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Keeping track of MNEs through business group databases: the experience of Bank of Portugal¹

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¹ This paper was prepared for the meeting. The views expressed are those of the authors and do not necessarily reflect the views of the BIS, the IFC or the central banks and other institutions represented at the meeting.

Keeping track of MNEs through business group databases: The experience of Banco de Portugal

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Abstract

The world has gone global and statistics developed at national level will miss the global picture if we do not react accordingly. Our national economies are impacted not only by local firms but also by multinational enterprises (MNEs) which operate around the globe and organize themselves in various complex and interconnected ways hardly captured by the current statistical standards and definitions. Several statistical domains are therefore likely affected by this phenomenon, namely in the field of balance of payments and related statistics such as foreign affiliates statistics. There are already a number of ongoing initiatives lead by international organizations such as the OECD and the Eurostat and in this paper we present the contribution of Banco de Portugal in this respect. The presence of MNEs in Portugal, as well as Portuguese groups across the world, has several implications in our economy through the interlinkages they establish with the domestic agents. To address this issue, Banco de Portugal developed its own business groups' database that clearly depicts the group structure of Portuguese non-financial corporations (NFCs), showing all the relationships within the group, covering both the resident and non-resident members of the group. This paper presents the architecture and the methodology underlying the design of the database and provides some highlights about its geographical dispersion. Namely, it shows the countries of the ultimate controlling institutional units (UCIs) of multinational groups in Portugal and the host countries of Portuguese groups.

Keywords: Business statistics; database design; multinational enterprises (MNEs)

JEL classification: C80; F23; F60

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1. Introduction

The mission of central banks is not confined to the financial world. Understanding the interlinkages between financial intermediaries and the other agents of the economy is key to decide on the adequate monetary policy, macroprudential framework and credit risk assessment. Banking supervision also benefits from a better knowledge of those dynamics.

There is then a case for central banks to have good quality data on non-financial corporations (NFCs). Sector financial accounts, Balance of Payments, International Investment Position and Foreign Affiliates' Statistics are powerful analytical tools that the Statistics Department of Banco de Portugal provides to the other Departments of the Bank so that the different dimensions of Portuguese NFCs can be assessed.

Complementarily, there is a need to move beyond the aggregates and the use of micro data is fundamental. Banco de Portugal manages the Central Balance Sheet data Office (CBSO) since 1983, with full coverage of all companies operating in Portugal since 2006. Internal and external researchers by BPLim – Microdata Research Laboratory of Banco de Portugal also benefit from this micro database.

In an increasingly global world, understanding NFCs requires also a business groups' database to keep track of Portuguese and foreign MNEs and their impact in the Portuguese economy. To get a complete picture of NFCs sector, consolidated data is also needed to complement individual accounts and business groups' structures.

Banco de Portugal participation's in the European Committee of Central Balance-Sheet Data Office (ECCBSO) promoted the exchange of experiences and encouraged the creation of a consolidated accounts database at Portuguese Central Balance Sheet data Office (CBSO). Starting with listed companies compliant with International Accounting Reporting Standards (IFRS), nowadays, consolidated accounts database has information from 2013 onwards for all companies publishing consolidated annual reports according with IFRS (listed and non-listed) and National Generally Accepted Accounting Practices (National GAAP).

This paper provides a complete overview of the business groups' database and its remainder is as follows: Section 2 shows the data source of the business groups' database, while Section 3 presents the database, namely its architecture, the functioning of the algorithm that loads the database, the visualization tool and some summary statistics that characterize the database. All Names and Tax payer identification numbers used in Sections 2 and 3 are fictional. Section 4 presents the relevance of MNEs in Portugal by comparing some of their economic and financial indicators with those of all-resident enterprise groups and non-groups. Section 5 concludes with some final remarks. Definitions are presented in the Annex.

2. Data source

The business groups' database developed by Banco de Portugal contains information on the group structure of Portuguese Non-Financial Corporations (NFCs). The main data source is the *Simplified Corporate Information* (IES, in the Portuguese acronym), a mandatory annual report through which NFCs submit their annual accounts (balance-sheet, income statement, statement of changes in equity, cash flow statement and the annex to the financial statements) simultaneously to the Tax Authority, Ministry of Justice, Banco de Portugal and Statistics Portugal. IES is reported within six and a half months after the end of the economic year, which, for most enterprises resident in Portugal, corresponds to 15th July of the year following the reference year. After the submission of IES, information is subject to quality control at the Central Balance Sheet Data Office (CBSO) of Banco de Portugal until the end of September. The results presented in this paper refer to the year 2016, the last year available at the time of writing.

The following items are required to ramp up the business groups' database:

- Tax payer identification number (Tax ID)
- Legal entity identifier (LEI) (optional)
- Name
- Country
- NACE (Statistical Classification of Economic Activities in the European Community)
- Direct participation in share capital (percentage)
- Direct participation in voting rights (percentage)
- Date of beginning and end of the participation

Tax payer identification number is mandatory for all entities (resident and non-resident). In Portugal, the Tax ID is unique and mandatory for all entities and is used as the key number in all micro data databases managed by Banco de Portugal.

The information about group structure is collected through five distinct tables. One table collects the identification of ultimate controlling institutional unit (UCI) and the ultimate controlling entity in Portugal if the UCI is non-resident. In this table only the first four above items are required. In the remaining four tables all the above items are collected according to the type of participation:

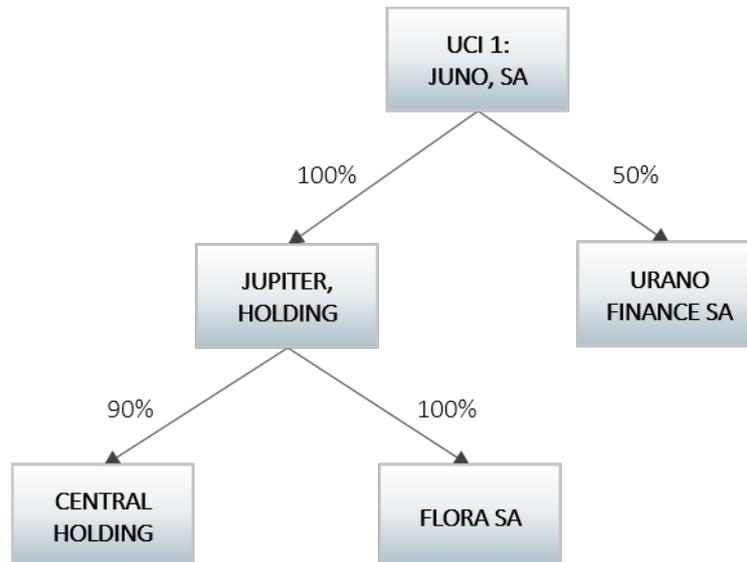
- (1) Direct upward;
- (2) Direct downward;
- (3) Indirect upward;
- (4) Indirect downward.

Direct upward participations exist when one or more companies have a participation in the share capital of the reporting entity. If there are other companies participating in the share capital of the direct upward participants then indirect upward participations occur. The same rationale applies to downward participations.

All indirect participations are reported in pairs of companies, i.e., link by link of the control chain in the group structure. For example: JUNO, SA reports a direct downward participation in JUPITER, HOLDING and an indirect downward participation

of JUPITER, HOLDING in FLORA SA and other indirect downward participation of JUPITER, HOLDING in CENTRAL HOLDING (Figure 1).

Figure 1 – Report of an indirect downward equity participation



Direct participations are mandatory for all reporting entities with no minimum threshold, implying that the reporting entity has to declare all direct upward and downward participations. Instead of asking for the complete group structure to the Portuguese UCI or the ultimate controlling entity in Portugal if the UCI is non-resident, the option was to require all direct participations for all NFCs in order to reach better quality on group structure data. The assumption was that reporting companies have a better knowledge of their direct participations. This option also allowed to avoid missing data from reported companies on the top of the control chain in Portugal. The report of all direct participations will generate repeated participations in the database, which will later be deleted by the algorithm in order to build a complete and non-redundant business groups' database.

Indirect participations are mandatory only for Portuguese UCIs or for the ultimate controlling entity in Portugal if the UCI is non-resident. In the case of indirect upward participations only those from non-resident companies in the field of Balance of Payments statistics are required. The solution applied to indirect participations reduces the reporting burden on NFCs.

The structure of the tables mentioned above was adopted in 2014 when data for Balance of Payments and International Investment Position (BoP/IIP) statistics was also included in IES, namely equity, dividends and retained earnings of non-resident entities in the scope of foreign direct investment statistics, and variables for outward Foreign Affiliates Statistics (FATS) for all non-resident entities controlled by a Portuguese UCI. This change in the structure of the tables and the incorporation of information for BoP/IIP and FATS statistics was of utmost importance to improve data quality. Data collection became more user friendly and facilitated the reporting of the group structure. At the same time, the inclusion of information from BoP/IIP statistics

promoted a better report of the group structure, with a complete coverage of foreign direct investment and FATS entities.

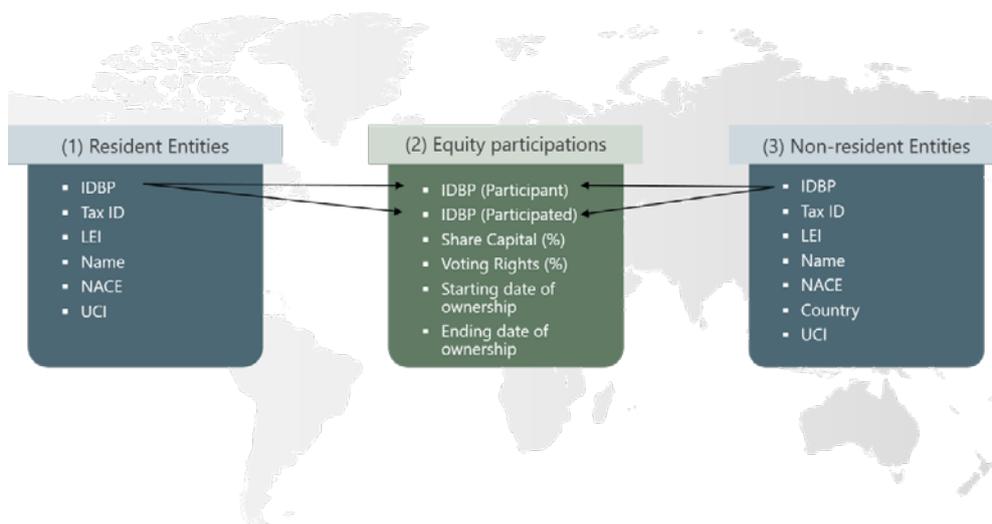
3. The business groups' database

CBSO developed an algorithm to analyse and conciliate all the information reported by companies. The algorithm eliminates repeated information, chooses the best option when the information is similar but not equal and tries to identify the correct UCI. When it is not possible to detect automatically the most accurate information, manual quality control will apply.

3.1 Architecture

The business groups' database comprises 3 tables: (1) the business register of resident entities, (2) all the equity participations between entities characterized by the percentages of participation in share capital and voting rights and (3) the business register of non-resident entities (Figure 2).

Figure 2 – Architecture of the business groups' database



3.2 Algorithm

The algorithm deals with the identification of: (1) non-resident entities; (2) equity participations and (3) UCIs. At the end, the algorithm result is uploaded in the business groups' database.

3.2.1 Non-resident entities

Non-resident entities are reported by resident NFCs and are identified by Tax ID, Name and Country.

Although the Tax ID is mandatory for all entities, a check digit validation only applies for national tax payer numbers. For non-resident entities some checks are also done, like eliminating dots and spaces and even removing the entire Tax ID if it is presumably wrong.

Also, the Name of the same non-resident entity could be reported in slightly different ways by different reporting entities. This situation requires a procedure to find out similarities on Tax IDs and Names and decide whether the entity is the same or not.

The similarity procedure on Tax IDs and Names uses the fuzzy lookup add-in for Excel which executes a matching of textual data in Excel to identify fuzzy duplicate data. Fuzzy lookup ignores dots, commas, question marks and other punctuation marks and special characters.

The algorithm compares the attributes of all non-resident entities according to the following rules:

- 1) If Tax ID, Name and Country are equal the entity is considered the same;
- 2) If Country is the same and:
 - a. Tax ID is equal: Fuzzy lookup compares the Name and considers that it is the same entity when the similarity of the Name is higher than 55%;

Example: "FLORA SA France" with Tax ID "96720542239" and "Flora SA" with the same Tax ID "96720542239" are compared as "FLORASAFRANCE" and "FLORASA" and considered the same company;
 - b. Tax ID is different: Fuzzy lookup compares the binomial (Tax ID, Name) and decides that the entity is the same if the similarity (Tax ID, Name) is higher than 70%;

Example: "Ares Corp. SA" with Tax ID "70253621" and "Ares SA" with a slightly different Tax ID "AB7025321" are compared as "70253621AresCorpSA" and "AB7025321AresSA" and considered the same company;
- 3) If Country is different and:
 - a. The similarity of the binomial (Tax ID, Name) is higher than 70%, then those entities are selected for manual check;

Example: "Local Company Ltd Corp" from Brazil is compared with "Local Company Ltd" from USA with the same Tax ID "850401763" and delivered for manual check;
 - b. The similarity of (Tax ID, Name) is lower or equal than 70%, then those entities are considered different.

Example: "Central Holding" from Austria without Tax ID and "Central Investments Ltd" from Italy with Tax ID "456292930" are considered different companies.

At the end of this procedure the table with all non-resident entities is uploaded with an internal ID called IDBP which will be used in the following steps.

Finally, for the same non-resident entity, the algorithm compares the classification of economic activity (NACE) and LEI and if one or both are different, those cases are selected for manual quality control.

3.2.2. Equity participations

As all direct equity participations are requested, there is some overlap between information reported by different entities. Moreover the same equity participation could be reported as indirect by different entities or even reported as direct by one company and as indirect by another company.

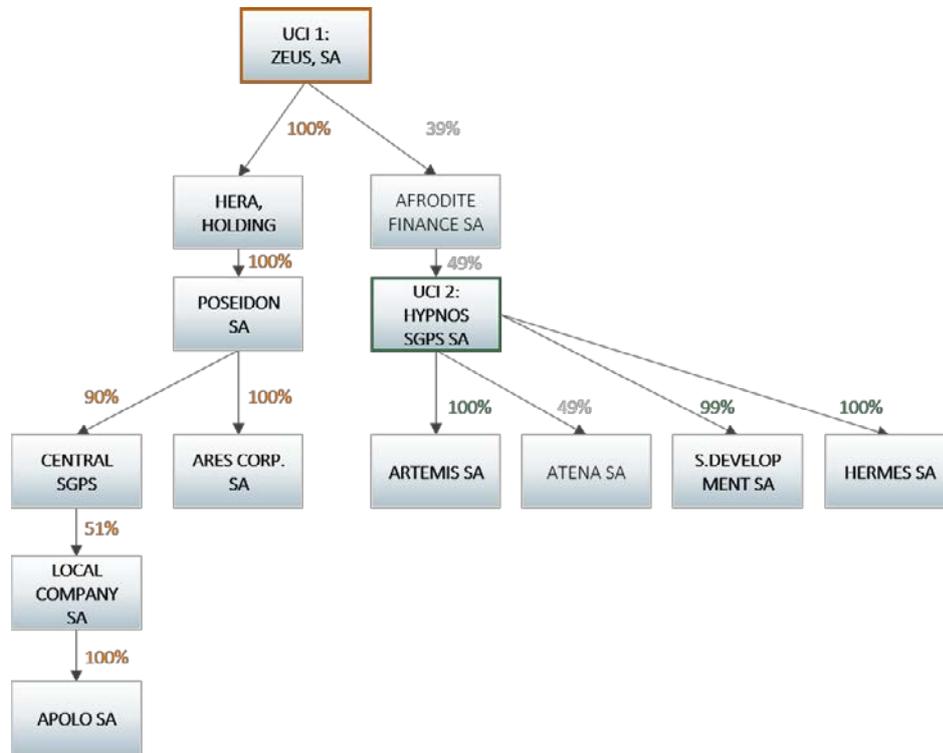
The algorithm uses the IDBP of the entity generated in the previous step to compare the percentages of equity participation and voting rights and decide if the equity participation is the same or not. The algorithm follows the following hierarchy:

- Entries reported more than once by different firms (duplications) are eliminated;
- Entries where the reporting firm reports itself as part of an indirect participation (it should only be part of direct participations) are eliminated
- Direct participations prevail over indirect participations (it is assumed that each reporting firm is more knowledgeable for its direct participations);
- Direct downward participations (firm A participates in firm B) prevail over direct upward participations (firm B is participated by firm A) (it is assumed that each reporting firm is more knowledgeable for its assets than for its liabilities).
- Mismatches between direct participations reported by different entities are selected for manual quality control.

3.2.3. Ultimate Controlling Institutional Unit (UCI)

Empirical evidence shows that companies tend to wrongly identify themselves as UCI. To attribute the correct UCI to a group of companies, the algorithm analyses the chain of voting rights higher than 50% (generally more than 50% implies control) and goes up into the group structure to find out the correct UCI. The UCI of the group will be the company on the top of the control chain. In the example of Figure 3, two different UCIs will be detected by the algorithm: UCI 1 – ZEUS, SA and UCI 2 – HYPNOS SGPS SA. Manual quality control will apply to treat unsolved situations by the algorithm.

Figure 3 – UCI detection by the algorithm



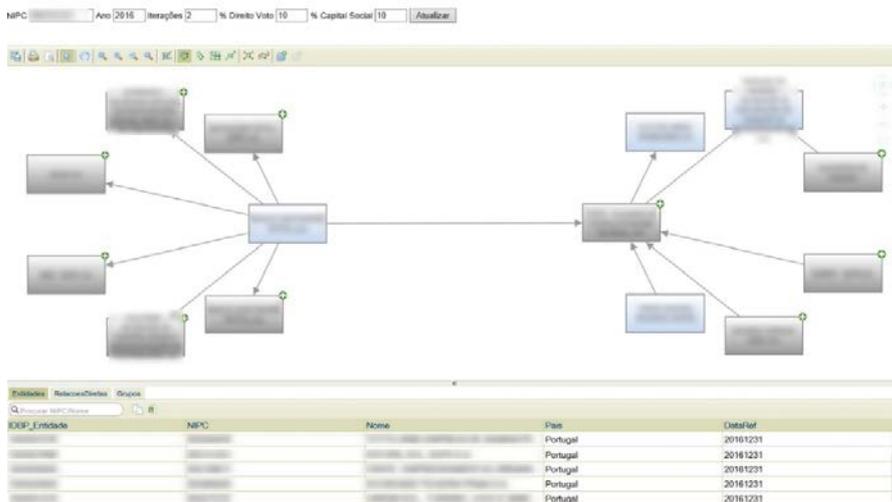
3.3 Visualization

Tom Sawyer software is used to visualize and analyse business group structures. This software allows us to use filters to visualize different perspectives of the same group: all equity participations with the same UCI or outside the scope of the group, changing the percentages of share capital or voting rights.

A company can be found by name or tax number and the group structure appears in the main screen or below in a table (Figure 4). All the information could be exported to Excel.

Tom Sawyer also shows different views besides the hierarchical layout: circular layout, orthogonal layout and symmetric layout.

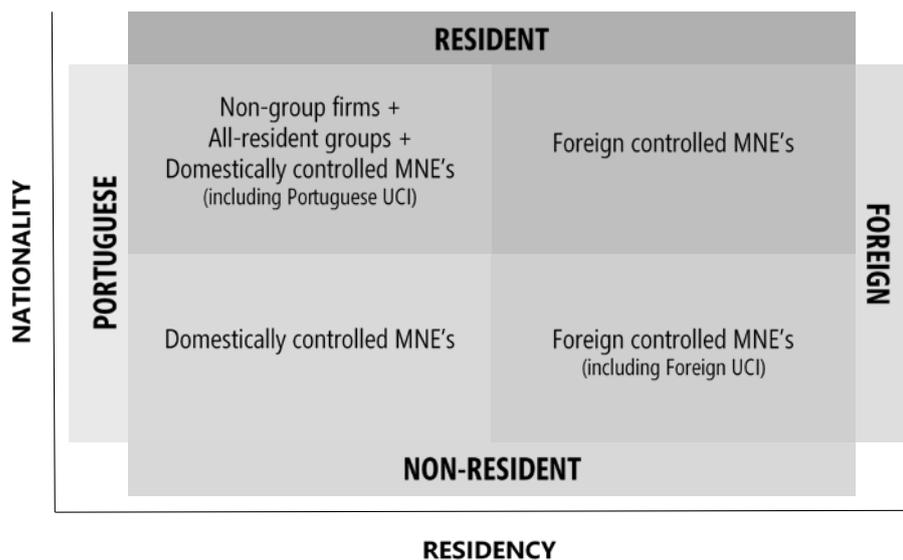
Figure 4 – Group structure visualization with Tom Sawyer software



3.4 Brief characterization of the database

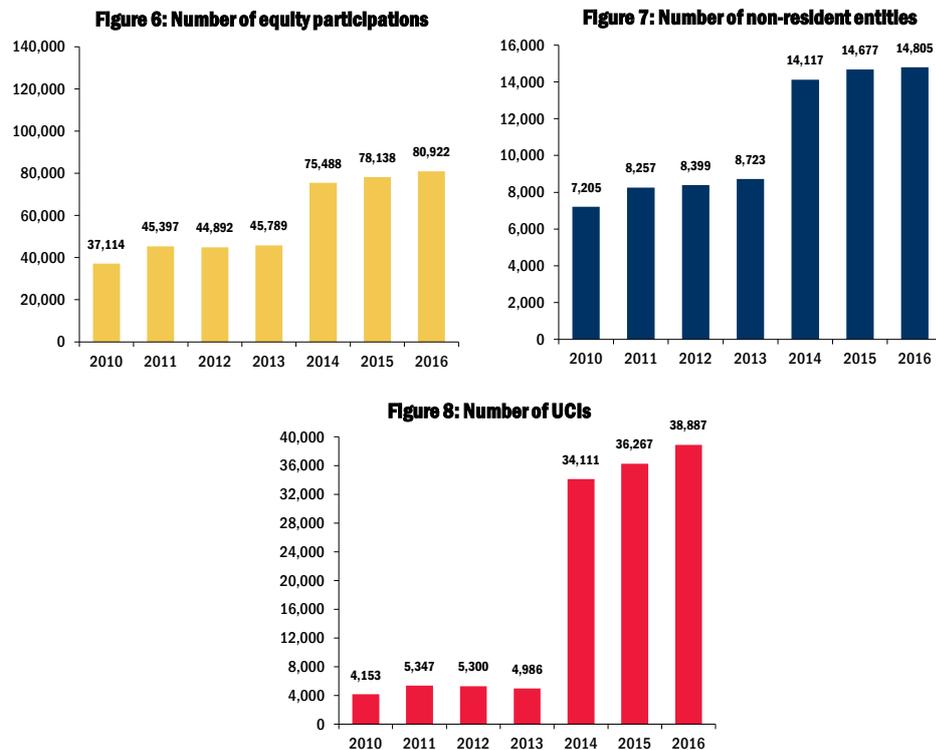
The entities in the business groups' database were classified depending on their nationality and residency as illustrated by Figure 5. Next figures will be based on different reference universes according to these concepts of nationality and residency.

Figure 5 – Nationality vs. residency



The business groups' database has information from 2010 onwards. In 2010, with the adoption of a new accounting framework in Portugal - in line with the IFRS -

information about UCI and indirect equity participations became also available, in addition to the information on direct equity participations already available in the previous National GAAP. As mentioned in section 2, in 2014 the framework changed, which resulted in an overall improvement in data quality. The impact of these changes can be seen in Figures 6 to 8.

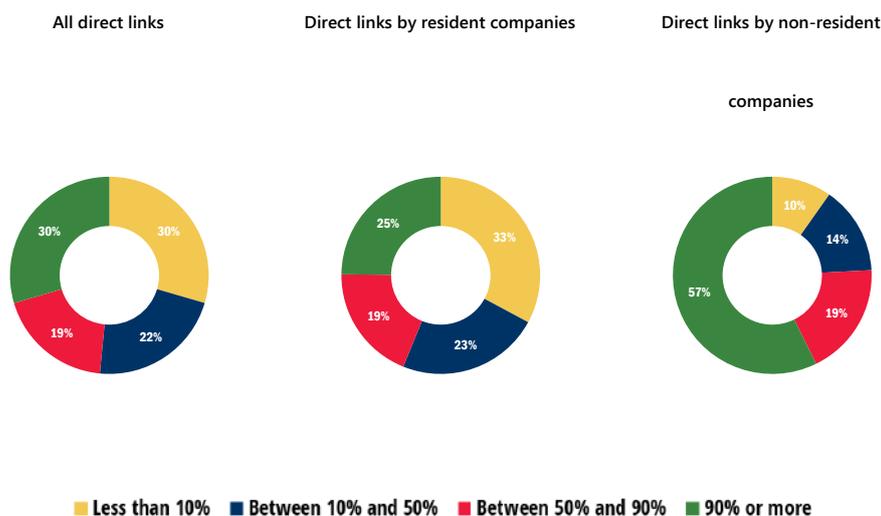


The number of equity participations and non-resident entities increased 65% and 62% in 2014, respectively. The huge increase in the number of UCIs is related to the rules applied in the new framework (Figure 8). All the reporting entities who declare the existence of, at least, one participation are obliged to identify the UCI.

Regarding the intensity of the direct shareholding link¹, 30% of the participations are below 10% (Figure 9), whereas majority equity capital stakes (more than 50%) represent 49% of the total number of equity participations. The fraction of participations in share capital above 50% are higher for non-resident rather than for resident entities (76% vs 44%). The equity participations higher than 90% represent 57% of the total equity participations held by non-resident entities, hence suggesting that non-resident entities investing in Portugal have the clear goal of controlling the management of companies.

Figure 9: Intensity of the direct shareholding link (in %, 2016)

¹ A similar analysis was performed by Heuse and Vivet (2017).



Box 1: The impact of the algorithm and the manual quality control

1. The impact of the algorithm

The reported equity participations, non-resident entities and UCIs are submitted to an algorithm developed at CBSO to build a complete and non-redundant business group database. The algorithm detects repeated equity participations and similar non-resident entities, eliminates duplicates and attributes the correct UCI.

The impact of the algorithm corresponds to deleted information shown on Figures 10 to 12. In 2016, 37% of reported equity participations, 11% of reported non-resident entities and 17% of reported UCIs were deleted.

2. The impact of manual quality control

Manual quality control will apply to treat situations not solved by the algorithm and also to complete missing information which are mainly detected through the analyses of foreign direct investment companies and consolidated annual reports. This validation procedure is based on information available in annual reports, companies' websites and through direct contacts to companies, by email or telephone and is done during the summer by 35 trainees selected from 5 universities of economics, management and accounting.

The impact of manual quality control is marginal when compared to the total reported information. Manual validation added new equity participations in an amount equivalent to 3% of the reported participations from 2014 to 2016 and changed only 0.3%. About non-resident entities, 9% of the total were added and 1% were changed. In the case of UCIs, manual quality control is residual, corresponding to 0.3% of the total.

Figure 10: Number of equity participations in IES

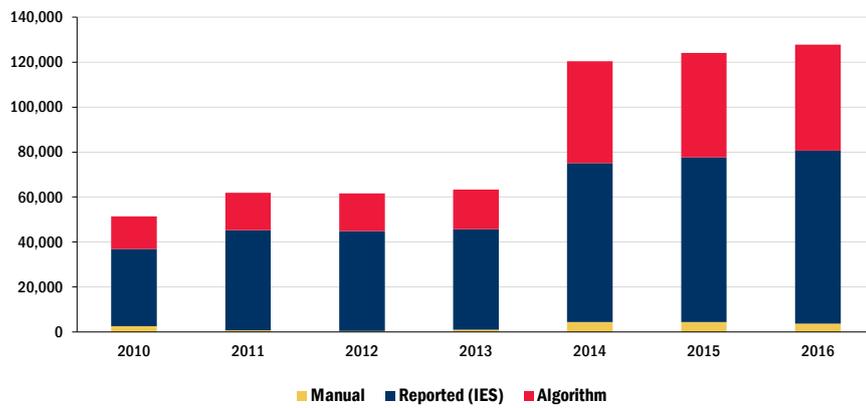


Figure 11: Number of non-resident entities in IES

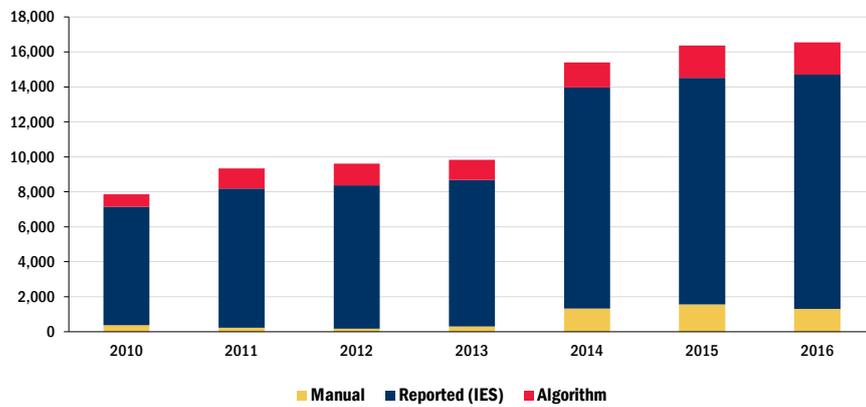
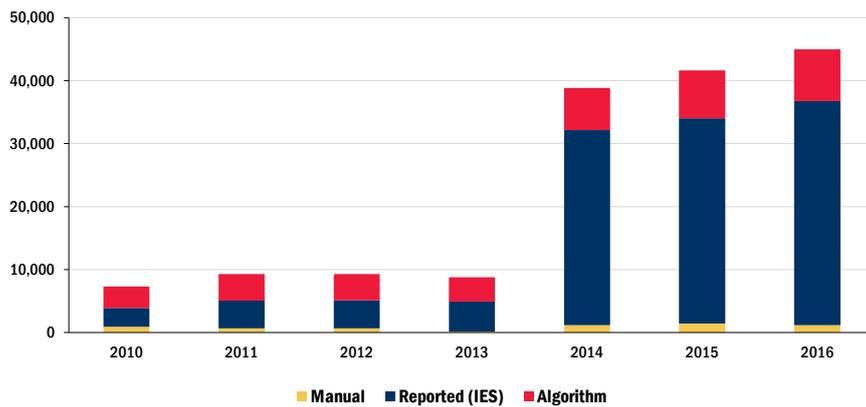


Figure 12: Number of UCIs in IES



4. Relevance of MNEs

Using the information available in the business groups' database and matching it with the information from individual accounts annual reports available at the CBSO allows us to understand the impact of MNEs in the NFCs sector (Banco de Portugal, 2018).

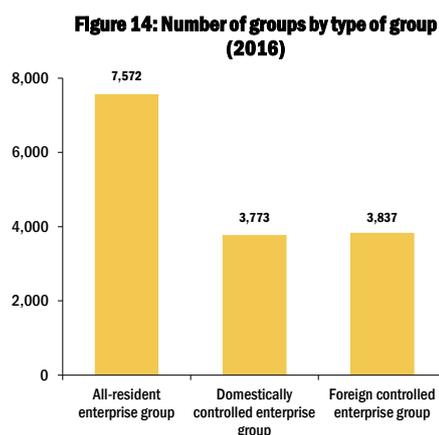
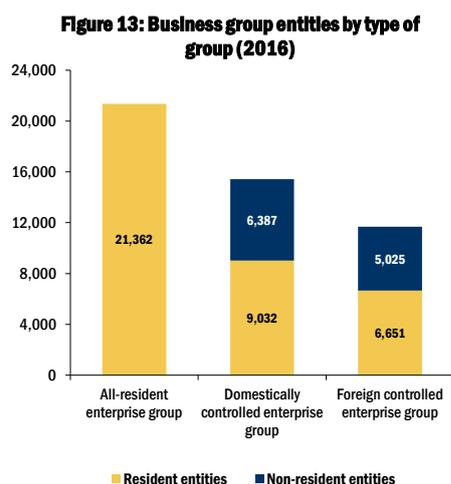
In this analysis, a business group is defined as a set of companies controlled, directly or indirectly, by the same UCI. The concept of control requires holding more than 50% of voting rights in another company or the existence of control due to shareholders agreements. Hence, taking the control into account, 15.182 business groups were identified in the business groups' database in 2016.

We split the business groups into three types²:

- (1) All-resident enterprise groups: groups with resident entities only;
- (2) Domestically controlled enterprise groups: groups with resident and non-resident entities, but with domestic control; and
- (3) Foreign controlled enterprise groups: groups with resident and non-resident entities, but with foreign control.

Figure 13 shows the business groups entities split into resident and non-resident, by type of group. All-resident enterprise groups are, by definition, only composed by resident entities. In the MNEs, the proportion of non-resident entities is around 40%.

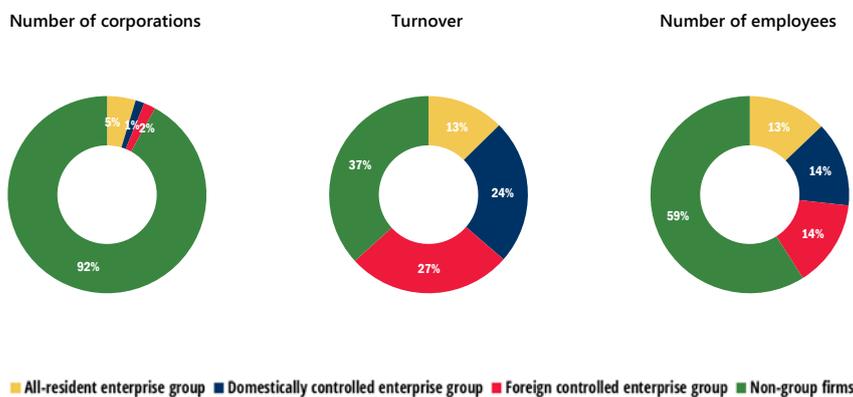
The number of groups by type is shown in Figure 14. In relative terms, around 50% of business groups in the database are all-resident and the other half is equally divided (25%) between domestically and foreign controlled groups.



² These definitions and other related with MNEs are in the Annex.

The impact of MNEs in the Portuguese economy is evaluated in Figure 15 in terms of number of corporations, turnover and number of employees.

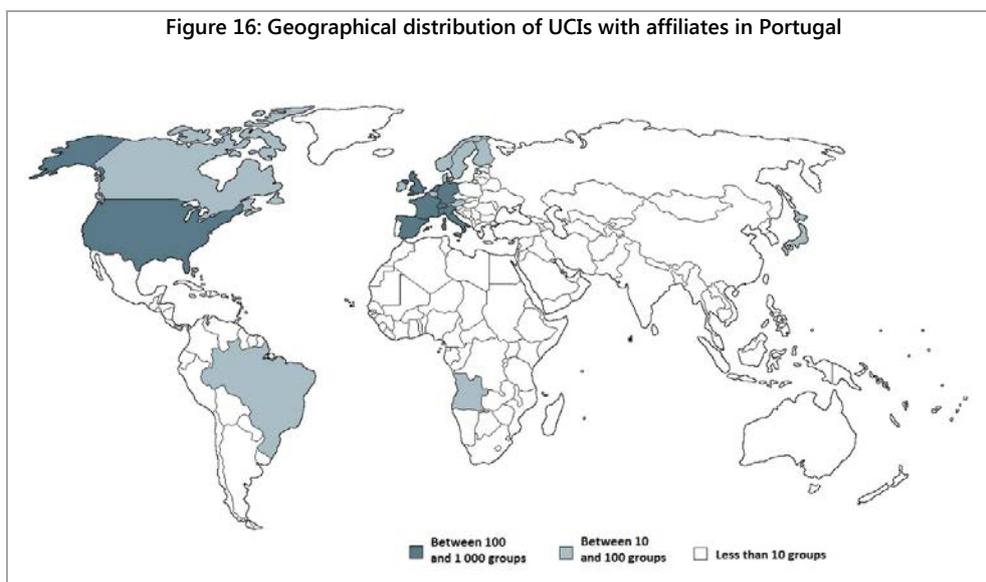
Figure 15: Resident NFCs by type of group (2016)



In 2016, although only 3% percent of the total NFCs are MNEs (both Portuguese or foreign controlled), they represent 51% of the turnover and 28% of the number of employees of this institutional sector, of which MNEs under foreign control respectively weighted 27 and 14 percentage points.

4.1 Foreign controlled MNEs

Geographical distribution of UCIs from foreign controlled MNEs shows a clear preponderance of European countries, large world economies like USA, Canada and Japan and some Portuguese speaking countries, namely Brazil and Angola (Figure 16).



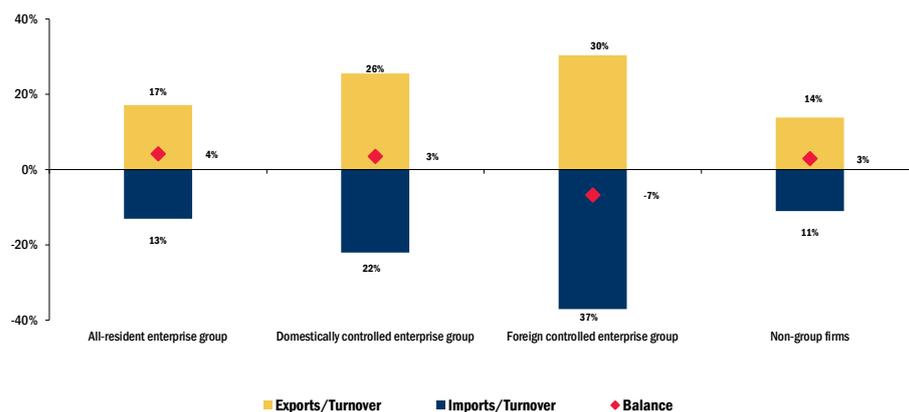
Spain is the most frequent destination of Portuguese controlled MNEs as is geographically closer for companies to start investing abroad and “benefit from corporate support functions at headquarters” (OECD, 2018). Spain is followed by other European large economies, such as France, UK and Germany. The presence of Netherlands and Luxembourg likely reflects the importance of Special Purpose Entities (SPEs) (OECD, 2018). Other large economies appear, like Russia, China, India, Latin America, North Africa regions and some Portuguese speaking countries, namely Brazil, Angola and Mozambique, with the common language leveraging foreign investment.

4.3 Economic and financial indicators

Some economic and financial indicators are presented, based on the sum of individual accounting data (non-consolidated), in order to better assess the influence of MNEs in the operating and financing activity of NFCs in Portugal (Banco de Portugal, 2018). Results for MNEs are exhibited alongside with the results for all-resident enterprise groups and non-group firms to stress the importance of MNEs.

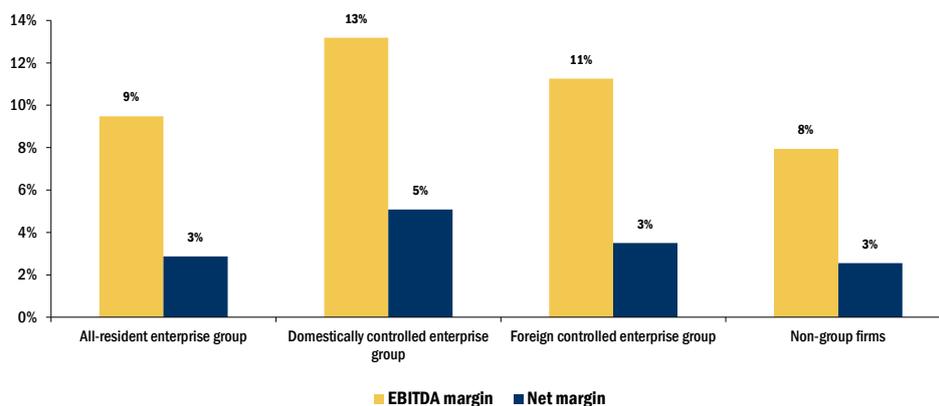
With respect to the operating activity, being part of a MNE usually implies a higher share of exports and imports in turnover. Figure 19 shows that more than 25% of the turnover generated by NFCs integrated in MNEs is exported. However, these firms also import relatively more, which leads to a negative balance (equivalent to 7% of the turnover) in the case of foreign controlled enterprises. Standalone NFCs (non-group firms) and NFCs from all-resident enterprise groups have similar structures. They export a smaller fraction of the turnover, but have positive balances.

Figure 19: Share of exports and imports in turnover (2016)



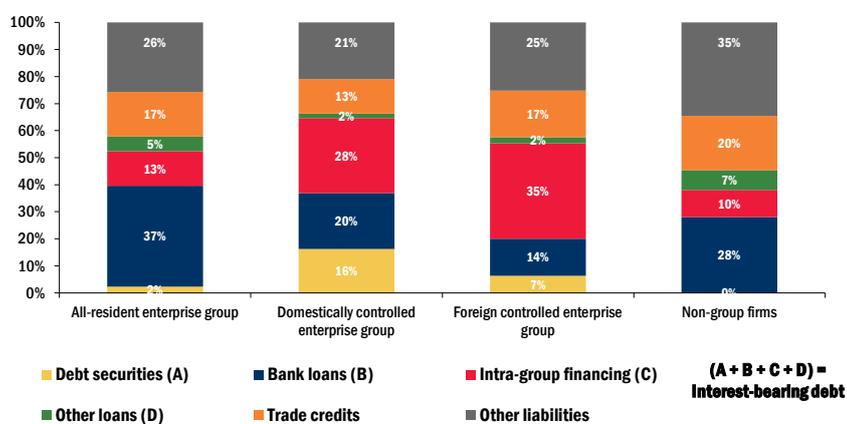
The analysis of EBITDA/Total revenues shows that MNEs are, on average, more efficient transforming revenues into operational results (Figure 20). However, there is no such a difference in the net margin, as depreciations and amortizations account for a greater percentage in total revenues of MNEs, given that they usually hold a larger amount of assets.

Figure 20: EBITDA and net margins (2016)



Another interesting distinctive feature between MNEs and all-resident and non-group firms regards the liabilities structure (Figure 21). On one hand, MNEs present a more diversified pattern of financing, in spite of the predominance of intra-group financing³. On the other hand, financing from debt securities is almost exclusive from MNEs. In all-resident enterprise groups and non-group firms, bank loans and other liabilities⁴ prevail.

Figure 21: Liabilities structure



³ In the context of the present analysis, group definition implies control (more than 50% of the voting rights or shareholders agreement). However, for lower voting power, intra-group financing could exist, which explains the existence of intra-group financing in non-group firms.

⁴ "Other liabilities" includes income tax payable and other payables to public administrations, non-interest bearing shareholder loans, other accounts payable and other current liabilities.

5. Conclusion

This paper presents the work developed by Banco de Portugal to build a business groups' database in order to better evaluate business group relationships and understand how MNEs impact the NFCs sector and the external statistics.

The first step to successfully achieve that task was to use an administrative data source, electronic and mandatory for all NFCs. Afterwards, it was fundamental to develop an algorithm to read massive amounts of numeric and text information and implement a fuzzy matching procedure to check similarities and clearly identify and distinguish non-resident entities, equity participations and UCIs. Complementary to the automatic procedures, manual quality control is of great importance to fill in unsolved situations by the algorithm and some data gaps.

A business groups' database could be explored to perform useful analyses and studies. At the individual level, it is possible to visualize the group structure and get quick information about its entities through Tom Sawyer Software. At the aggregate level, it is also attainable to know in more detail the economic activity sectors and the world dispersion of non-resident entities belonging to Portuguese MNEs, as well as how MNEs contribute to the number of companies, turnover, employees and the results of NFCs sector. In 2016, despite accounting for only 3% of Portuguese firms, MNEs represented 51% of the turnover and 28% of the employees, thus confirming its importance in our economy.

In an increasingly globalised world MNEs will continue to expand their activities which poses a permanent challenge to high quality official statistics. Close cooperation between the statistical authorities, both domestically and internationally, is key to efficiently overcome the difficulties. It is also needed an adequate framework for the sharing of data, where the whole is greater than the sum of its parts. Complementary, initiatives to promote the use of the Legal Entity Identifier (LEI) or even to make it mandatory should also be pursued.

The CMFB workshop on globalisation (July 2018) showed that there is already a significant number of initiatives going on but there is still work to be done. The use of blockchain for data protection, web scrapping and artificial intelligence for MNEs' profiling, the creation of a common Large Case Unit or "*an AnaCredit for MNEs*" were some of the boldest ideas that, in our opinion, could pave the way to MNE accounts.

Annex – Definitions

All-resident enterprise group

An enterprise group composed only of enterprises that are all resident in the same country (Business Registers Recommendation Manual).

Global decision centre

Institutional unit where the decisions on the global strategy of the group are taken (Business Registers Recommendation Manual).

Domestically controlled enterprise group

A multinational group where the global decision-centre is in the country compiling the business register (Business Registers Recommendation Manual).

Enterprise group

Council Regulation (EEC) No. 696/93 on Statistical Units defines the Enterprise Group as “an association of enterprises bound together by legal and/or financial links. A group of enterprises can have more than one decision-making centre, especially for policy on production, sales and profit. It may centralize certain aspects of financial management and taxation. It constitutes an economic entity which is empowered to make choices, particularly concerning the unit it comprises”.

Foreign controlled enterprise group

A multinational group where the global decision-centre is outside the country compiling the business register (Business Registers Recommendation Manual).

Multinational enterprise group

The Business Register Regulation states in article 2(d) “Multinational enterprise group shall mean an enterprise group which has at least two enterprises or legal units located in different countries”.

Multinational enterprise (MNE)

Multinationals usually comprise companies or other entities established in more than one country and so linked that they may co-ordinate their operations in various ways. While one or more of these entities may be able to exercise a significant influence over the activities of others, their degree of autonomy within the enterprise may vary widely from one multinational enterprise to another (OECD, 2011).

A note in the Business Registers Recommendation Manual (p. 309) refers that, although the definition is ambiguous, ‘Multinational enterprise’ is used in the same meaning as ‘Multinational enterprise group’.

Ultimate controlling institutional unit (UCI)

The institutional unit, proceeding up in the affiliate's chain of control, which is not controlled by another institutional unit (Regulation (EC) No 716/2007). Foreign Affiliates Statistics (FATS) use the resident country of the ultimate controlling institutional unit (UCI) as global decision-centre.

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Irving Fisher Committee on
Central Bank Statistics

BANK FOR INTERNATIONAL SETTLEMENTS

Ninth IFC Conference on "Are post-crisis statistical initiatives completed?"

Basel, 30-31 August 2018

Keeping track of MNEs through business group databases: the experience of Bank of Portugal¹

Ana Bárbara Pinto, José Alexandre Neves and Tiago Pinho Pereira,
Bank of Portugal

¹ This presentation was prepared for the meeting. The views expressed are those of the authors and do not necessarily reflect the views of the BIS, the IFC or the central banks and other institutions represented at the meeting.

Keeping track of MNEs through business group databases: The experience of Banco de Portugal

Ana Bárbara Pinto • Statistics Department

9th IFC Conference on
Are post-crisis statistical initiatives completed?
30th and 31st August 2018



BANCO DE
PORTUGAL
EUROSYSTEM



AGENDA

- DATA SOURCE
- THE BUSINESS GROUPS' DATABASE
- BRIEF CHARACTERIZATION OF THE DATABASE
- RELEVANCE OF MNES

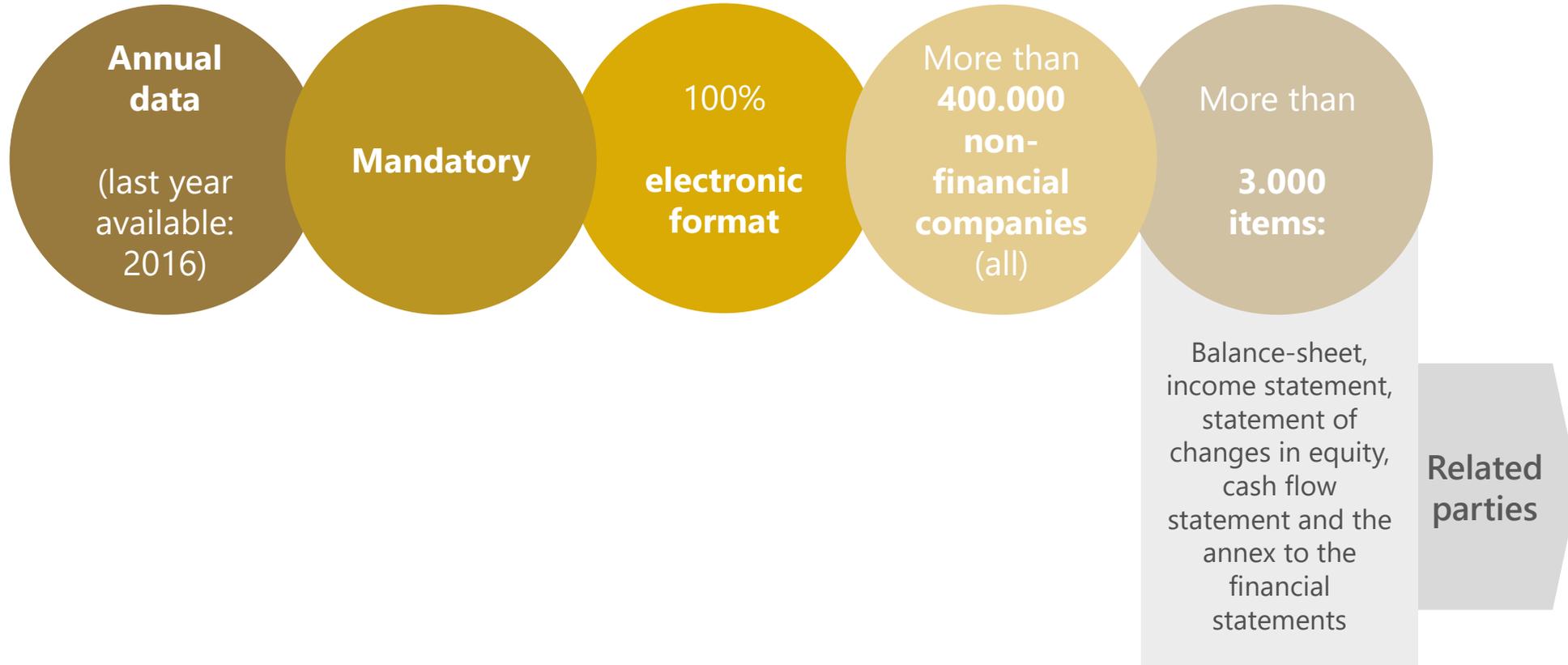
1. DATA SOURCE



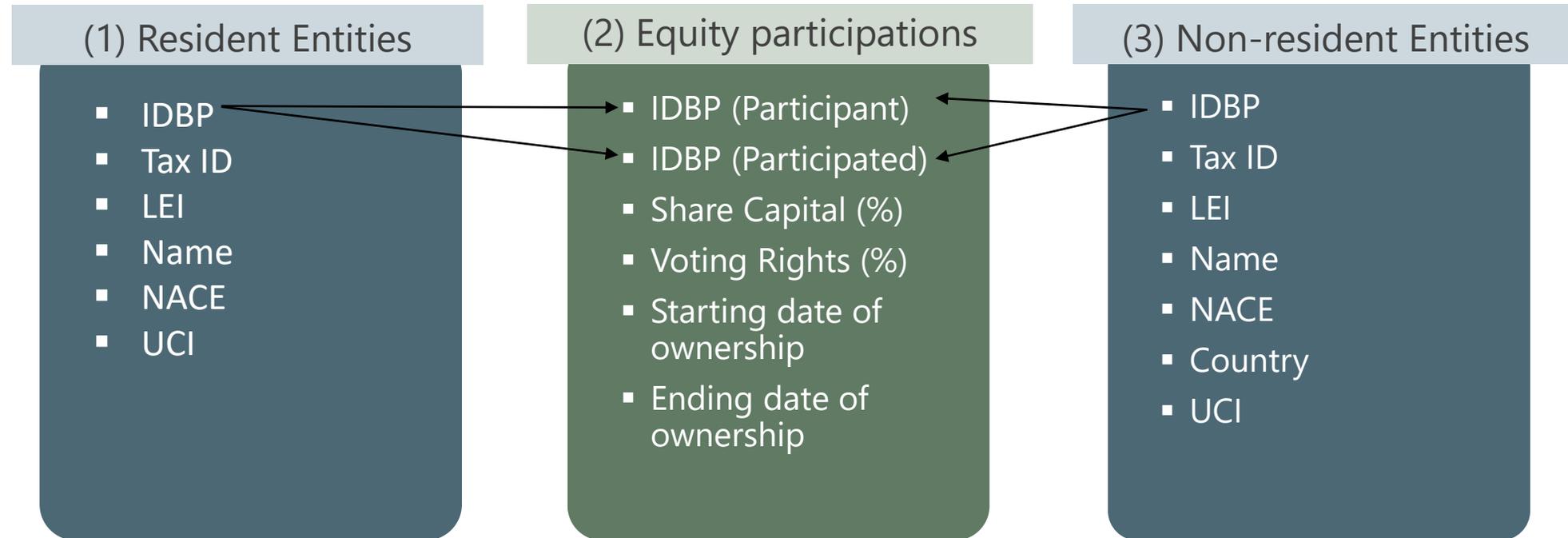
Simplified Corporate Information

is the legal deposit of accounts

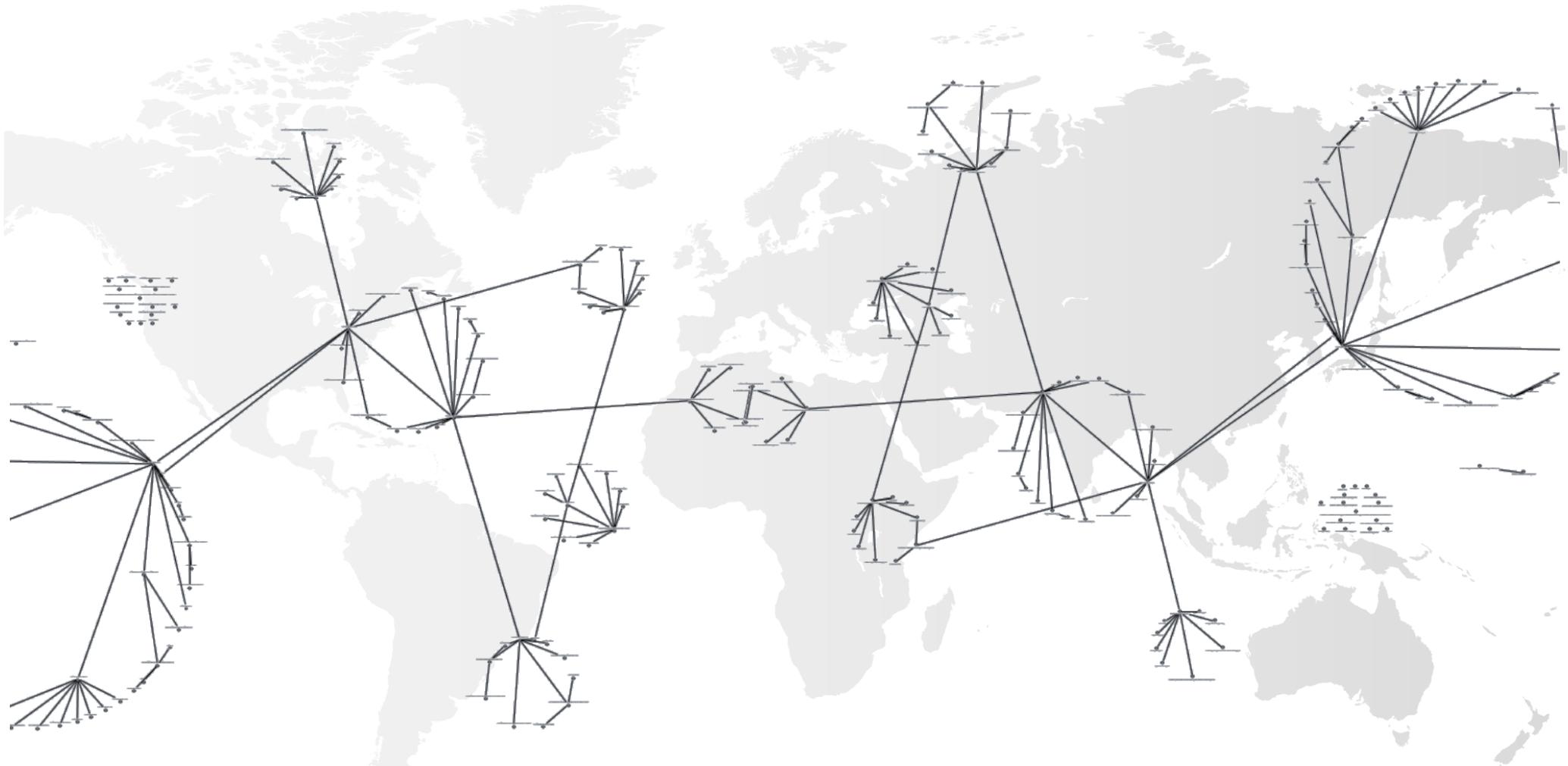
ANNEX A: reported by non financial companies



2. THE BUSINESS GROUPS' DATABASE | 2.1. ARCHITECTURE AND VISUALIZATION



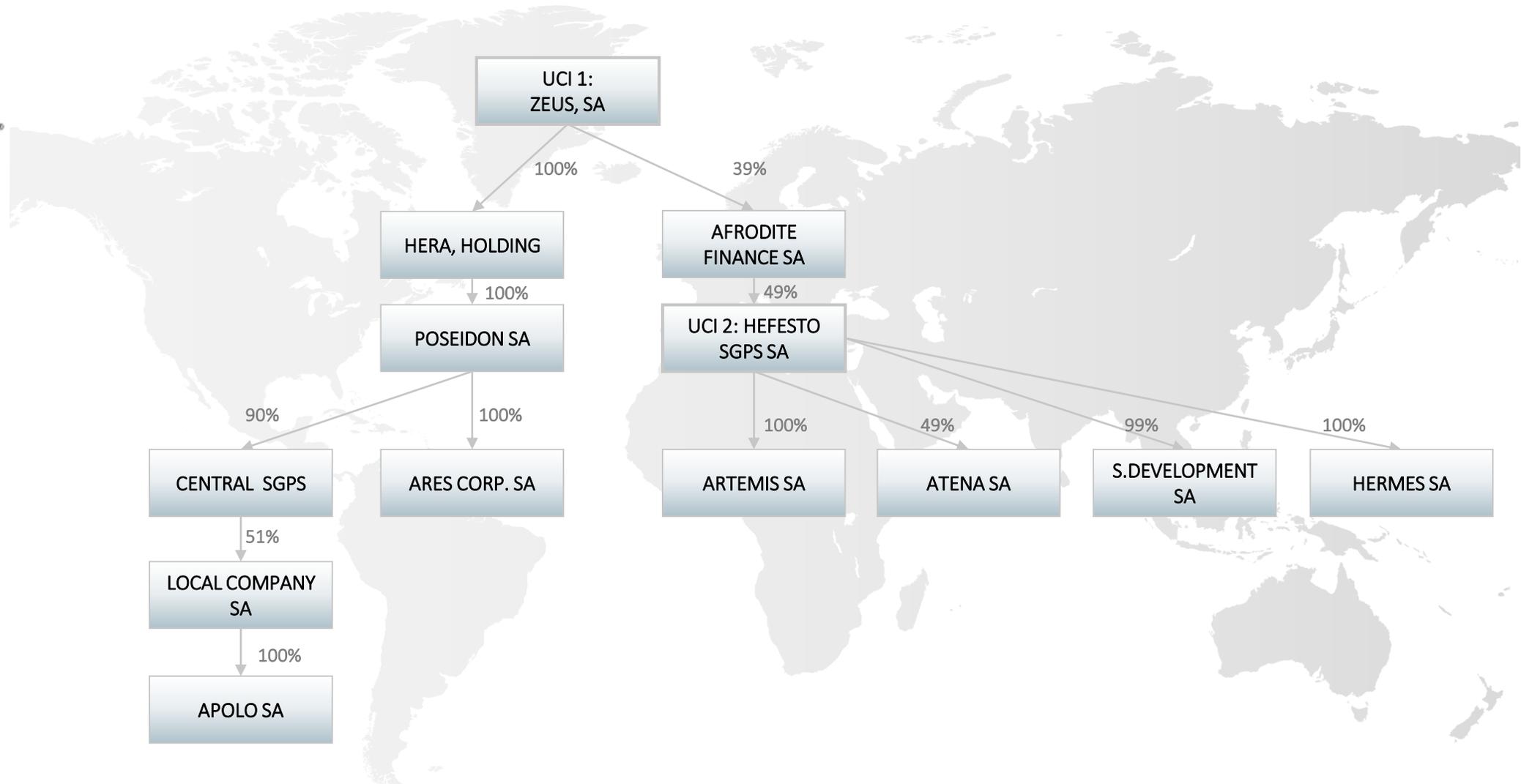
2. THE BUSINESS GROUPS' DATABASE | 2.1. ARCHITECTURE AND VISUALIZATION



' All Names and Tax IDs used are fictional and based in the Greek and Roman mythology



2. THE BUSINESS GROUPS' DATABASE | 2.1. ARCHITECTURE AND VISUALIZATION



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2. THE BUSINESS GROUPS' DATABASE | 2.2.1. ALGORITHM - NON-RESIDENT ENTITIES

- ! The same non-resident entities is reported by different resident NFC.
- ! Non-resident entities are identified by Tax payer identification number (Tax ID), Name and Country.
- ! A check digit validation only applies for national tax payer numbers.

If it is not possible to unequivocally identify a non-resident entity, **manual quality control will apply.**

The algorithm compares the attributes of all non-resident entities and if¹:

Situation 1

Tax ID, Name and Country are equal

**The entity is
considered the
same**



¹ All Names and Tax IDs used are fictional and based in the Greek and Roman mythology

2. THE BUSINESS GROUPS' DATABASE | 2.2.1. ALGORITHM - NON-RESIDENT ENTITIES



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The algorithm compares the attributes of all non-resident entities and if¹:

Situation 2

Country is the same & Tax ID is equal

Fuzzy lookup compares the name -> the same entity when similarity > than 55%;

EXAMPLE!

Name: FLORA SA France
Tax ID: 96720542239

Name: FLORA SA
Tax ID: 96720542239

Are compared as "**FLORASAFRANCE**" and "**FLORASA**" and considered the same company;

¹ All Names and Tax IDs used are fictional and based in the Greek and Roman mythology



2. THE BUSINESS GROUPS' DATABASE | 2.2.1. ALGORITHM - NON-RESIDENT ENTITIES



The same non-resident entities is reported by different resident NFC.



Non-resident entities are identified by Tax payer identification number (Tax ID), Name and Country.



A check digit validation only applies for national tax payer numbers.

If it is not possible to unequivocally identify a non-resident entity, **manual quality control will apply.**

The algorithm compares the attributes of all non-resident entities and if¹:

Situation 2

Country is the same & Tax ID is **different**

Fuzzy lookup compares the tax payer identification number and the name (Tax ID, Name) -> similarity > than 70%;

EXAMPLE!

Name: Ares Corp. SA
Tax ID: 70253621

Name: Ares SA
Tax ID: AB7025321 (slightly different)

Are compared as "**70253621AresCorpSA**" and "**AB7025321AresSA**" are considered the same company;

¹ All Names and Tax IDs used are fictional and based in the Greek and Roman mythology

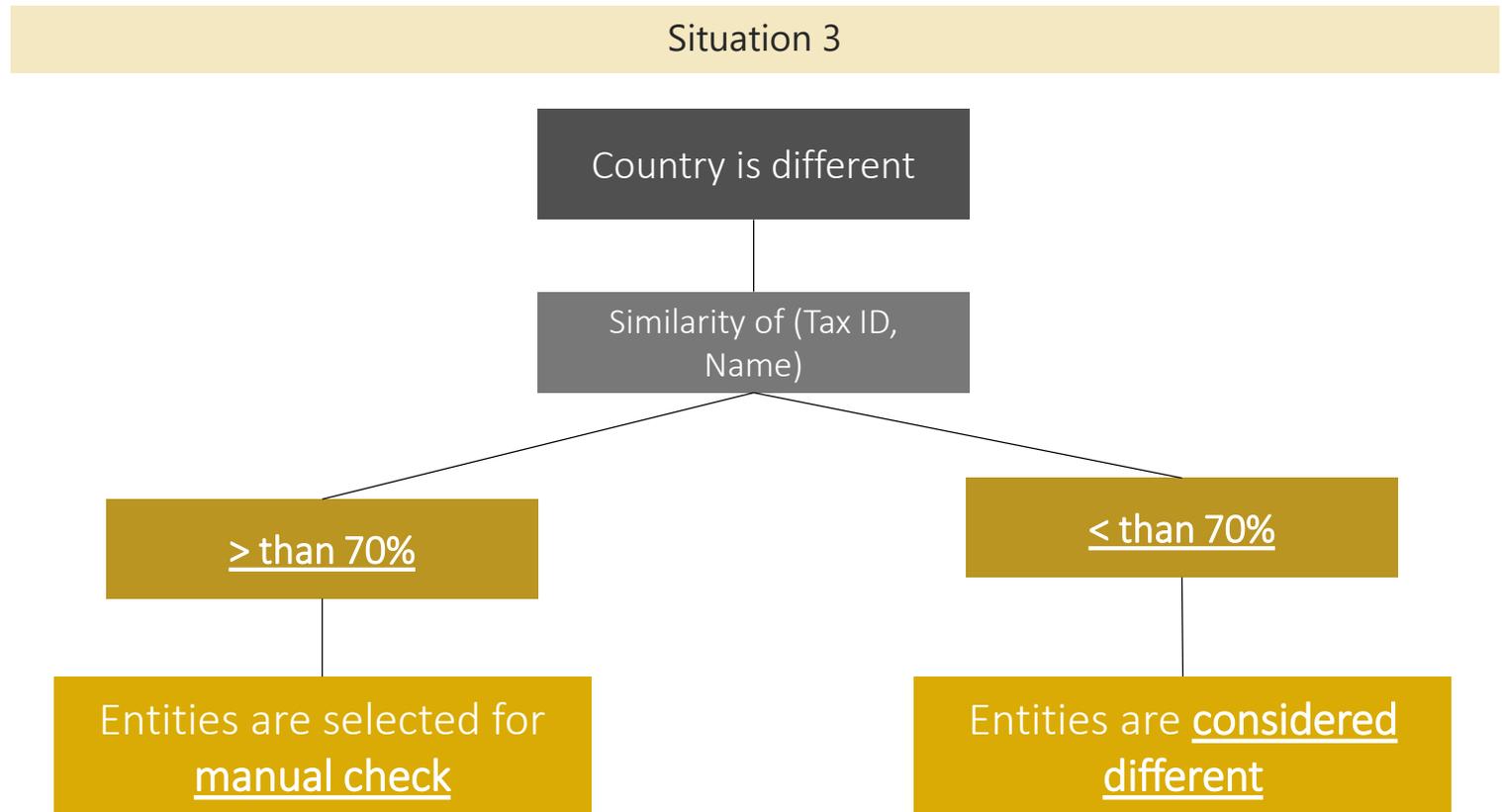


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2. THE BUSINESS GROUPS' DATABASE | 2.2.2. ALGORITHM - EQUITY PARTICIPATIONS



The same participation reported by different resident companies

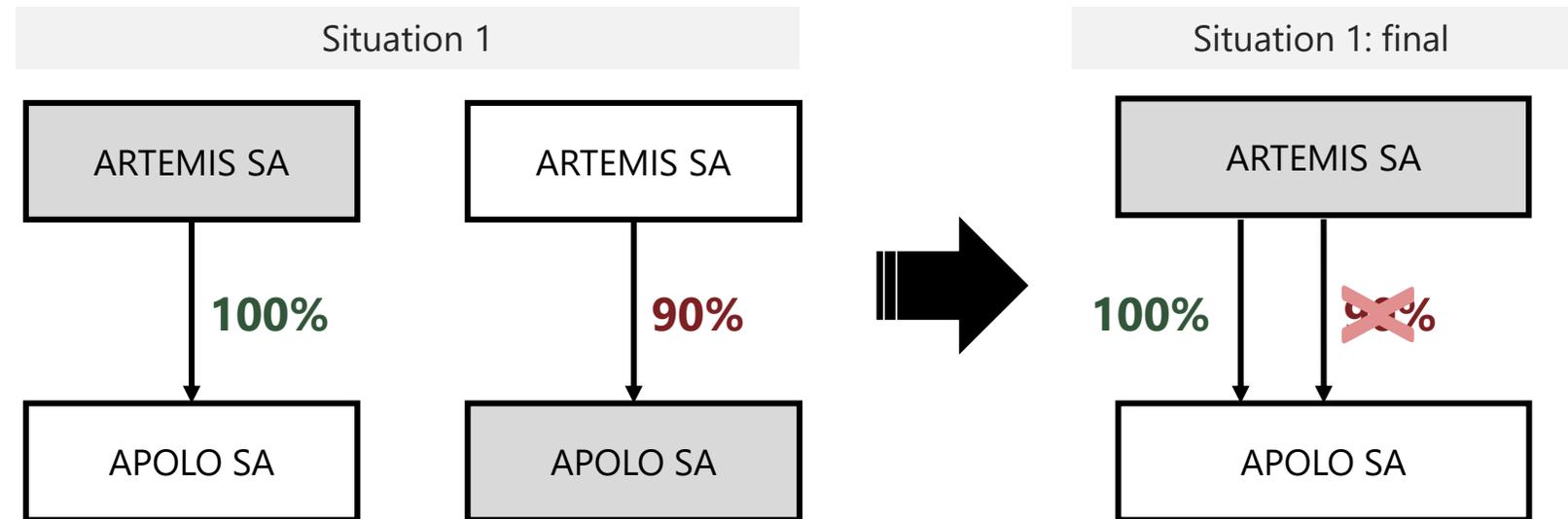


Participation involving reporting entity filed as indirect

If it is not possible to unequivocally identify a participation, **manual quality control will apply.**

The algorithm establishes the following hierarchy:

- Repeated participations are deleted
- Indirect participations where the reporting entity is identified are deleted
- Direct participations prevail over indirect participations
- Direct downward participations prevail over direct upward participations



2. THE BUSINESS GROUPS' DATABASE | 2.2.2. ALGORITHM - EQUITY PARTICIPATIONS

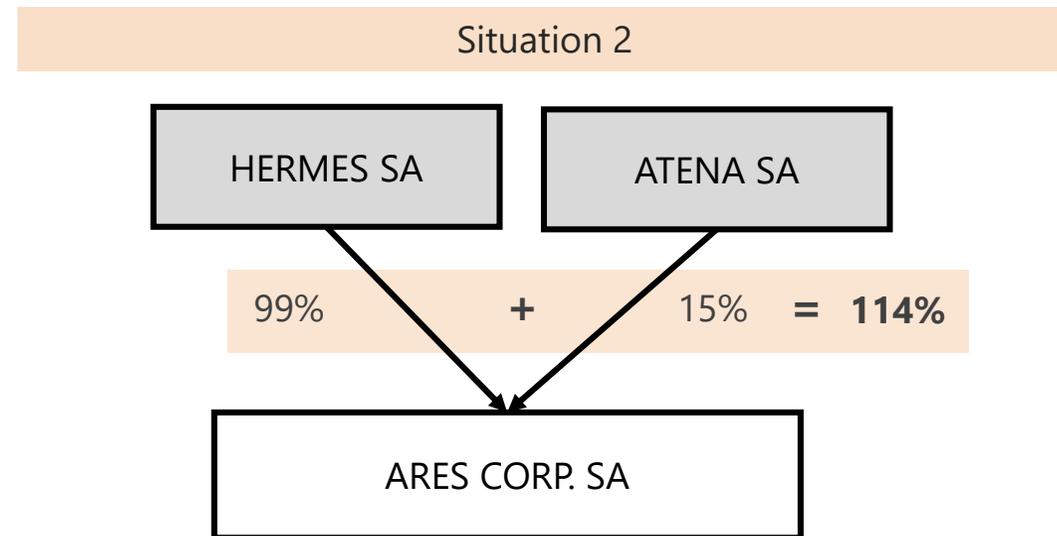
! The same participation reported by different resident companies

! Participation involving reporting entity filed as indirect

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2. THE BUSINESS GROUPS' DATABASE | 2.2.3. ALGORITHM - UCI

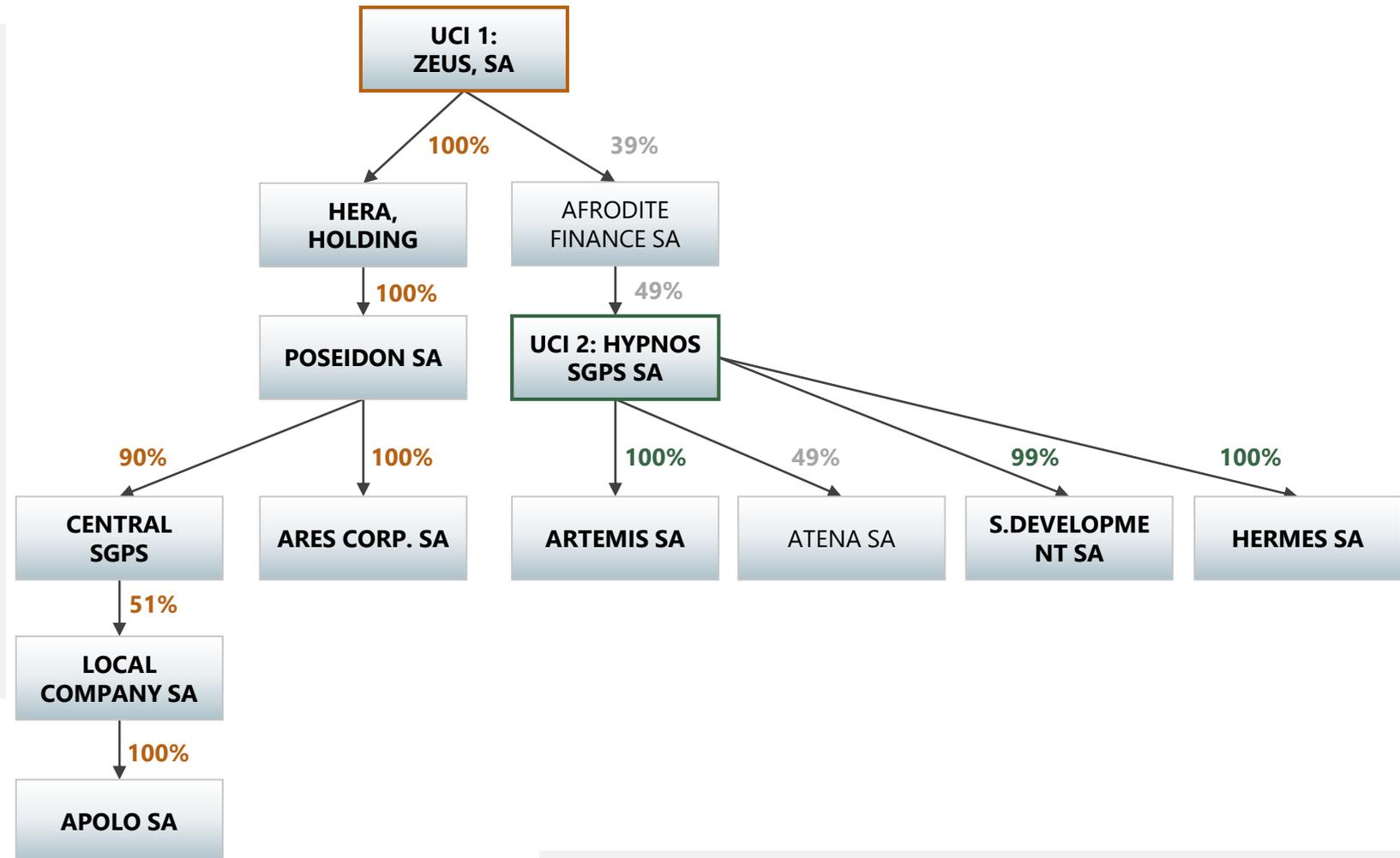


UCI inconsistencies - companies tend to wrongly identify themselves as UCI

The **algorithm analyse** the chain of voting rights higher than 50% and go up into the group structure to find out the correct UCI

The UCI of the group will be **the company on the top of the control chain**

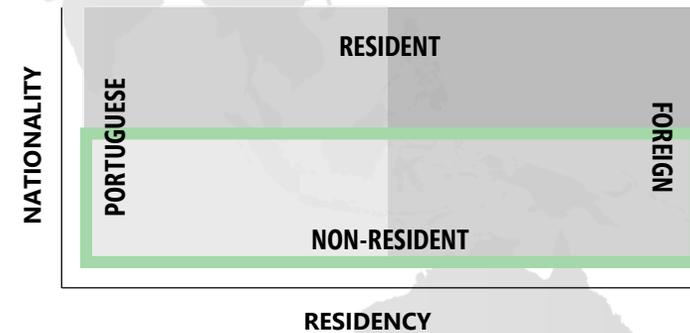
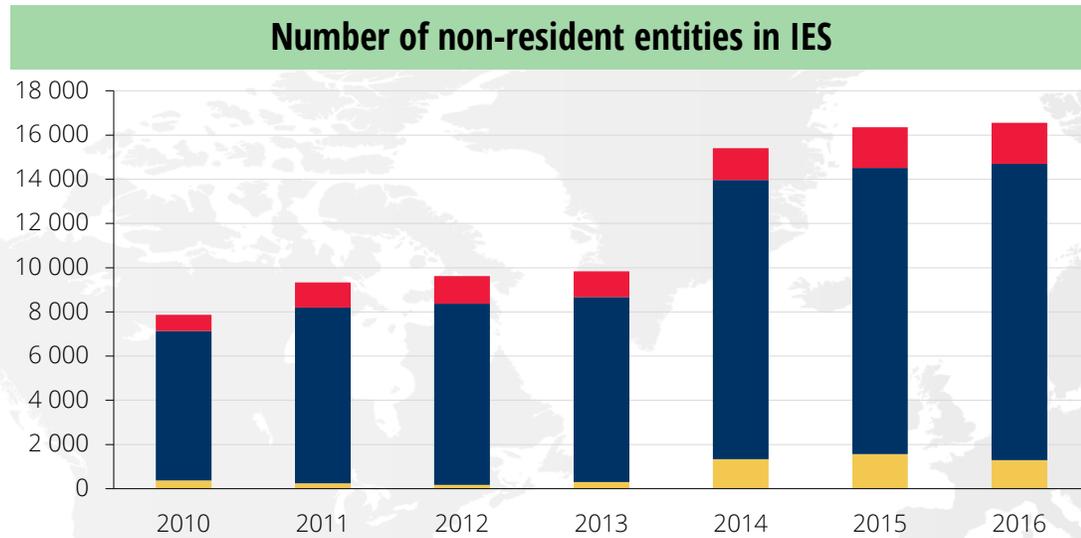
If it is not possible to unequivocally identify a UCI, **manual quality control will apply.**



All Names and Tax IDs used are fictional and based in the Greek and Roman mythology

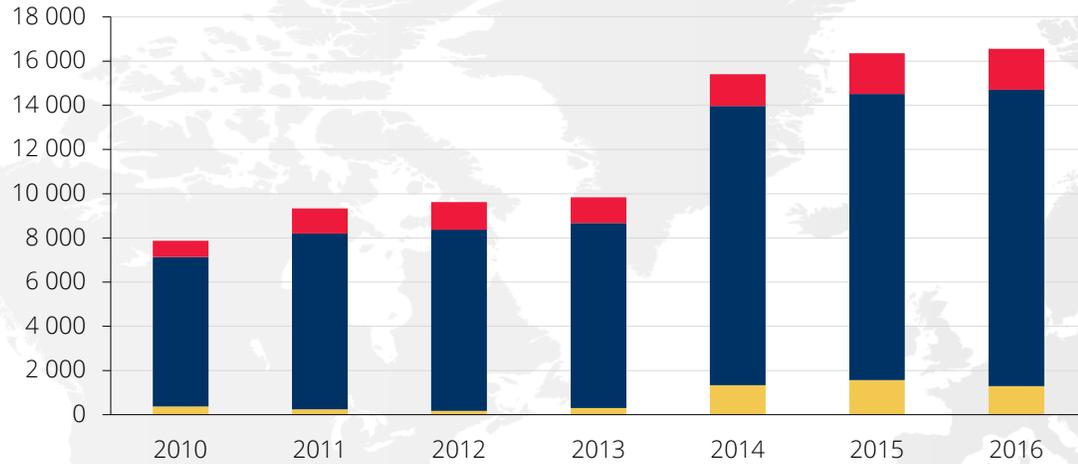


2.3. THE IMPACT OF THE ALGORITHM AND THE MANUAL QUALITY CONTROL

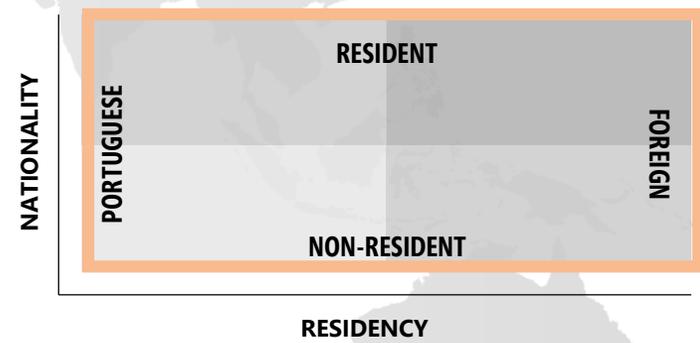
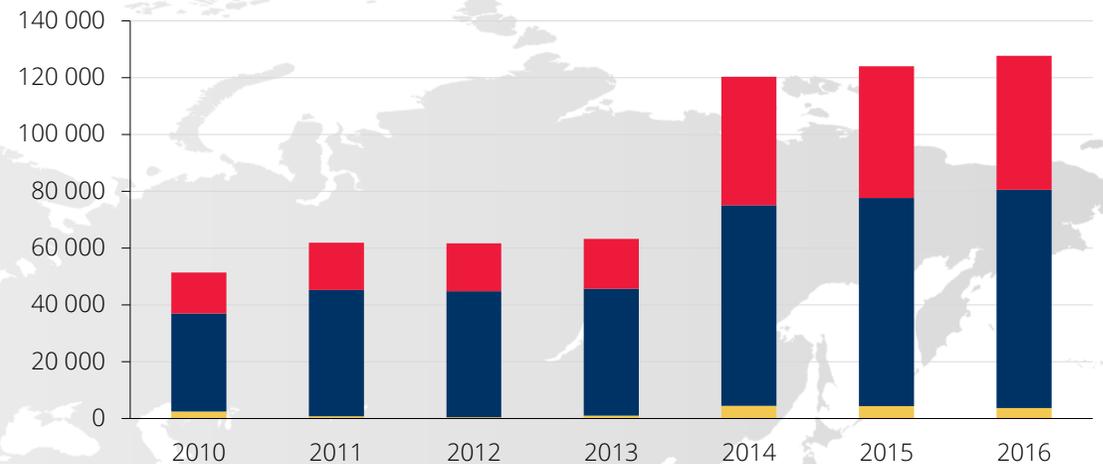


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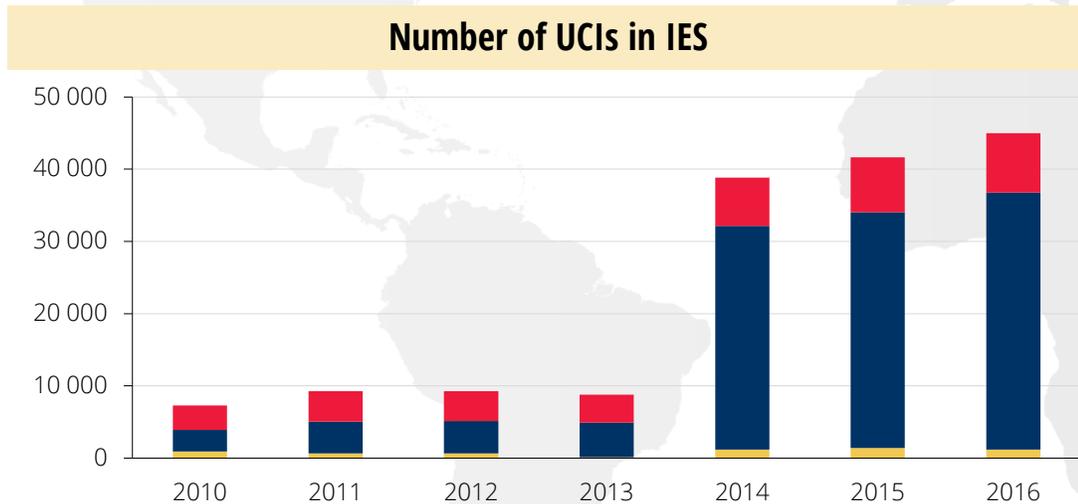
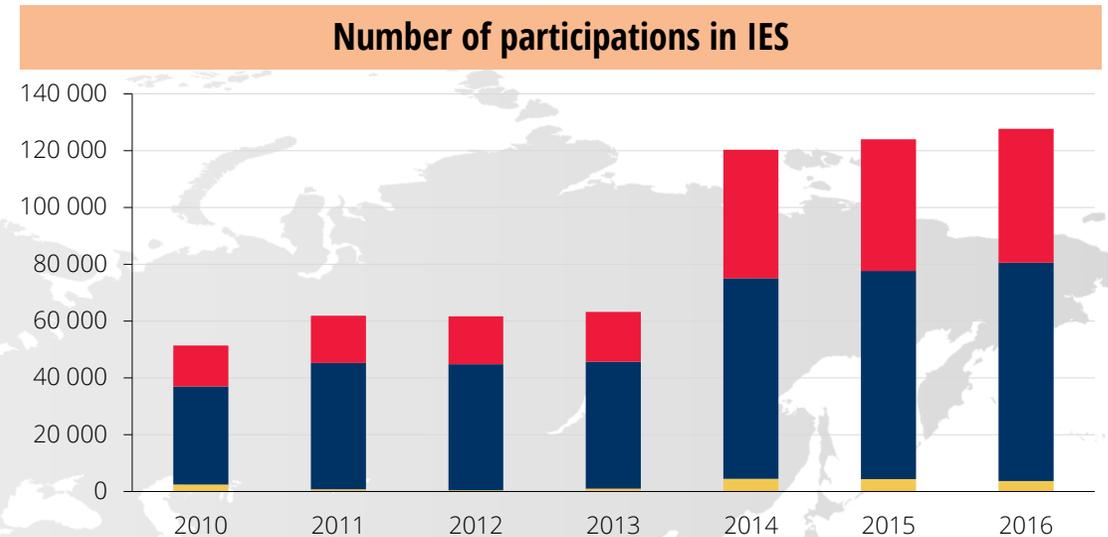
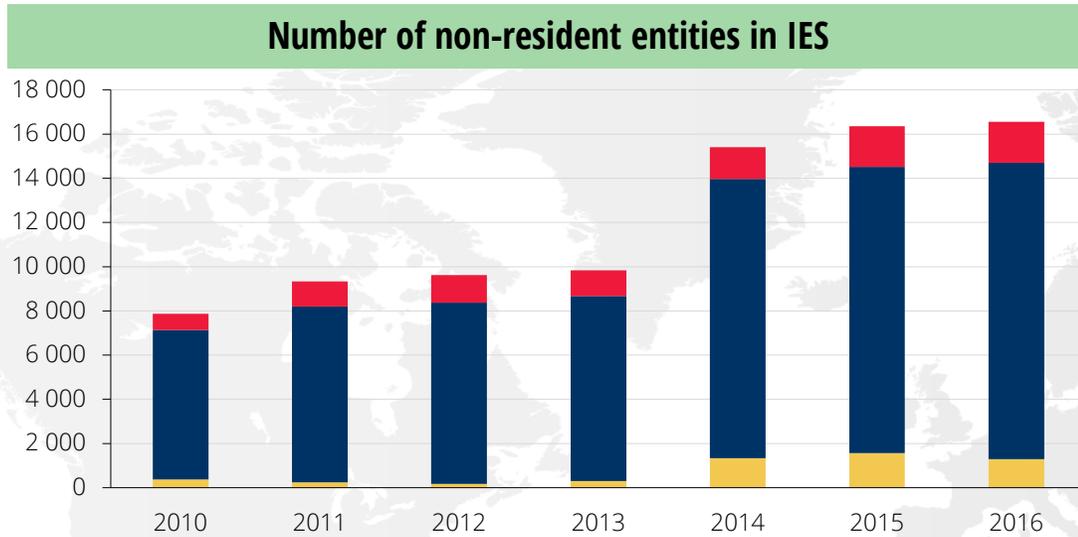
Number of non-resident entities in IES



Number of participations in IES

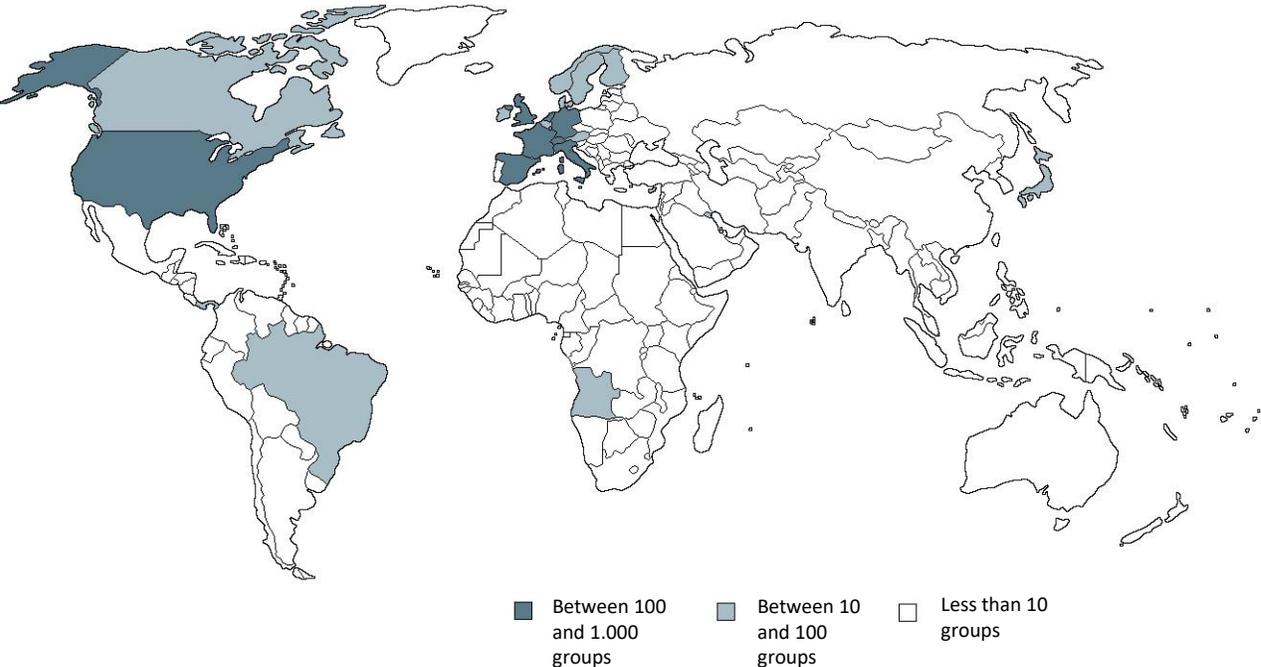


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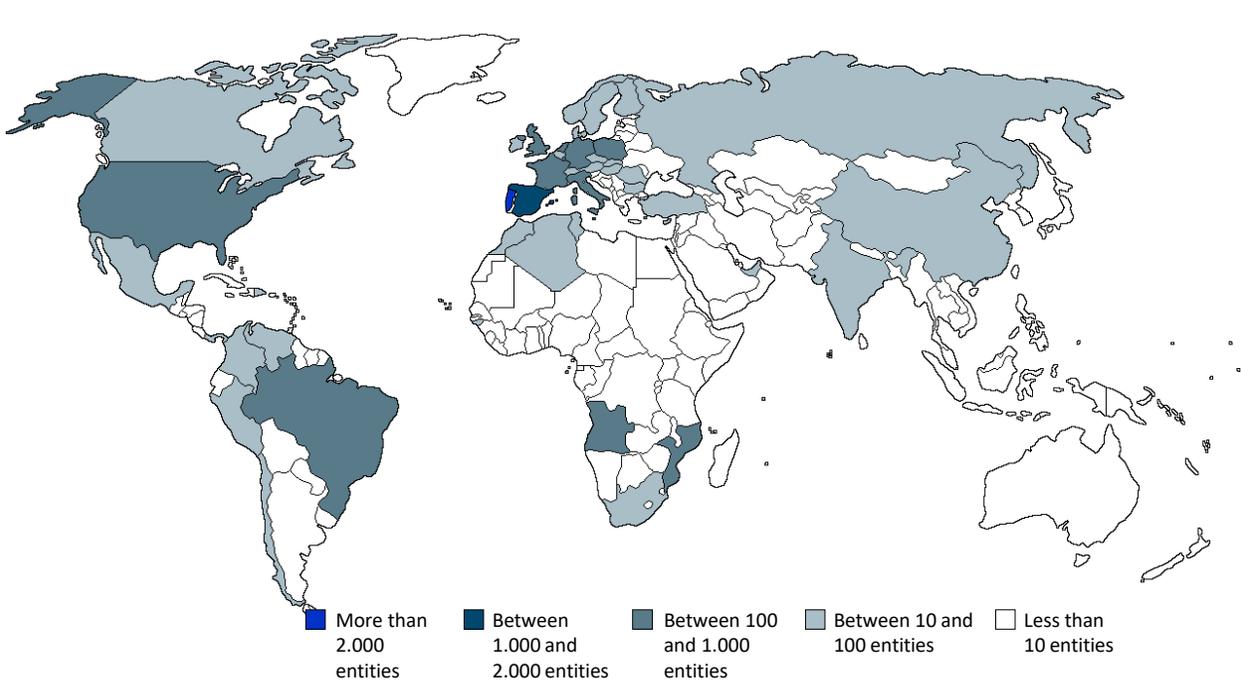


3. BRIEF CHARACTERIZATION OF THE DATABASE: SOME FIGURES (2016)

Geographical distribution of UCI with affiliates in Portugal



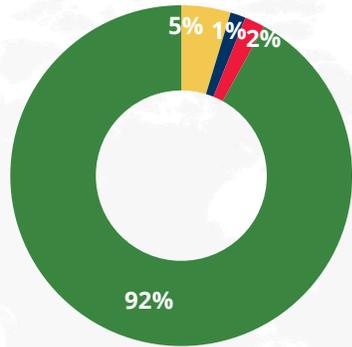
Geographical distribution of Portuguese controlled MNEs



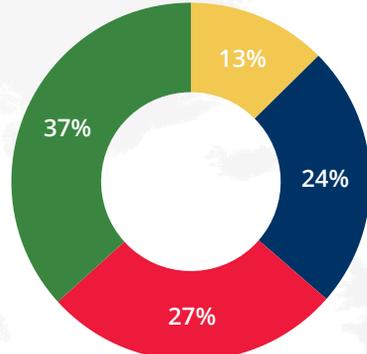
4. RELEVANCE OF MNES (2016)

Resident NFCs by type of group

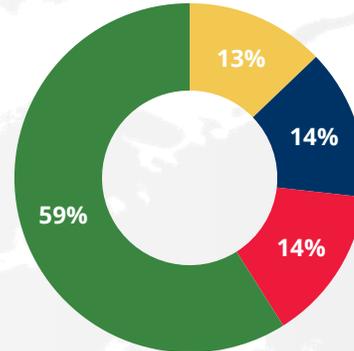
Number of corporations



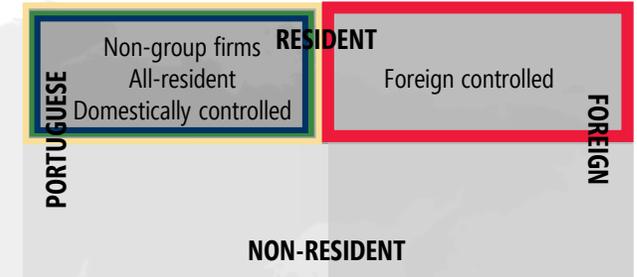
Turnover



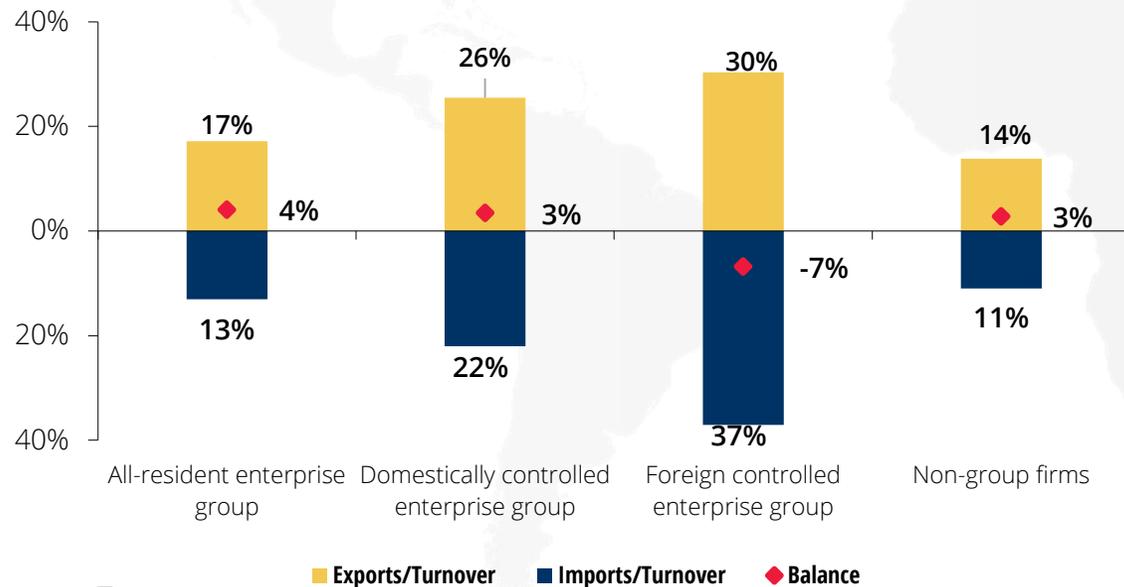
Number of employees



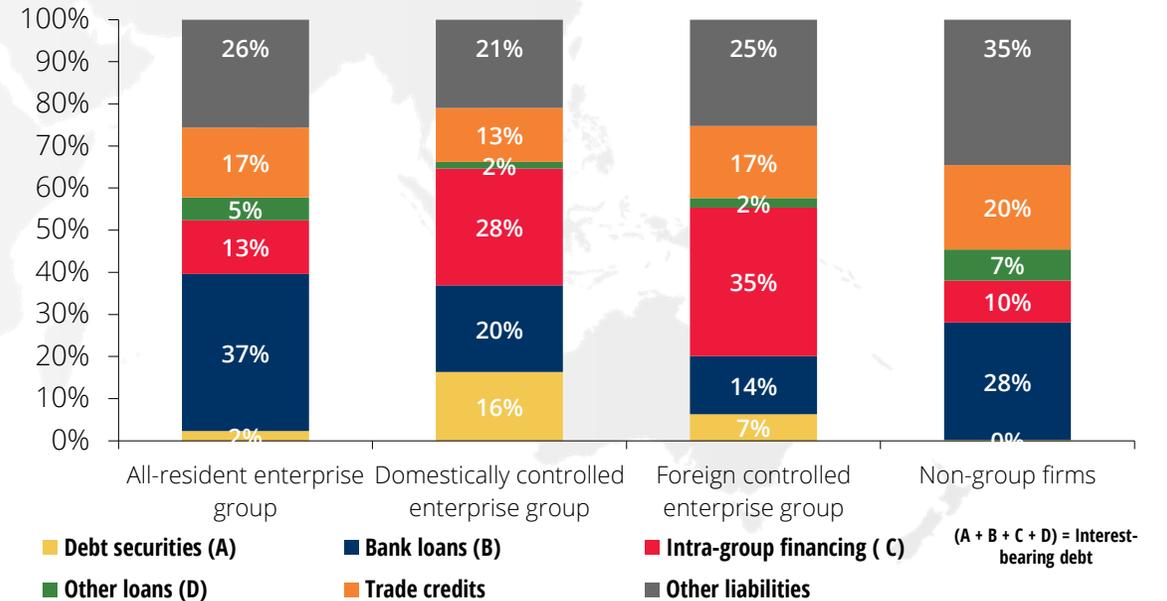
■ All-resident enterprise group
 ■ Domestically controlled enterprise group
 ■ Foreign controlled enterprise group
 ■ Non-group firms



Share of exports and imports in turnover



Liabilities structure



CONCLUDING REMARKS

Improving the quality of business groups' data

- Close cooperation between statistical authorities at a national and international level
- Establishment of an effective framework to interchange data
- LEI mandatory for all entities operating in international markets (used as a key to identify non-resident entities)



THANK YOU FOR YOU ATTENTION

Ana Bárbara Pinto • Statistics Department