends downward. The main contributors are loans granted by resident and non-resident captive financial institutions and money lenders (sector S127).

In addition, NFCs increasingly resorted to non-resident funding sources in the post-crisis period. Indeed, before the 2007-2008 financial crisis, residents represented the major counterpart of NFC debt. Conversely in the post-crisis period, the share of non-residents increased substantially so that in 2018Q4, the respective shares between resident and non-resident counterparts are almost even<sup>29</sup>. This suggests that in the post-crisis period, inward foreign direct investments (FDI) initiated by non-resident counterparts (and notably by sectors S11 and S127 in the form of loans) towards resident NFCs have increased. This in turn contributes to inflate the stock of inward FDI in Luxembourg in the post crisis period<sup>30</sup>.

The drivers of the dynamics of the debt components are multiple. Determinants can relate to the access to finance or to the cost of finance. They can arise from domestic and/or foreign sides. They can be different across NFCs, notably between foreign-controlled NFCs and national private NFCs. They can also vary over time and across debt components. While the main scope of this paper is to understand why the ratio of debt-to-GDP is high in Luxembourg, testing and discerning the empirical drivers of each debt component may constitute a potential sequel of this paper.

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<sup>28</sup> Note that this macroeconomic observation is drawn from the whole population of NFCs and can conceal differences at the firm-level; notably between foreign-controlled NFCs and national NFCs.

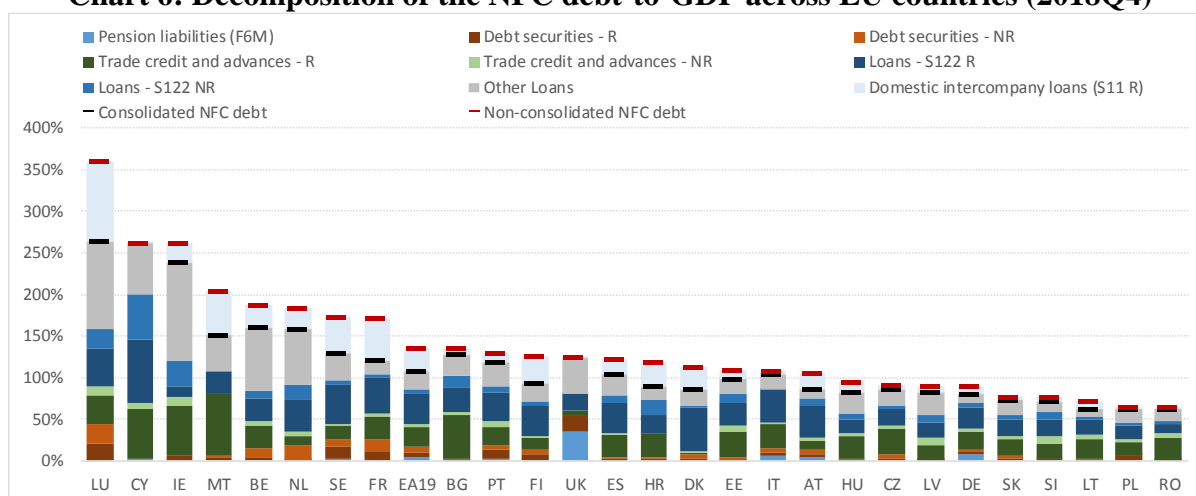
<sup>29</sup> Table C.1 in Appendix C presents a structural decomposition of NFCs' total financial liabilities for 2018Q4 between residents and non-residents.

<sup>30</sup> See Charts B.1 and B.3 in Appendix B.

### 3.2 Comparison across EU countries

Chart 6 compares the decomposition of the ratio of NFC debt-to-GDP across EU countries in 2018Q4, based on available data provided by the ECB-SDW. Given the use of a different data source compared to Chart 5, Chart 6 includes a residual category labelled “*Other loans*” (representing about 106% of GDP for Luxembourg as of 2018Q4). When comparing the debt components between Charts 5 and 6, the category “*Other loans*” comprises loans granted by resident/non-resident sectors others than those provided by resident/non-resident sectors S122 and resident sector S11. In other words, “*Other loans*” includes the following items: loans by non-resident NFCs (sector S11 NR), loans by resident/non-resident captive financial institutions and money lenders (sector S127 R/NR) and loans by other sectors (whether resident or non-resident). In Chart 5, the latter items account for about 116% of GDP in 2018Q4, with loans granted by non-resident sector S127 representing the major component (about 89% in 2018Q4). In other words, the category “*Other loans*” in Chart 6 includes in majority loans granted by the non-resident sector S127, as of 2018Q4.

**Chart 6: Decomposition of the NFC debt-to-GDP across EU countries (2018Q4)**



Source: ECB (QNA, BSI, BOP), BCL (BOP-IIP). R (NR) stands for the resident (non-resident) counterpart. NB: As in the ESRB Risk Dashboard, data for UK are based on annual ESA2010 series for 2018. For the UK, no decomposition for the counterpart of debt securities issued by NFCs was available. Hence for the UK, debt securities are those held by residents and non-residents. Period: 2018Q4. Units: Percent of GDP.

In 2018Q4, Luxembourg holds the largest ratio of NFC debt-to-GDP across EU countries, whether in consolidated or non-consolidated terms. The ratio is above the EA19 level (135% in 2018Q4) and above the critical threshold of 133% set by the European Commission in its Scoreboard for the Macroeconomic Imbalance Procedure for the private sector as a whole (NFCs, households and non-profit institutions serving households (NPISHs)).

Several components of the NFC debt-to-GDP ratio contribute to explain the position of Luxembourg. These components are: other loans (106% of GDP) - which based on the comparison between Charts 5 and 6 includes in majority loans provided by non-resident captive financial institutions and money lenders - domestic intercompany loans (95% of GDP) and debt securities (43% of GDP). For the latter two debt components, Luxembourg holds the largest stocks compared to other European countries, while for the first component, Luxembourg comes second in terms of importance, just behind Ireland.

Altogether, the components of NFC debt that contribute the most to the large ratio of NFC debt-to-GDP in Luxembourg take the form of loans - granted whether by NFCs (sector S11) or by captive financial institutions and money lenders (sector S127) - and debt securities issued by resident NFCs and purchased by non-resident entities.

### **3.3 Characteristics of NFC debt dynamics**

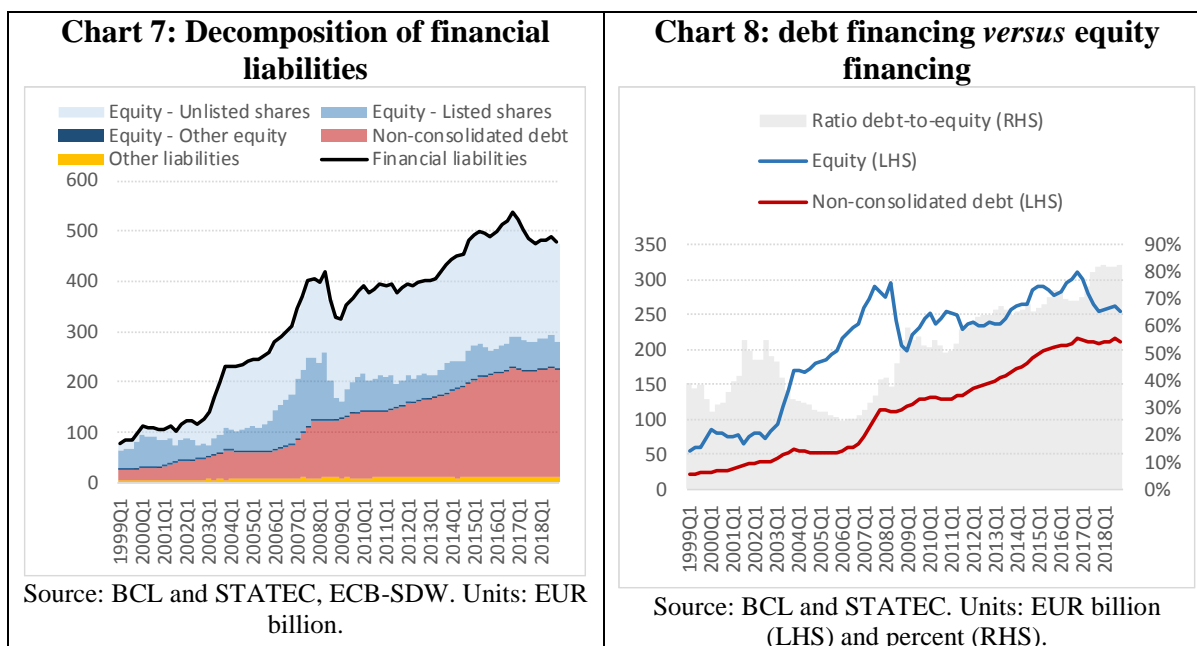
#### **3.3.1 The case of Luxembourg**

This section analyses the characteristics of NFC debt dynamics in Luxembourg whether on the liability side or on the asset side.

##### ***Debt components on the liability side***

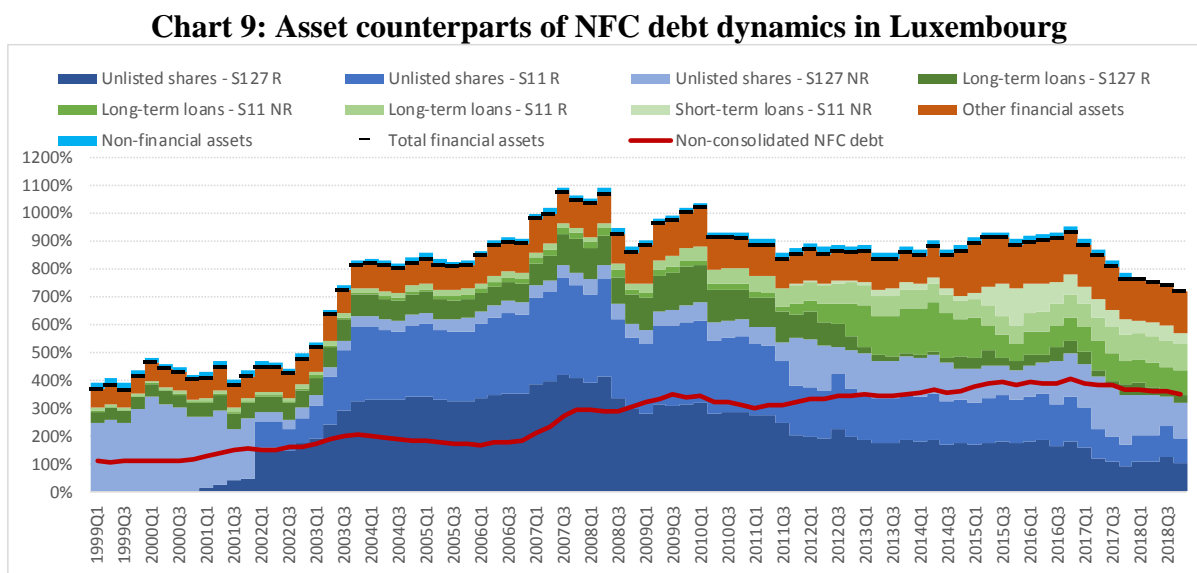
On the liability side, Chart 7 shows that equity securities (or social capital) represent the major part of financial liabilities (65%, on average, over the period 1999Q1-2018Q4). Within equity securities, unlisted shares constitute the major component (on average 76% over the period 2008Q1-2018Q4). The other liability components - mainly financial derivatives and other accounts payable - are negligible.

Since the 2007-2008 global financial crisis, debt has increased faster than equity as shown by the increase in the ratio of NFC debt-to-equity (Chart 8). Hence, the relative share of equity decreased to the benefit of (non-consolidated) debt. Thus, the stock of debt almost doubled between 2008Q1 and 2018Q4 while the stock of equity remains broadly stable over the latter period (Chart 8). This suggests that on aggregate, NFCs favored debt financing to equity financing in the post-crisis period.



### *Debt counterparts on the asset side*

On the asset side, NFC liabilities can finance either the acquisition of non-financial assets or the purchase of financial assets. To analyze which type of assets concurs with NFC debt dynamics, Chart 9 decomposes the stock of total assets held by NFCs over the period 1999Q1-2018Q4.



In the aggregate balance sheet of NFCs, financial assets represent the major part of total assets. The share of non-financial assets is negligible. The most important components of financial assets are unlisted shares invested respectively in resident sectors S127 and S11 and in non-resident sector S127, followed by long-term loans granted to resident sector S127, non-resident sector S11 and resident sector S11. The series of short-term loans granted by resident NFCs to non-resident NFCs feature also some relative importance, although the availability of the series is only from 2011Q4 onwards. Taken together, the aforementioned components represent 83% of the stock of total assets held by NFCs in Luxembourg (or equivalently 668% of GDP) on average, over the period 1999Q1-2018Q4. NFC liabilities thus finance in majority corporate investments in the form of unlisted shares or loans *vis-à-vis* NFCs (sector S11) or captive financial institutions and money lenders (sector S127).

In addition, the share of non-residents in the stock of total financial assets held by NFCs trends upwards after the 2007-2008 global financial crisis, increasing from 10% in 2017Q3 to 48% in 2018Q4<sup>31</sup>. This suggests that in the post-crisis period, outward foreign direct investments (FDI) initiated by resident sector S11 (in the form of unlisted shares and loans) towards non-residents (notably sectors S127 and S11) have increased. This in turn contributes to the increase in the stock of outward FDI in Luxembourg in the post-crisis period<sup>32</sup>.

### **3.3.2 Comparison with other EU countries**

Chart 10 decomposes the ratio of NFC assets-to-GDP across EU countries. For each EU country, the stock of financial assets held by NFCs is larger than the stock of non-financial assets.

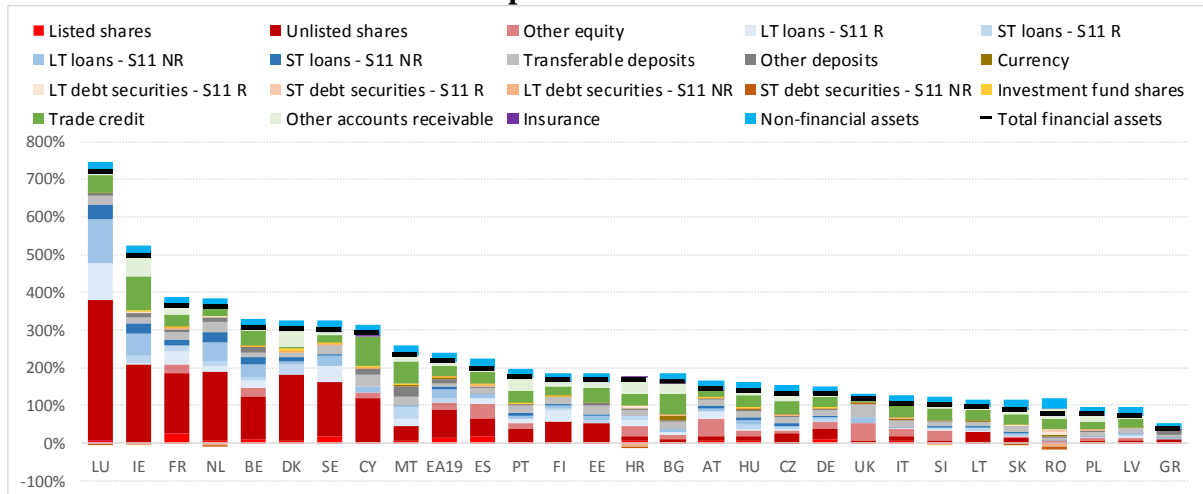
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<sup>31</sup> Table C.2 in Appendix C presents a structural decomposition of NFCs' total financial assets for 2018Q4 between residents and non-residents.

<sup>32</sup> See Charts B.2 and B.4 in Appendix B.



**Chart 10: Asset counterparts of NFC debt across EU countries**



Source: ECB-SDW for financial assets (Period: 2018Q4). Eurostat for non-financial assets (Period: 2017Q4 given available data, missing data for MT). R (NR) stands for the resident (non-resident) counterpart. Units: Percent of GDP.

In 2018Q4 and across EU countries, Luxembourg holds the largest ratio of NFC financial assets-to-GDP. The latter amounts to about 720%<sup>33</sup>. Two main components contribute to this large ratio: unlisted shares and loans granted to resident/non-resident NFCs (sector S11). Taken together, they represent 87% of the stock of total financial assets held by NFCs in Luxembourg.

Another remarkable observation is the importance of financial assets in NFC balance sheets compared to non-financial assets not only in Luxembourg - a global financial center - but also in other EU countries. This suggests a financialization of NFC balance sheets in EU countries<sup>34</sup>.

<sup>33</sup> Notice that the difference between the ratio of NFC total assets (both financial and non-financial)-to-GDP (about 720% in 2018Q4) and the ratio of NFC non-consolidated debt-to-GDP (about 360% in 2018Q4) is equal to the financial liabilities not taken into account in the definition of NFC debt; notably financial derivatives and other accounts payable, and equity securities (or social capital). From an accountability perspective, the total assets held by NFCs must equal the total liabilities held by NFCs.

<sup>34</sup> This fact is also observed in other advanced economies, notably in the United States (Davis (2018)).

## 4. Analysis of NFC debt: a firm-level perspective

### 4.1 Firm-level databases: objective and short description

The firm-level analysis complements the macroeconomic analysis by highlighting at the firm level, which type of NFCs contribute the most to the large ratio of NFC debt-to-GDP in Luxembourg.

The structure of the firm-level databases regroups nested databases at three levels. Table 1 lists the characteristics of each database together with the balance sheet items that can be used for the analysis of NFC debt.

**Table 1: Main characteristics of firm-level databases**

Database	Database 1	Database 2	Database 3
Source	BCL (ST2-S116)	STATEC's Central Balance Sheet Register	STATEC's Structural Business Statistics survey
NFCs covered	87 (only those with a balance sheet $\geq$ EUR 500 million)	391	34809
Update	Quarterly	Quarterly	Yearly
Frequency	Quarterly	Yearly	Yearly
Time periods available	2014Q1-2018Q4	2011-2018	2016
Series available	Loans from affiliated undertakings (2-LA2001, 2-LA2002, 2-LA2003); Loans from banks (2-N02000); Debt securities (2-003000); Total assets (1-000000); Equity securities held (1-005000); Loans to affiliated undertakings (1-LA2001, 1-LA2002, 1-LA2003); Debt securities (1-003000); Non-financial assets (1-006000)	Amounts owed to affiliated undertakings; Amounts owed to banks; Debenture loans; Trade creditors; Shares in affiliated undertakings; Loans to affiliated undertakings; Amounts owed by affiliated undertakings; Financial assets; Tangible assets; Total assets	Short-term loans; Long-term loans (provided by S122, S11, S1311, S1314, RoW); Debt securities; Trade credit; Pension liabilities; Equity securities held; Non-financial assets; Total assets

Source: BCL, STATEC.

The first database is managed on a quarterly basis by the BCL and covers 87 NFCs whose balance sheet size is larger than EUR 500 million. This database spans 2014Q1 to 2018Q4 in quarterly frequency.

The second database relies on the Central Balance Sheet Register (*Centrale des Bilans* (CdB)). It is an electronic database based on balance sheet data provided by the Trade and Companies Register (Registre de Commerce et des Sociétés (RCS)) and compiled by the

Central Balance Sheet Office of the STATEC<sup>35</sup>. The database includes 391 NFCs whose balance sheet items are available on a yearly frequency over the period 2011-2018 and updated on a quarterly basis.

The third database relies on the annual Structural Business Statistics (SBS) survey<sup>36</sup> and is also compiled by the STATEC. It contains balance sheet data for 34809 NFCs in Luxembourg. One limit of this latter database is that it is available only for 2016 and includes grossing-up estimates. The SBS survey uses grossing-up estimates as the survey does not cover the full population of NFCs. Therefore, the sample of surveyed NFCs needs to be inflated to represent the whole population of NFCs in Luxembourg. Estimation is the means by which this inflation occurs, also referred to as “grossing up”. Different grossing-up techniques exist<sup>37</sup>. In the case of Luxembourg (Zangerlé (2014)), grossing up survey data is always implemented based on ancillary data available in the administrative sources such as the NFCs’ turnover and the number of employees (Eurostat (2006), Zangerlé (2009, 2014))<sup>38</sup>. Indeed, these ancillary variables most often have a linear correlation with the variables of interest in the SBS survey. Based on the SBS database provided by the STATEC for the year 2016, the grossing-up estimation accounts for about 15%, whether for total assets or total liabilities<sup>39</sup>.

The considered firm-level databases includes NFCs that are also classified as SPEs. The paper does not attempt to isolate SPEs from the sample of NFCs as no clear-cut definition of SPEs is available in the literature. Besides, SPEs are often consolidated within the balance sheet of NFCs making it difficult to disentangle which part of the balance sheet belongs to SPEs and which part does not.

Eventually, the main difficulty of the firm-level analysis is that each firm-level database presents distinct structures. Differences pertain to the number of NFCs covered, the update of the database, the data frequency, the time periods available and the series available (Table 1).

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<sup>35</sup> For more information, see <https://statistiques.public.lu/en/methodology/methodes/entreprises/Centrale-bilans/centrale-bilans/index.html>. For a presentation of the Central Balance Sheet Office, see Gonzalez (2009) and STATEC (2012).

<sup>36</sup> For more information on the Structural Business Survey, see <https://ec.europa.eu/eurostat/web/structural-business-statistics>. For Luxembourg, the reader can refer to Eurostat (2006) and to the STATEC website: <https://statistiques.public.lu/en/methodology/methodes/entreprises/Stat-struct/sse/index.html>

<sup>37</sup> See IMF (2009)’s BPM6, “Chapter 2: How to Conduct a Survey?”, p. 6-19 and “Chapter 8: Crosscutting Issues in Compiling Balance of Payments and International Investment Position Statistics”, p. 101-128.

<sup>38</sup> See Eurostat (2006), p. 17, Zangerlé (2009), p. 15-16 and Zangerlé (2014), p. 30.

<sup>39</sup> These figures have been computed for total assets and total liabilities, respectively. Note that the share of the grossing-up estimation differs across items of the financial accounts.

In spite of this difficulty, the paper ensures to get consistent results across the various firm-level databases.

## **4.2 Types of NFCs**

The firm-level databases allow distinguishing between different types of NFCs. In particular, they disentangle NFCs into national public NFCs, national private NFCs and foreign-controlled NFCs. The classification is provided by the STATEC.

National public NFCs (S11001) include all resident NFCs and quasi-corporations under the control of general government. National private NFCs (S11002) include all resident non-financial corporations and quasi-corporations, which are not controlled by units of government or by non-resident institutional units. Foreign-controlled NFCs (S11003) include all resident NFCs and quasi-corporations, which are controlled by non-resident institutional units.

For sake of simplicity, the remainder of the analysis distinguishes two types of NFCs: foreign-controlled NFCs and national NFCs.

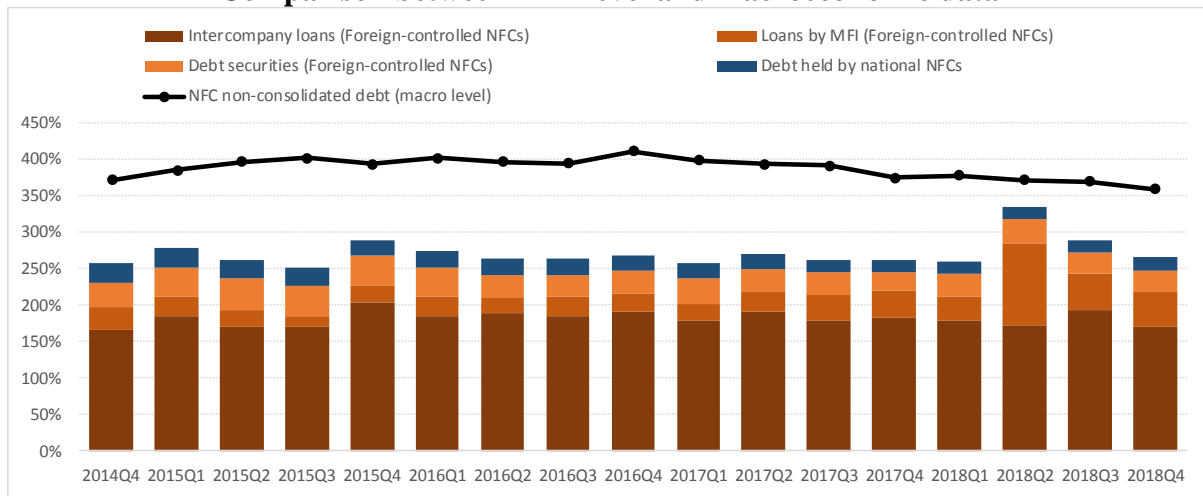
The paper proceeds by comparing the ratio of debt-to-GDP at the firm-level and at the macroeconomic level and by analyzing which type of NFC contributes the most to the large ratio of NFC debt-to-GDP in Luxembourg.

## **4.3 Contribution of NFCs to the ratio of debt-to-GDP**

### **4.3.1 BCL firm-level database**

Chart 11 compares the ratio of NFC non-consolidated debt-to-GDP in Luxembourg between firm-level data (obtained from the BCL) and macroeconomic data (obtained from the ECB-SDW). Bars relate to firm-level data and the line refers to macroeconomic data.

**Chart 11: NFC (non-consolidated) debt-to-GDP ratio in Luxembourg:  
Comparison between firm-level and macroeconomic data**



Source: ECB-SDW for macroeconomic data; BCL (ST2-S116) for firm-level data. NFC debt includes intercompany loans, loans granted by MFI and debt securities; hence all debt components except trade credit and pension liabilities, given available data. Period: 2014Q4-2018Q4. Units: Percent of GDP.

At the macroeconomic level, the ratio of NFC non-consolidated debt-to-GDP is larger than the ratio computed across NFCs and calculated with the firm-level database. This is expected as the BCL database includes only 87 NFCs. In spite of this, the BCL database covers on average and over the period 2014Q4-2018Q4, 70% of the total NFC non-consolidated debt at the macroeconomic level. Indeed, the BCL database includes the largest NFCs *i.e.* those whose balance sheet size is larger than EUR 500 million.

A predominant share of the ratio of NFC debt-to-GDP relates to debt issued by foreign-controlled NFCs. National NFCs contribute only in minority to NFC debt. Indeed, the various shades of orange bars associated with foreign-controlled NFCs are larger than the various shades of blue bars associated with national NFCs.

On average, over the period 2014Q4-2018Q4, debt held by foreign-controlled NFCs represents 65% of the NFC non-consolidated debt at the macroeconomic level. National NFCs account for 5% of the NFC non-consolidated debt at the macroeconomic level.

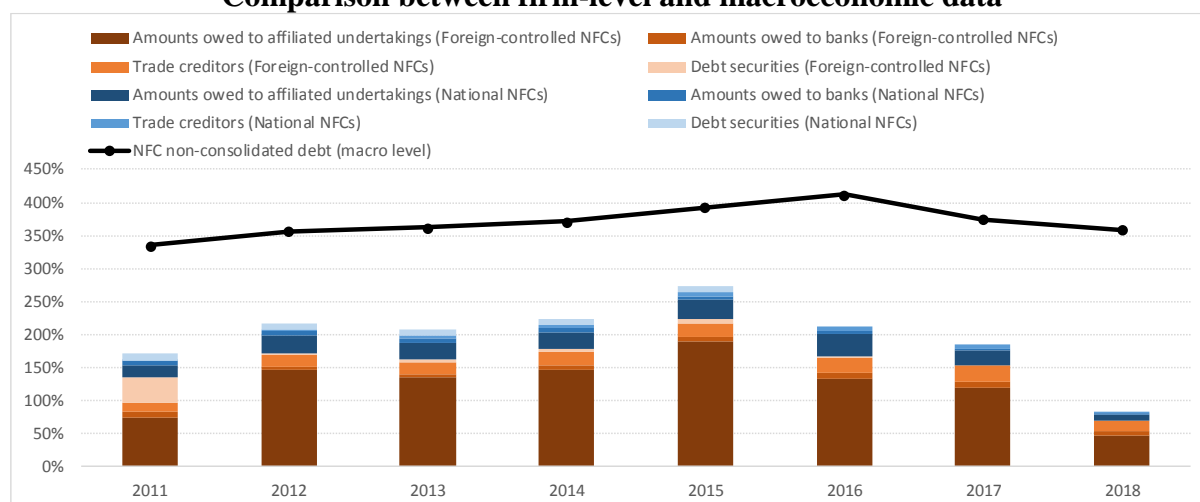
In addition, according to the BCL database, the largest component of debt for foreign-controlled NFCs are intercompany loans, followed by debt securities. This result is in line with the macroeconomic analysis (section 3)<sup>40</sup>.

<sup>40</sup> The BCL database comprises only 9 national private NFCs and 3 national public NFCs. The latter are too small numbers to be representative of the whole population of national NFCs in Luxembourg. Hence, the paper does not discuss the debt components for those companies.

### 4.3.2 STATEC's Central Balance Sheet Register firm-level database

Chart 12 compares the ratio of NFC non-consolidated debt-to-GDP between firm-level data (obtained from the STATEC's Central Balance Sheet Office) and macroeconomic data (obtained from the ECB-SDW). Bars relate to firm-level data and the line refers to macroeconomic data.

**Chart 12: NFC (non-consolidated) debt-to-GDP ratio in Luxembourg: Comparison between firm-level and macroeconomic data**



Source: ECB-SDW for macroeconomic data; STATEC's Central Balance Sheet Register for firm-level data. NFC debt contains the following items: amounts owed to affiliated undertakings (including intra-group loans), loans granted by MFI (or amounts owed to banks), debt securities and trade credit; hence all non-consolidated debt components except pension liabilities, given available data. Period: 2011-2018. Units: Percent of GDP.

At the macroeconomic level, the ratio of NFC debt-to-GDP is larger than the sum of this ratio across NFCs. This is expected as the firm-level database comprises only 391 NFCs. In spite of this, the Central Balance Sheet Register database covers on average and over the period 2011-2018, 53% of the NFC non-consolidated debt at the macroeconomic level.

Debt issued by foreign-controlled NFCs contributes in majority to the ratio of NFC debt-to-GDP. National NFCs contribute only in minority to NFC debt. Indeed, the various shades of orange bars associated with foreign-controlled NFCs are larger than the various shades of blue bars associated with national NFCs.

On average, over the period 2011-2018, debt held by foreign-controlled NFCs represents 43% of the NFC non-consolidated debt at the macroeconomic level while national NFCs account only for 10% of the NFC non-consolidated debt at the macroeconomic level.

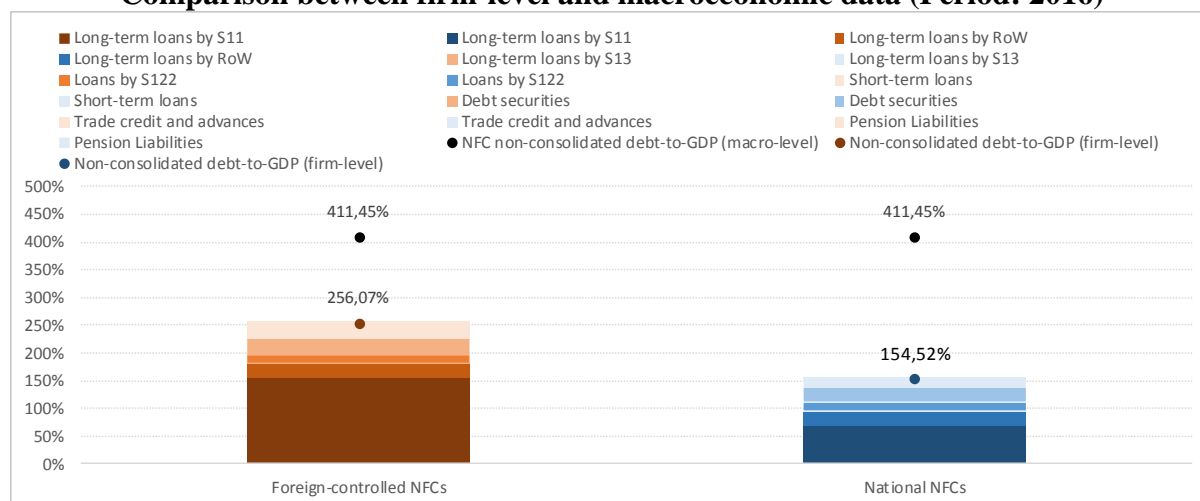
In addition, according to the Central Balance Sheet Register database, the largest component of debt for foreign-controlled NFCs are the amounts owed to affiliated undertakings

(including intra-group loans). This result is in line with the macroeconomic analysis (section 3).

### 4.3.3 STATEC’s Structural Business Statistics firm-level database

Chart 13 compares the level of the ratio of NFC non-consolidated debt-to-GDP in Luxembourg between firm-level data (obtained from the STATEC’s Structural Business Statistics survey) and macroeconomic data (obtained from the ECB-SDW). Bars relate to firm-level data and the black dots refer to macroeconomic data.

**Chart 13: NFC debt-to-GDP ratio in Luxembourg:  
Comparison between firm-level and macroeconomic data (Period: 2016)**



Source: ECB-SDW for macroeconomic data; STATEC’s Structural Business Statistics survey for firm-level data. NFC debt contains loans (including intercompany loans and loans granted by MFI), debt securities, trade credit and advances and pension liabilities. Period: 2016 only. Units: Percent of GDP.

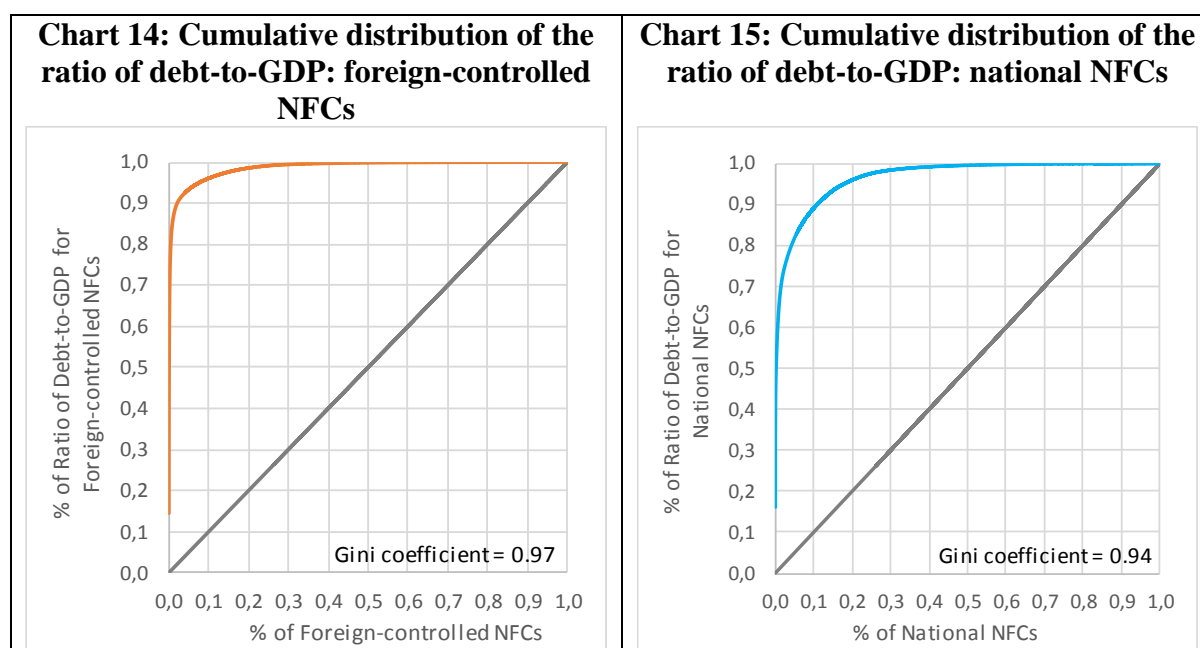
The ratio of NFC debt-to-GDP computed at the macroeconomic level (411.45%) is consistent with the firm-level ratio calculated with microeconomic data (410.59%=256.07%+154.52%). The firm-level ratio is defined as the sum of the different NFC debt-to-GDP ratios across resident NFCs.

Foreign-controlled NFCs (depicted in various shades of orange) contribute more than national NFCs (depicted in various shades of blue) to the NFC debt-to-GDP ratio at the macroeconomic level. Indeed, debt held by foreign-controlled NFCs represents 62% of the total NFC debt while debt held by national NFCs accounts for 38% of the total NFC debt. This result is in line with the ones highlighted in the previous firm-level databases.

According to the STATEC’s SBS survey, the largest component of debt for foreign-controlled NFCs are intercompany loans (“*long-term loans granted by sector S11*”). This result

matches those found in the previous firm-level databases as well as those highlighted in the macroeconomic analysis (section 3).

Chart 14 and 13 analyze the distribution of debt across the types of firms. The distribution of debt is more unequal for foreign-controlled NFCs (Chart 14) than for national NFCs (Chart 15). Indeed, the Gini coefficient is larger for foreign-controlled NFCs (0.97) than for national NFCs (0.94). This suggests that some foreign-controlled NFCs companies contribute more than others to the large ratio of debt-to-GDP.



Source: STATEC’s Structural Business Statistics survey, author’s calculations. Period: 2016 only.

Indeed, within foreign-controlled NFCs, only a few corporates hold the majority of debt (Table 2, third column)<sup>41</sup>. As a matter of fact, 10 foreign-controlled NFCs hold 52% of the total debt held by foreign-controlled NFCs while 100 foreign-controlled NFCs hold 85% of the total debt held by foreign-controlled NFCs. More interestingly, 60 foreign-controlled NFCs hold about 50% of the total debt of NFCs at the macroeconomic level (Table 2, fourth column).

<sup>41</sup> This observation holds also for the other firm-level databases and is robust across time, although the latter databases do not cover the whole population of NFCs in Luxembourg as the STATEC’s SBS database does, but provide instead a longer time span.



**Table 2: Distribution of the ratio of debt-to-GDP across types of NFCs**

Foreign-controlled NFCs				National NFCs			
Number of firms	Cumulated sum of debt-to-GDP ratio	Percentage of debt held by foreign-controlled NFCs	Percentage of non-consolidated debt at the macro level	Number of firms	Cumulated sum of debt-to-GDP ratio	Percentage of debt held by national NFCs	Percentage of non-consolidated debt at the macro level
<b>10</b>	134.30%	52.45%	32.64%	<b>500</b>	114.13%	73.86%	27.74%
<b>20</b>	169.97%	66.37%	41.31%	<b>1000</b>	124.28%	80.43%	30.21%
<b>40</b>	194.41%	75.92%	47.25%	<b>5000</b>	149.47%	96.73%	36.33%
<b>60</b>	205.39%	80.21%	49.92%	<b>10000</b>	153.65%	99.44%	37.34%
<b>100</b>	216.69%	84.62%	52.67%	<b>15000</b>	154.39%	99.92%	37.52%
<b>TOTAL</b>	256.07%	100.00%	62.24%	<b>TOTAL</b>	154.52%	100.00%	37.55%

Source: STATEC's Structural Business Statistics survey, author's calculations. Period: 2016 only.

## 5. Lessons and alternative NFC debt indicators

### 5.1 Lessons from macro-level and firm-level analyses

The macroeconomic analysis shows that the main components of NFC debt in Luxembourg are loans granted whether from resident NFCs or from resident/non-resident captive financial institutions and money lenders<sup>42</sup>. Since the 2007-2008 financial crisis, NFCs have increasingly favored debt financing to equity financing<sup>43</sup>. On the asset side, debt mainly finances corporate investments in the form of unlisted shares (to resident NFCs and resident/non-resident captive financial institutions and money lenders) or loans (to resident/non-resident NFCs or to resident captive financial institutions and money lenders)<sup>44</sup>. The firm-level analysis shows that debt issued by foreign-controlled NFCs predominates over debt issued by national NFCs. In other words, debt issued by foreign-controlled NFCs represents the major part of NFC debt at the macroeconomic level. The largest component of debt for foreign-controlled NFCs are intra-group loans<sup>45</sup>. Another important observation is that between types of NFCs, debt is not equally distributed across firms. This observation is particularly true for foreign-controlled NFCs<sup>46</sup>. This suggests that some companies contribute more than others to the large ratio of debt-to-GDP.

<sup>42</sup> See charts 5 and 6 and section "3.1.2 Decomposition of the ratio of NFC non-consolidated debt-to-GDP".

<sup>43</sup> See charts 7 and 8 and the debt counterparts on the liability side in section "3.3 Counterparts of NFC debt dynamics".

<sup>44</sup> See chart 9 and the debt counterparts on the asset side in section "3.3 Counterparts of NFC debt dynamics".

<sup>45</sup> See the contribution of NFCs to the ratio of debt-to-GDP in section "4. Analysis of NFC debt: a firm-level perspective".

<sup>46</sup> See charts 14 and 15 and Table 2 in section "4.3 Contribution of NFCs to the ratio of debt-to-GDP".

Altogether, the macroeconomic and firm-level analyses provide evidence that the large ratio of NFC debt-to-GDP for Luxembourg compared to other EU jurisdictions stems from a structural feature of Luxembourg that pertains to its role as a global financial center. Indeed, the country hosts a large number of NFCs and notably foreign-controlled NFCs (including large MNEs; see *infra*, charts 11, 12, 13 and Table 2) that benefit from Luxembourg as a financial platform to manage their business activities and structure their corporate investments (Hoor (2018)). This financing takes place between NFCs or between NFCs and captive financial institutions and money lenders. In fact, numerous NFCs (including MNEs and notably foreign-controlled NFCs) have set up a centralized treasury entity for the purpose of debt management strategies in Luxembourg, the latter playing the role of regional treasury center (RTC)<sup>47</sup>.

On the liability side, the financing channel of NFCs mainly relies on loans granted by NFCs (including intra-group loans; see *infra*, charts 11 and 12) or by captive financial institutions and money lenders (see *infra*, charts 5 and 6) to resident NFCs. On the asset side, these resources finance the purchase of unlisted shares or the attribution of long-term loans by resident NFCs to NFCs or to captive financial institutions and money lenders (see *infra*, charts 9 and 10).

This structural feature contributes to explain why Luxembourg holds the largest ratio of NFC debt-to-GDP across EU jurisdictions. In turn, this structural characteristic should be taken into consideration when interpreting the large ratio of NFC debt-to-GDP to avoid any misinterpretation, notably in terms of excessive debt burden for NFCs.

### ***Discussion of the results***

The analysis showed an increase in NFC debt, notably after the 2007-2008 financial crisis. It also pointed to the role of Luxembourg as a financial platform used by NFCs to finance

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<sup>47</sup> Indeed, according to IBFD (2012), financial centers allow MNEs to reap economies of scale and scope by centralizing their treasury department operations. In the case of Luxembourg, Hoor (2018) mentions that it is quite common for multinational enterprises to use Luxembourg as a hub for the structuring of financing activities. The spectrum of financing activities is diverse and may for example involve the implementation of a central treasury function in Luxembourg (for example, to move cash around a multinational group), the issuance of bond on the Luxembourg stock exchange or the on-lending of funds to group companies. For example, a Luxembourg company performing cash pooling activities can receive loans from group companies with access cash and grants loans to group companies which require additional funding. Overall, for the group, the implementation of a central treasury entity in Luxembourg should optimize the use of cash in the group and reduce external funding costs (see Hoor (2018), p. 203).

their intra-group activities notably *via* captive financial institutions and money lenders. Different factors - whether cyclical or structural - can potentially explain these observations.

Cyclical factors can pertain to heightened uncertainty concerning the access to external financing for NFCs in the wake of the global financial crisis, illustrated by tighter external financing conditions in terms of both the credit standards and the cost of funding (ECB (2009, 2012b), IBFD (2012) p. 2 and p. 39, ECB (2017) p. 9). These subdued external financing conditions may have led NFCs and in particular MNEs (including notably those located outside Luxembourg<sup>48</sup>) to favor internal financing. They hoarded cash - possibly for precautionary purposes (ECB (2012b)) - and pooled it in centralized treasury entities of the group - often located in global financial centers - to ensure a smooth and unimpaired access to financing means for all the companies composing the group (IBFD (2012)<sup>49</sup>, Hashimoto and Kinoshita (2016), Colangelo (2016)<sup>50</sup>, Davis (2018)). Thus, the 2007-2008 global financial crisis could have encouraged a more efficient use of internally generated financial resources within MNE groups, leading to an increase in intra-group financial transactions, notably in the form of loans and hence, in NFC debt.

Structural factors - proper to the structure offered by a country - may also have contributed to the increase in intra-group financing. The literature has often pointed to tax considerations as a major factor to explain the importance of intra-group financing in a given country (see *e.g.* IBFD (2012), ESRB (2016), EC (2018) among others)<sup>51</sup>. This argument

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<sup>48</sup> Indeed, based on ECB-SDW data, there is no evidence of a substantial increase in cash holding in the balance sheet of NFCs in Luxembourg since the 2007-2008 global financial crisis.

<sup>49</sup> According to IBFD (2012), the 2007-2008 global financial crisis showed the importance of liquidity within a company. For an MNE, it is important to manage its liquidity effectively to ensure optimal usage of the available liquidity within the group, *i.e.* making sure that any excess cash is available where needed in the right currency and that any excess cash is invested properly. Generally, the MNE's treasury department follows the sub-sequent objectives: enterprise risk management (*i.e.* financial risk such as market risk, foreign exchange risk, *etc.*); minimize external financing costs of the MNE group (*e.g.* due to cash deficits at entities within the MNE group) and maximize the return on surplus cash within the MNE group.

<sup>50</sup> For example, Colangelo (2016) suggests that "*cash pooling* [with sector counterparts S11 and S127] *appears to have become increasingly popular after the onset of the financial crisis when, in an environment characterized by limited access to capital markets, reduced bank lending, low returns and higher risks on banks' deposits, corporate groups started to maximise their use of internal sources of financing*".

<sup>51</sup> According to IBFD (2012), intercompany finance are often considered in the context of tax optimization because of the treatment of interest (generally deductible, although with limitations), under the laws of most countries. Considering the high mobility of capital, the impact of intercompany financial transactions on the effective tax rate can be further optimized by the specific tax positions of group companies, for example: entities located in jurisdictions with favorable tax regimes; entities located in jurisdictions with special regimes for group financing activities; and loss-making entities. In the case of Luxembourg, IBFD (2012) underlines the flexible tax, legal and regulatory environment as a key feature of the attractive transfer pricing rules applicable to intra-group financing transactions in Luxembourg (see IBFD (2012) p. 372-373). EC (2018) p. 46-52 argues that among other things, taxes on interest-related income are lower for NFCs in Luxembourg compared to other jurisdictions. ESRB (2016) argues that the presence of captive financial institutions and money lenders as an important counterparty for NFC

should nevertheless be considered with caution given that additional factors other than tax advantages can explain the relative importance of intra-group financing activities in Luxembourg. Indeed, according to Hoor (2018), the main factors underlying Luxembourg's attractiveness as a preferred location for the structuring of intra-group financing activities are its stable and flexible tax, legal and regulatory environment, the availability of qualified and multilingual workforce, its extensive tax treaty network, the absence of Luxembourg withholding tax on interest payments and access to the established Luxembourg stock exchange. Therefore, the attractiveness of Luxembourg to perform intra-group financing is not exclusively related to tax considerations as often pointed by the literature but can rather be potentially explained by an astute combination of factors.

## **5.2 Alternative and complementary indicators to assess NFC debt: macro-level**

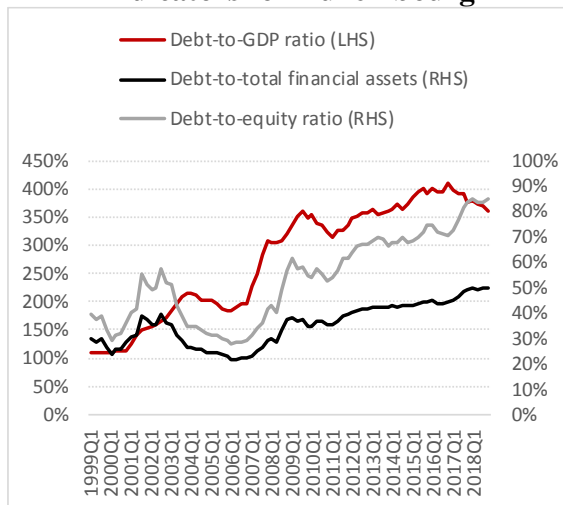
This section presents alternative NFC debt indicators at the macroeconomic level. These indicators amend the denominator of the ratio of non-consolidated debt-to-GDP by relying mainly on total financial assets and equity securities (or social capital) held by NFCs.

Chart 16 compares the evolution of the ratio of (non-consolidated) debt-to-GDP (left-hand scale) to the evolution of the ratios of debt-to-total financial assets and debt-to-equity (right-hand scale) in Luxembourg. The latter ratios are solvency ratios. They allow evaluating a company's financial leverage with respect to its financial assets or its equity. A higher ratio indicates a greater degree of leverage. Chart 16 shows that the debt burden of NFCs varies substantially according to the considered metric.

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financing in Luxembourg are related to tax advantages. According to ESRB (2016), captive financial institutions and money lenders may, for example, engage in transactions on behalf of their parent corporations and multinational groups in order to raise finance or to facilitate intra-group transactions. These entities often have little or no operational linkages with the countries in which they are established. The main rationale for their location is the presence of financial services providers and fiscal planning. ESRB (2016) adds that these entities are currently known to be active mainly in a small number of countries in the euro area, such as IE, LU and NL. The attractiveness of the latter countries pertains to their networks of tax treaties (for example, Luxembourg has concluded 83 double tax treaties (source: [https://impotsdirects.public.lu/fr/conventions/conv\\_vig.html](https://impotsdirects.public.lu/fr/conventions/conv_vig.html)) and 20 tax treaties are in negotiations (source: [https://impotsdirects.public.lu/fr/conventions/conv\\_neg.html](https://impotsdirects.public.lu/fr/conventions/conv_neg.html))), the holding regimes and intra-group financing regimes. In general, many of these entities are set up strategically by corporations for the purpose of benefiting from a favorable tax treatment and reduced tax rates. ESRB (2016) consequently argues that setting up an international corporate structure around the aforementioned countries is very common practice and the majority of foreign multinationals have at least one entity there. The aforementioned arguments which put a relatively large weight on tax advantages as a main driver of intercompany finance, should nevertheless be considered with caution. Indeed, they have not been tested empirically and besides, additional factors other than tax advantages can explain the relative importance of intra-group financing activities in the case of Luxembourg (see Hoor (2018)).

**Chart 16: Alternative NFC debt indicators for Luxembourg**



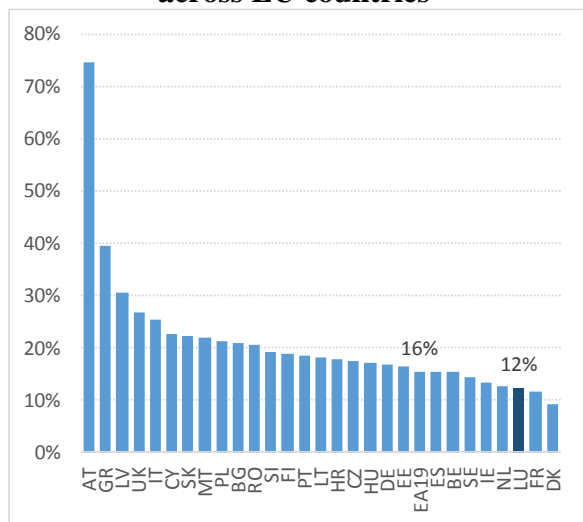
Source: ECB-SDW. NFC debt is measured in non-consolidated terms.

As a matter of fact, the ratio of debt-to-GDP is always larger than 300% since 2007Q4 while the ratios of debt-to-total financial assets and debt-to-equity do not exceed 50% and 90%, respectively. Thus, while NFCs are perceived as strongly indebted when gauging NFC debt with GDP, the debt burden lowers considerably when assessing debt with total financial assets or equity.

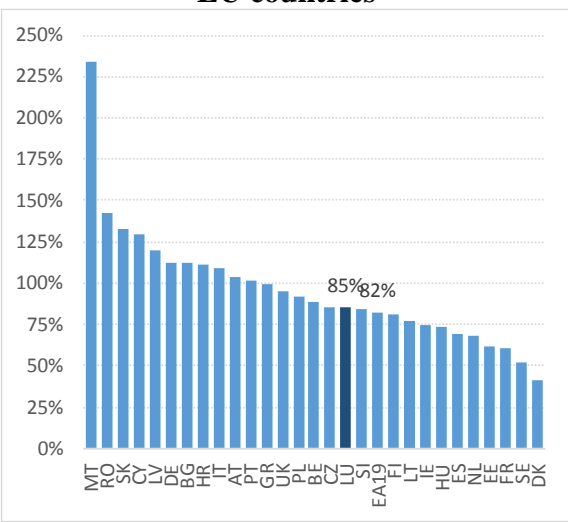
Charts 17 and 18 compare the ratios of debt-to-total financial assets and debt-to-equity across EU countries for 2018Q4. For Luxembourg, the ratio of debt-to-financial assets amounts to 12%, a value below the EA19 average (16%) and amongst the lowest across EU countries. The ratio of debt-to-equity reaches 85% in 2018Q4, close to the EA19 average (82%).

Thus, while Luxembourg NFCs are perceived as the most indebted across EU countries when measured as a proportion of GDP (see *infra*, Chart 1), they in fact present one of the lowest debt ratios when measured as a proportion of total financial assets or close to the EA19 debt average when considering the ratio of debt-to-equity.

**Chart 17: Ratio of debt-to-financial assets across EU countries**



**Chart 18: Ratio of debt-to-equity across EU countries**



Source: ECB-SDW. Period: 2018Q4. NFC debt is measured in non-consolidated terms.

The limit of using ratios calculated at the macroeconomic level is that they can conceal differences across firms including across types of companies and more precisely between foreign-controlled NFCs and national NFCs. The firm-level analysis allows overcoming this limit<sup>52</sup>.

### **5.3 Alternative and complementary indicators to assess NFC debt: firm-level**

This section presents alternative NFC debt indicators at the firm-level. These indicators amend the numerator and the denominator of the ratio of non-consolidated debt-to-GDP. Changes to the numerator are brought by disentangling between debt held by foreign-controlled NFCs and debt held by national NFCs. Changes to the denominator are implemented by considering total asset and total equity (or social capital) held respectively by foreign-controlled NFCs and national NFCs.

As firm-level data are only available for Luxembourg, the paper cannot undertake a comparison analysis across EU countries and focuses exclusively on Luxembourg NFCs.

Table 3 presents key statistics retrieved from the STATEC's Structural Business Statistics firm-level survey available for the year 2016 only. It focuses on the number of NFCs, their total debt, their total assets and their total equity across types of NFCs, disentangling between national NFCs and foreign-controlled NFCs.

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<sup>52</sup> Another limit pertains to the valuation of financial assets. In the case of Luxembourg, financial assets held by NFCs consist in majority in unlisted shares. According to EC (2013)'s ESA2010, unlisted shares are equity securities not listed on a formal exchange (EC (2013), p. 142-143). Equity securities include shares issued by unlisted limited liability companies as follows: capital shares, redeemed shares, dividend shares, participating preference shares or stocks (EC (2013), p. 143). Unlisted shares are issued usually by smaller or new firms who cannot or do not wish to comply with the listing requirements of an official exchange (often a minimal size of the firm as defined by annual income or market capitalization or the willingness to pay the listing fees) and a minimal liquidity of the shares (a certain number of shares must already have been issued)). Furthermore, because they are not traded on organized markets, unlisted securities are often less liquid than listed securities. While listed shares are valued at their market values (EC (2013), p. 178), unlisted shares which are not traded on organized markets, should be estimated. According to BCL (2018), in the quarterly financial account of Luxembourg, no market value is estimated for unquoted shares; they are recorded at the book value of the "own funds". Only for listed companies within sector S11, where data is available on the difference between the market value and the book value of the equity, a correction is undertaken to bring the holdings of unquoted shares at "fair value".

**Table 3: Key statistics for national NFCs and foreign-controlled NFCs (period: 2016)**

Sectors	Number		Total (non-consolidated) debt		Total assets		Total equity	
	Amount	Proportion	Amount	Proportion	Amount	Proportion	Amount	Proportion
National private NFCs	22896	65.78%	82.63	37.63%	151.36	28.20%	63.89	20.76%
Foreign-controlled NFCs	11913	34.22%	136.94	62.37%	385.39	71.80%	243.83	79.24%
Aggregate sample of NFCs	34809	100.00%	219.57	100.00%	536.75	100.00%	307.72	100.00%

Source: STATEC's Structural Business Statistics survey. Period: 2016 (based on available data). Units: EUR billion for total debt, total assets and total equity.

In terms of number, national private NFCs are more numerous than foreign-controlled NFCs. In terms of debt, total assets and total equity, foreign-controlled NFCs hold larger stocks than national NFCs. This result is confirmed in Chart 19 which decomposes by types of NFCs the (non-consolidated) debt, the total assets and the total equity, relative to GDP, for 2016Q4.

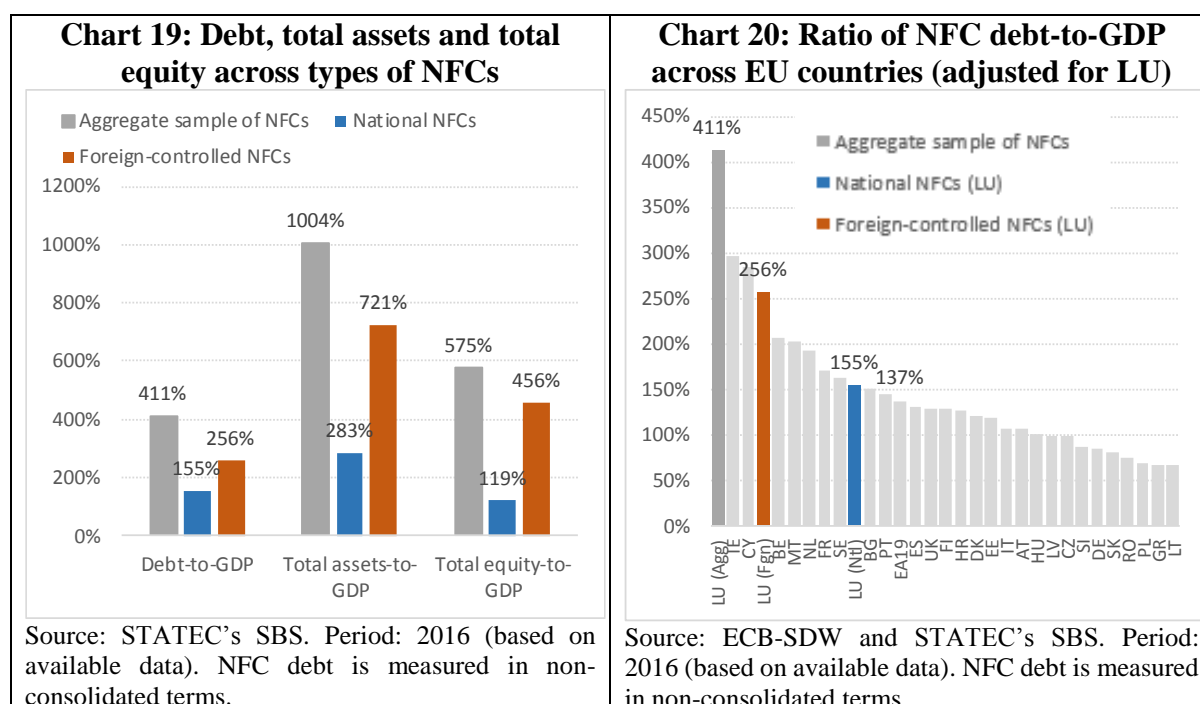
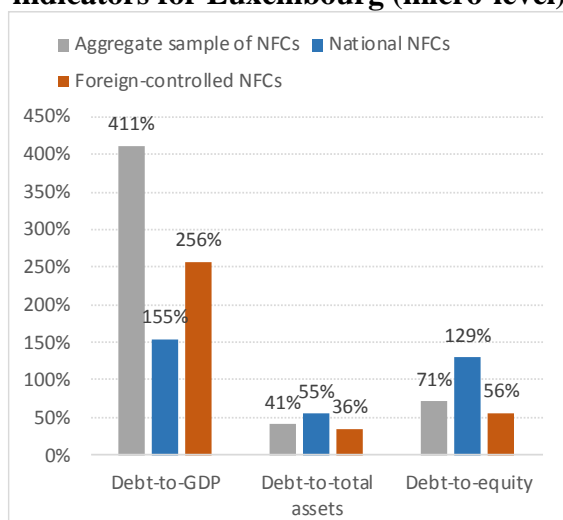


Chart 19 shows that the ratio of (non-consolidated) debt-to-GDP for national NFCs amounts to 155% in 2016Q4. This amount is above the critical threshold of 133% set by the European Commission in its Scoreboard for the Macroeconomic Imbalance Procedure for the private sector as a whole (NFCs, households and non-profit institutions serving households

(NPISHs)). However, it is closer to the EA19 average (137% in 2016Q4, Chart 20). This means that when correcting the ratio of (non-consolidated) debt-to-GDP by excluding foreign-controlled NFCs and considering only national NFCs, Luxembourg no more resembles an outlier amongst EU countries (Chart 20).

**Chart 21: Alternative NFC debt indicators for Luxembourg (micro-level)**



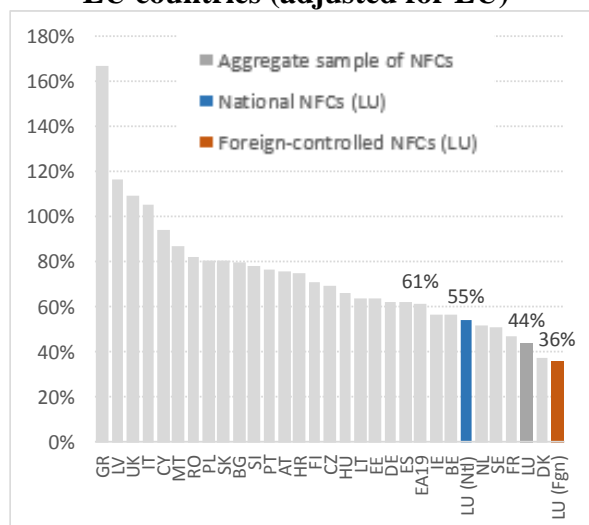
Source: STATEC's SBS. Period: 2016 (based on available data). NFC debt is measured in non-consolidated terms.

In addition, Chart 19 shows that despite the fact that foreign-controlled NFCs contribute to the major part of the debt relative to national NFCs, the former hold a larger stock of total assets and total equity compared to national NFCs. This implies that the ratio of debt-to-total assets and debt-to-total equity is lower for foreign-controlled NFCs than for national NFCs (Chart 21). In other words, national NFCs are more leveraged than foreign-controlled NFCs.

Charts 22 and 23 compare respectively the ratios of NFC debt-to-total assets and NFC debt-to-total equity across EU countries for 2016Q4. The charts disentangle between national and foreign-controlled NFCs for Luxembourg only. Compared to other EU countries, Luxembourg features a lower ratio of debt-to-total assets (Chart 22), whether when considering national NFCs (55%), foreign-controlled NFCs (36%) or the whole sector of NFCs (44%). These ratios are below the EA19 average (61%).

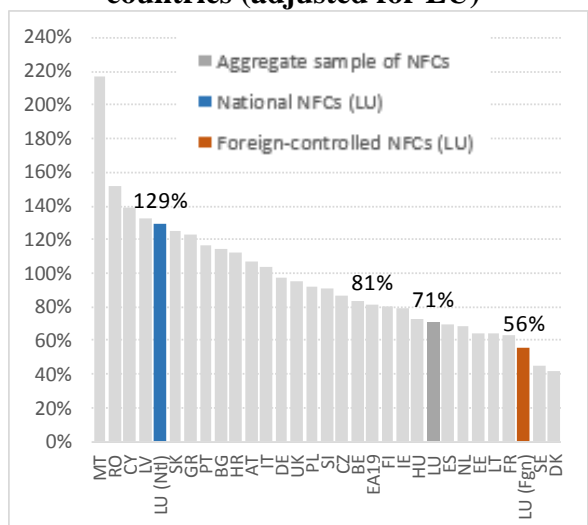


**Chart 22: NFC debt-to-total assets across EU countries (adjusted for LU)**



Source: ECB-SDW for financial assets, Eurostat for non-financial assets and STATEC's SBS for Luxembourg. Period: 2016 (based on available data). NFC debt is measured in non-consolidated terms.

**Chart 23: NFC debt-to-equity across EU countries (adjusted for LU)**



Source: ECB-SDW and STATEC's SBS. Period: 2016 (based on available data). NFC debt is measured in non-consolidated terms.

The ratio of debt-to-equity gives a somewhat different picture in terms of NFC leverage in Luxembourg. Indeed, while the ratios of debt-to-equity are rather low and lie below the EA19 average (81%) in 2016Q4 for the aggregate sample of NFCs (71%) and the foreign-controlled NFCs (56%), the ratio of debt-to-equity for national NFCs is rather high (129%) and lies above the EA19 average.

The latter result should be put into perspective for at least two reasons. First, the analysis of the debt-to-equity ratio - and in particular assessing its highness - depends on a variety of factors, including a company's industry or a corporate's activity<sup>53</sup>. A second factor to take into consideration when analyzing a company's debt-to-equity ratio is its own historical average. Indeed, Chart 23 takes a picture of the ratio at one point in time, *i.e.* in 2016Q4, and not across time. A company may be at or below the average for the industry but above its own historical average, which can be a cause for concern. In other words, to determine a relevant benchmark for the leverage ratio of a particular company, it is important to undertake an analysis across time, across industries or business activities and to compare this ratio relative to its close competitors. In addition, while the paper limits itself to the use of leverage ratios (given data

<sup>53</sup> For example, industries featuring large capital project investments usually have a higher debt-to-equity ratio. These industries can include utilities, transportation and energy. Appendix D provides a decomposition of the following ratios: NFC debt-to-GDP, NFC debt-to-total assets and NFC debt-to-total equity in Luxembourg, across sectors and across types of NFCs.

availability), assessing whether a company's debt is excessive or not would deserve a larger panel of firm-level indicators than relying only on leverage ratios.

## **6. Conclusion**

The ratio of gross debt-to-GDP for non-financial corporations (NFCs) is often used to assess corporate indebtedness. Across European Union (EU) countries, Luxembourg holds the largest ratio. A natural question that arises is whether there should be any concern in terms of excessive debt build-up for NFCs in Luxembourg. Against this background, the paper analyses the underlying characteristics of NFC debt in Luxembourg. It undertakes a macroeconomic and a firm-level analysis. It explores the debt components, their counterparts and the type of NFCs that contribute to the debt. The paper comes up with alternative and complementary indicators aimed to provide a finer assessment of NFC debt in Luxembourg.

The macroeconomic analysis shows that the main components of NFC debt in Luxembourg are loans granted whether from resident NFCs or from resident/non-resident captive financial institutions and money lenders. On the asset side, debt mainly finances corporate investments in the form of unlisted shares (to resident NFCs and resident/non-resident captive financial institutions and money lenders) or loans (to resident/non-resident NFCs or to resident captive financial institutions and money lenders).

The firm-level analysis shows that debt issued by foreign-controlled NFCs predominates over debt issued by national NFCs. In other words, debt issued by foreign-controlled NFCs represents the major part of NFC debt at the macroeconomic level. The largest component of debt for foreign-controlled NFCs are intra-group loans. Another important observation is that between types of NFCs, debt is not equally distributed across firms. This observation is particularly true for foreign-controlled NFCs. This suggests that some companies contribute more than others to the large ratio of debt-to-GDP.

Altogether, the macroeconomic and firm-level analyses provide evidence that the large ratio of NFC debt-to-GDP for Luxembourg compared to other EU jurisdictions stems from a structural feature of Luxembourg that pertains to its role as a global financial center. Indeed, the country hosts a large number of NFCs and notably foreign-controlled NFCs (including large MNEs) that benefit from Luxembourg as a financial platform to manage their business activities and structure their corporate investments.

While the ratio of debt-to-GDP places Luxembourg NFCs as the largest holders of debt across EU countries, alternative indicators suggest the opposite result. This is notably the case

of the ratio of debt-to-financial assets at the macroeconomic level as Luxembourg NFCs hold the largest stock of financial assets across EU countries. A similar observation holds for the ratio of debt-to-total assets whether for foreign-controlled NFCs, national NFCs or when considering the sector of NFCs as a whole.

While the paper is devoted to explain the rationale behind the large ratio of NFC debt-to-GDP in Luxembourg compared to other EU countries and to assess the potential risks of excessive debt build-up, other risks remain to be analyzed for NFCs. This is notably the case of liquidity risk (*i.e.* maturity mismatch between assets and liabilities), foreign exchange risk (*i.e.* the exposure of the debt to a variation in foreign currency prices), the sensitivity to any interest rate variation, the exposure of the domestic banking sector to NFCs, the importance of non-performing loans, *etc.* In addition, although the paper hints at several potential determinants of NFC debt dynamics, it does not test which factors drive NFC debt dynamics. The aforementioned tasks can constitute a potential sequel of the paper.

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## Appendix

### A. Definition of the components of NFC debt

Different definitions of NFC debt exist. NFC debt is based on the quarterly financial accounts data compiled by the STATEC and the BCL according to ESA2010. The broadest measure of NFC debt includes the following items: **loans, debt securities, trade credit and advances, pension entitlements, claims of pension funds on pension managers and entitlements to non-pension benefits.**

**Loans (ESA2010 code AF.4)** represent total credit to NFCs provided by domestic and foreign entities. They are retrieved from the non-financial corporation balance sheets (BCL (2018)). Loans are recorded at their nominal values<sup>54</sup>. In other words, loans are valued at the amount of principal that the debtor is contractually obliged to repay the creditor. Loans can be divided into short-term loans (maturity shorter or equal to one year, **AF.4 S**) and long-term loans (maturity longer than one year, **AF.4 L**). Loans include inter-sectoral loans granted by institutional units other than NFCs (credit institutions, other deposit-taking corporations, money market funds, captive financial institutions and money lenders, general government) whether resident or non-resident. Loans also include intra-sectoral loans, *i.e.* granted by NFCs. Loans between NFCs cover not solely intra-group loans *i.e.* loans extended between corporations belonging to the same company group, but also inter-group loans *i.e.* loans between corporations belonging to different groups (*i.e.* without a significant capital link). Intra-group lending has three components: debt liabilities of parents to their affiliates, debt liabilities of affiliates to their parents, and debt liabilities between related affiliates. Loans can be considered on a non-consolidated basis (*i.e.* including domestic intercompany loans) or on a consolidated basis (*i.e.* excluding domestic intercompany loans)<sup>55</sup>. Consolidation is done within the sector and essentially consists of netting out domestic loans between resident NFCs. This is the consolidation used by the European Commission's Macroeconomic Imbalance Procedure and the ESRB to proxy domestic intercompany loans.

**Debt securities (AF.3)** are interest-bearing instruments issued by NFCs, usually negotiable and traded on secondary markets or that can be offset on the market, and that do not grant the holder any ownership rights in the institutional unit issuing them. Debt securities are recorded at market value<sup>56</sup>. They are retrieved from SEC statistics of securities issues (ECB

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<sup>54</sup> See ESA2010 guidelines published by EC (2013), p. 178.

<sup>55</sup> See ESA2010 guidelines published by EC (2013), p. 139-142.

<sup>56</sup> See ESA2010 guidelines published by EC (2013), p. 177-178.



(2015) p. 32, BCL (2018)). Debt securities can be divided into short-term and long-term debt securities according to whether the maturity is shorter or equal to one year (**AF.3 S**) or longer than one year (**AF.3 L**). Debt securities are considered on a non-consolidated basis as intra-NFC holdings data are not yet available with sufficient backdata to allow for a computation on a consolidated basis<sup>57</sup>.

**Trade credits and advances (AF.81)** consist of all transactions in trade credits and advances arising from the direct extension of credit by suppliers and buyers for goods and services transactions and advance payments for work that is in progress or to be undertaken and associated with such transactions<sup>58</sup>. Trade credits can be seen to be equivalent, in several respects, to short-term loans provided by suppliers to their corporate customers upon an agreement to purchase their products and to settle the payment at a later stage (ECB (2011)). Trade credits and advances are valued at nominal value<sup>59</sup>. They are retrieved from the balance of payments and NFC balance sheets.

**Pension entitlements (AF.63)<sup>60</sup>, claims of pension funds on pension managers (AF.64)<sup>61</sup> and entitlements to non-pension benefits (AF.65)<sup>62</sup>** are pension-related liabilities. Pension commitment liabilities of NFCs *vis-à-vis* their (current and former) employees are liabilities which are similar to other debt components as they require predetermined, legally enforceable payments in the future. Such liabilities can arise from non-autonomous pension funds where the NFC is directly responsible for the pension scheme. In the case where a NFC has outsourced a pension scheme to a pension fund but retains the legal responsibility for a deficit in funding, the underfunding is a liability of the NFC<sup>63</sup>. Pension liabilities are value at the present value of the actuarially determined or promised benefits, or (for money purchase pension schemes) at the market value of the fund's assets<sup>64</sup>. They are retrieved from the non-financial corporation balance sheets (BCL (2018))

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<sup>57</sup> See ESA2010 guidelines published by EC (2013), p. 136-139 and ECB (2018b).

<sup>58</sup> See ESA2010 guidelines published by EC (2013), p. 152.

<sup>59</sup> See ESA2010 guidelines published by EC (2013), p. 179.

<sup>60</sup> Pension entitlements (AF.63) are financial assets that both existing and future pensioners hold against either their pension manager, *i.e.* their employer(s), a scheme designated by the employer(s) to pay pensions as part of a compensation agreement between the employer and employee or a life (or a non-life) insurer.

<sup>61</sup> Claims of pension funds on pension managers (AF.64) are financial assets representing the claims of pension funds on their pension manager for any deficit, and financial assets representing the claims of the pension manager on the pension funds for any excess, *e.g.* where the investment income exceeds the increase in entitlements and the difference is payable to the pension manager.

<sup>62</sup> Entitlements to non-pension benefits (AF.65) are the excess of net contributions over benefits as an increase in the liability of the insurance scheme towards the beneficiaries.

<sup>63</sup> See ESA2010 guidelines published by EC (2013), p. 145-148.

<sup>64</sup> See ESA2010 guidelines published by EC (2013), p. 179.

The above items are available on the BCL website in the item Statistics\5 Luxembourg macroeconomic indicators<sup>65</sup>. The BCL website provides public quarterly data on financial accounts in cross section or time series, whether as transactions or as stocks. Cross section data classifies financial account data across institutional sectors for each time period. Time series data classifies financial account data across time periods for each institutional sector.

## **B. Stocks of inward and outward FDI-to-GDP: comparison across EU countries**

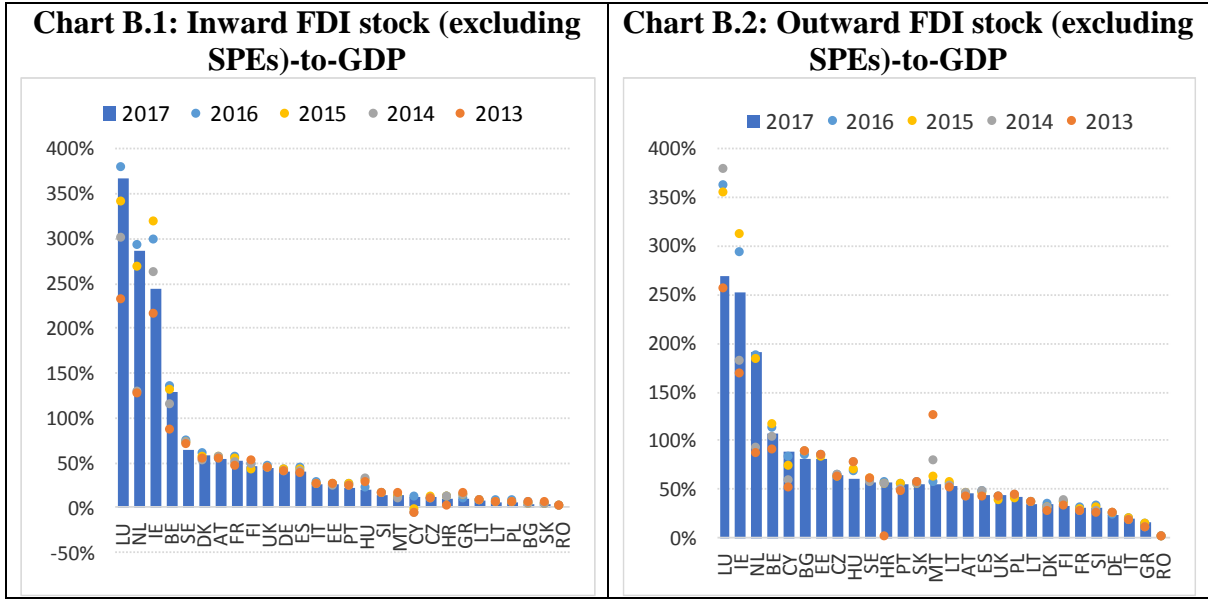
Charts B.1 and B.2 present the evolution of inward and outward FDI<sup>66</sup> (excluding Special Purpose Entities (SPEs<sup>67</sup>)). In terms of GDP, Luxembourg features the most important stocks of inward and outward FDI (excluding SPEs) compared to other countries. This suggests that direct investment inflows initiated by non-residents concurs with direct investment outflows initiated by residents. In other words, direct investment flows that come into the country, also flow out of the country. This provides evidence that Luxembourg is used as a financial platform notably by MNEs to channel corporate investment potentially *via* SPEs.

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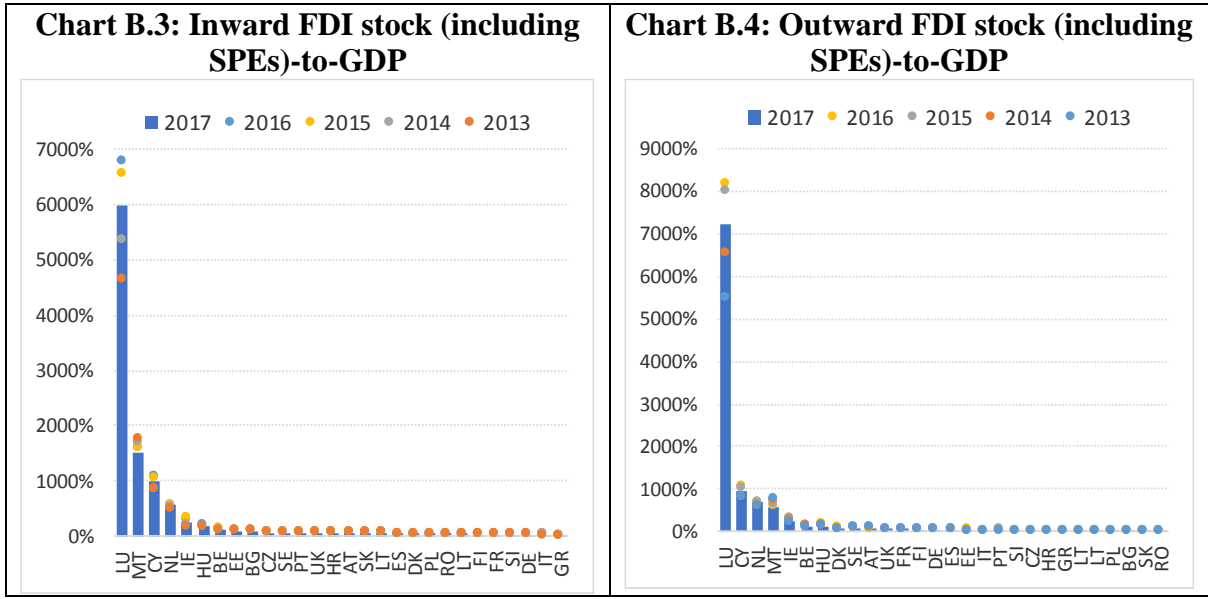
<sup>65</sup> Available at: [http://www.bcl.lu/en/statistics/series\\_statistiques\\_luxembourg/05\\_real\\_economy/index.html](http://www.bcl.lu/en/statistics/series_statistiques_luxembourg/05_real_economy/index.html). See BCL\Statistics\5 Luxembourg macroeconomic indicators. See tables “05.08 Financial accounts by institutional sector - stocks - time series”, “05.09 Financial accounts by institutional sector - transactions - time series”, “05.10 Financial accounts by institutional sector - stocks - cross section presentation” and “05.11 Financial accounts by institutional sector - transactions - cross section presentation”.

<sup>66</sup> Inward FDI reports the value of the investment stocks held by multinational enterprises in the economy of the reporting country. Outward FDI reports on the value of investment stocks held by multinational enterprises in the economy of countries other than the reporting country. Both are compared to GDP in order to allow comparisons across countries.

<sup>67</sup> According to OECD (2015), Special Purpose Entities (SPEs) are entities whose role is to facilitate the internal financing of a multinational enterprise but that have little or no physical presence in an economy. By excluding such entities from their FDI statistics, countries presumably have a better measure of the FDI into their country that is having a real impact on their economy. SPEs are normally included in sector S127. There are though some exceptions as some SPEs can be classified as NFCs. This is notably the case for Luxembourg (see section “2.2.4 *Impact of Special Purpose Entities (SPEs) on NFC debt*”, in the core text).



The evidence is even more compelling when considering the stock of inward and outward FDI by including SPEs (Charts B.3 and B.4).



### C. Decomposition of the ratio of NFC non-consolidated debt-to-GDP in Luxembourg: residents *versus* non-residents

Tables C.1 and C.2 decompose respectively the ratio of NFC non-consolidated debt-to-GDP and the ratio of NFC total assets-to-GDP, by resident and non-resident counterparts.

**Table C.1: Decomposition of the NFC non-consolidated debt-to-GDP ratio in Luxembourg: residents *versus* non-residents (as of 2018Q4)**

NFC debt components	Residents	Non-residents	TOTAL
Pension liabilities (-to-GDP)	0.34	0.34	0.68
Debt securities - Total (-to-GDP)	18.93	23.66	42.59
Debt securities purchased by S11 (-to-GDP)	0.01	23.66	23.67
Debt securities purchased by other sectors (-to-GDP)	18.92	0.00	18.92
Trade credit and advances (-to-GDP)	19.19	18.47	37.65
Loans - Total (-to-GDP)	153.11	116.27	269.39
Loans granted by S122 (-to-GDP)	45.64	12.42	58.06
Loans granted by S11 (-to-GDP)	94.93	0.00	94.93
Loans granted by S127 (-to-GDP)	4.30	103.86	108.16
Loans granted by other sectors (-to-GDP)	8.25	0.00	8.25
Non-consolidated debt (2018Q4) (-to-GDP)	191.57	158.74	350.31

Source: BCL and STATEC, financial accounts. Period: 1999Q1-2018Q4. Sectors: Deposit-taking corporations except central bank (S122); Captive financial institutions and money lenders (S127); Non-financial corporations (S11). Other sectors regroup mainly non-money market funds investment funds (S124) and general government (S13). R (NR) stands for the resident (non-resident) counterpart. Units: Percent of GDP. Period: 2018Q4.

**Table C.2: Decomposition of the NFC total assets-to-GDP ratio in Luxembourg: residents *versus* non-residents (as of 2018Q4)**

NFC debt components	Residents	Non-residents	TOTAL
Unlisted shares by S11 (-to-GDP)	88.82	48.42	137.24
Unlisted shares by S127 (-to-GDP)	100.89	126.70	227.59
Long-term loans by S11 (-to-GDP)	94.93	89.10	184.03
Long-term loans by S127 (-to-GDP)	28.64	N.C.	28.64
Short-term loans by S11 (-to-GDP)	0.05	39.60	39.65
Trade credit and advances (-to-GDP)	19.80	27.65	47.45
Other financial assets (-to-GDP)	42.58	13.15	55.73
Financial assets - Total (-to-GDP)	375.71	344.62	720.33
Non-financial assets - Total (-to-GDP)	N.C.	N.C.	22.93
Total assets (-to-GDP)	N.C.	N.C.	743.26

Source: BCL and STATEC, financial accounts. Period: 1999Q1-2018Q4. Sectors: Captive financial institutions and money lenders (S127); Non-financial corporations (S11). R (NR) stands for the resident (non-resident) counterpart. N.C. stands for not communicated (or unavailable data). Units: Percent of GDP. Period: 2018Q4 (2017Q4 for non-financial assets).

#### **D. Sectoral decomposition of NFC debt-to-GDP, NFC debt-to-total assets and NFC debt-to-total equity in Luxembourg**

Charts D.1 to D.3 present a sectoral decomposition of the ratio of debt-to-GDP, debt-to-total assets and debt-to-total equity for Luxembourg in 2016Q4, by distinguishing between national NFCs, foreign-controlled NFCs and the aggregate sample of NFCs. The sectoral decomposition has been undertaken based on the NACE code attached to each NFC<sup>68,69</sup>.

Chart D.1 shows that the distribution of NFC debt varies substantially across industries with some sectors being more indebted than others when considering the whole population of NFCs. In addition, the relative contribution of national NFCs and foreign-controlled NFCs to debt differs across sectors.

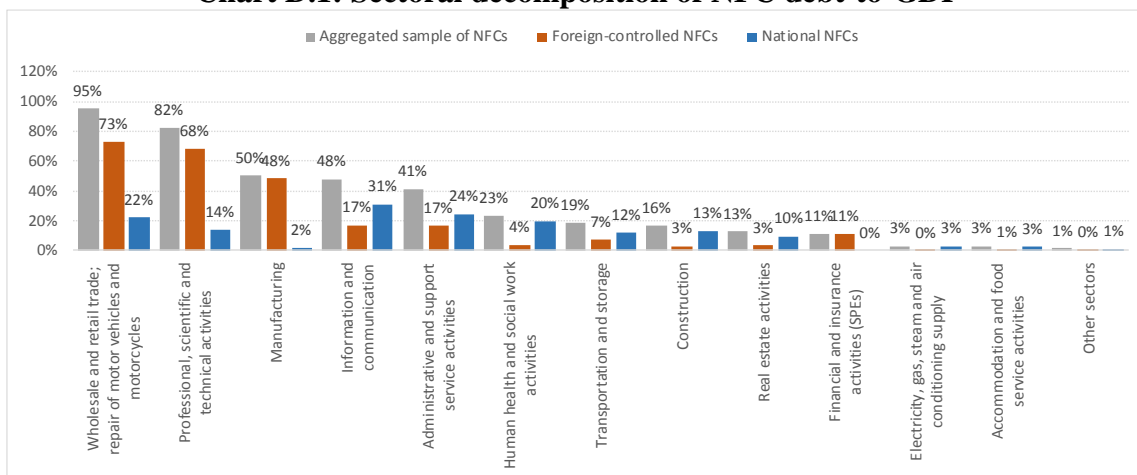
A similar observation prevails for the ratio of debt-to-total assets (Chart D.2) and debt-to-total equity (Chart D.3) although the distribution of the latter ratio appears more unequal across sectors than with the former ratio.

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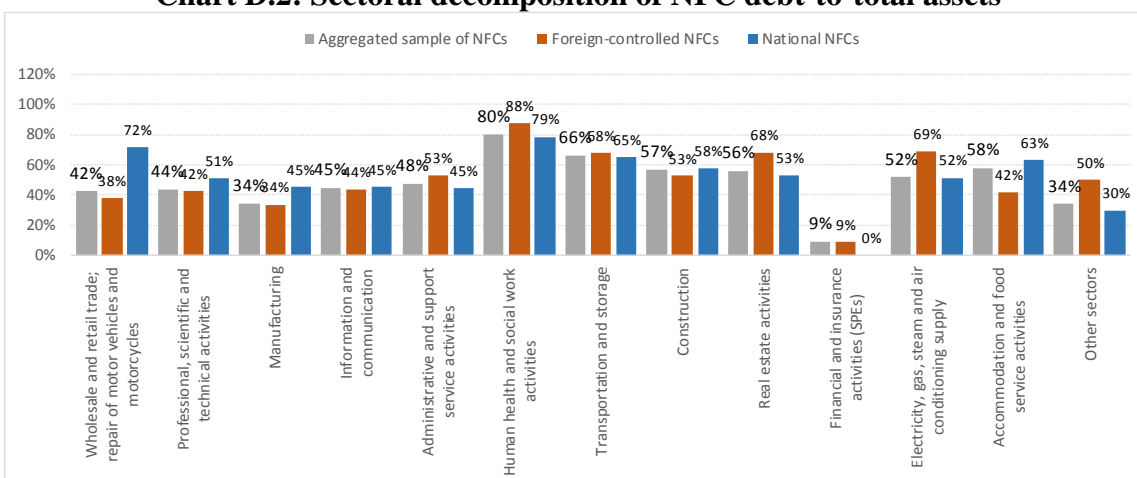
<sup>68</sup> According to EC (2008), NACE is the “statistical classification of economic activities in the European Community”. NACE is the acronym for “*Nomenclature statistique des activités économiques dans la Communauté européenne*”.

<sup>69</sup> An interesting exercise would have been to use in Chart D.1, the value added or the gross operating surplus of NFCs across sectors as an alternative denominator. Unfortunately, the available data does not allow calculating such a metric.

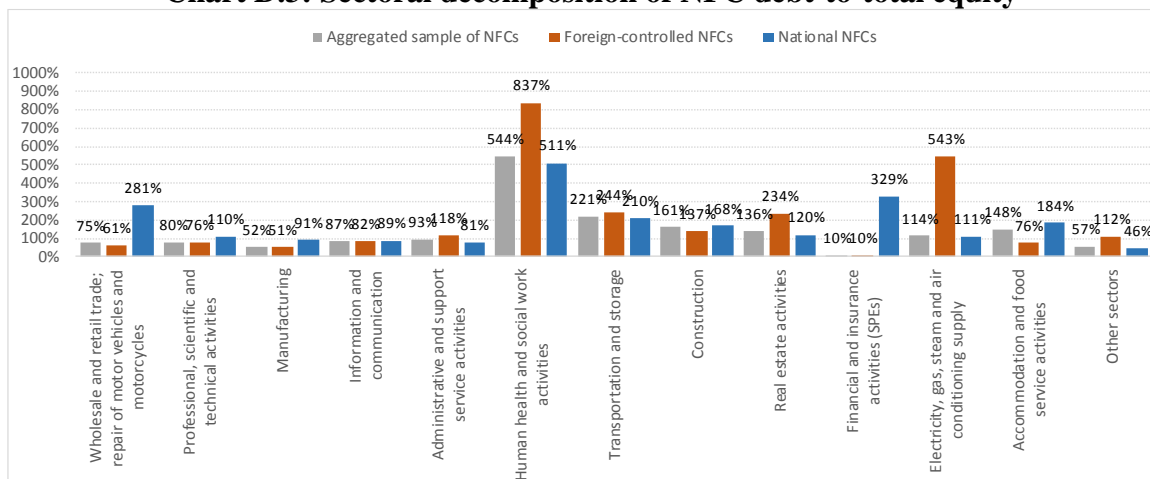
**Chart D.1: Sectoral decomposition of NFC debt-to-GDP**



**Chart D.2: Sectoral decomposition of NFC debt-to-total assets**



**Chart D.3: Sectoral decomposition of NFC debt-to-total equity**



Source: STATEC's Structural Business Statistics. NFC debt contains loans (including intercompany loans and loans granted by MFI), debt securities, trade credit and advances and pension liabilities. Period: 2016 only. Units: Percent.





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