Using microdata from monetary statistics to understand intra-group transactions and their implication in financial stability issues[1]

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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.

Using Microdata from Monetary Statistics to Understand Intra-group Transactions and their Implication in Financial Stability Issues

Graziella Morandi[1] and Giulio Nicoletti[2]

Abstract

Recent research has shown that intra-group lending may be large – often comparable in size to interbank flows – and hence form an important aspect of international banking and financial stability. Interbank transactions have implications on the conduct of monetary policy since banking groups can fund themselves from, or move resources to, their foreign subsidiaries located in different jurisdictions. This affects the transmission channel of monetary policy as highlighted by Cetorelli and Goldberg (2012) and Bruno and Shin (2015). From a macroprudential policy perspective, it helps understand how local economic conditions for a parent company may impact its subsidiaries. Very little is known as yet, even in the literature, about the systemic factors driving intra-group funding over time.

The paper investigates the pattern of intra-group transactions by looking at the intra-group loans contained in the ESCB statistics on individual MFI Balance Sheet Items and Interest Rates. To better exploit these indicators about the interconnectedness between sibling financial institutions, the ESCB 'Register of Institutions and Affiliates Database' is used to retrieve information on group consolidation and geographical counterparts.

JEL code: F34, G21, G28, G38

Keywords: Macro-Prudential Analysis, Interbank funding, Bank consolidation

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Introduction

In the post-crisis setting where financial research still stands, there is a lot literature showing that cross-border banking activity declined sharply during distressed periods on the financial markets.

A specific aspect of cross-border banking activity regards the existence of internal capital markets in international banking groups, also documented in several publications. The case of internal markets in the euro area and more generally within the European Union is of particular interest due to the efforts put into place by European institutions to achieve a better integration of the European banking industry. This has materialised in recent years by an acceleration of bank mergers across borders with the total number of credit institutions based in the euro area dropping from 8,320 in December 1998 to 4,988 entities in March 2017 (see ECB website – list of financial institutions). At the same time, the number of branches of euro area based credit institutions rose from 321 at end December 2005 to 406 entities in 2016.

If market integration allows overall for higher efficiency and diversification in funding the private sector across the European Union, it raises the risk, as indicated by Popov and Udell (2012), that a shock to the capital of an international banking group propagates across borders to the countries where the group operates by means of a branch or subsidiary. Such a risk has implications for the macro-financial stability of the Eurozone due to the unbalanced structure of the banking sector across Member States. In the new Member States (Eastern Europe and Baltic countries), a large part of credit institutions are foreign-owned whereas the banking sector is mostly held by domestic credit institutions in the western part of Europe (Germany, France, Spain, Italy). Besides, in terms of economic activity and revenue, foreign banks (branches or subsidiaries) are often of relatively small importance from the parent's bank perspective whereas they may be of systemic importance for host countries, thus leading to contradictory interests or supervisory views between the home and the host countries. Therefore, cross-border activities may be seen by governments and regulators as a threat to control and financial stability. What if foreign-owned credit institutions stop lending in countries where they represent a large proportions of the loans granted?

In more concrete terms, the work carried out on internal capital markets often assumes that lending by foreign-owned banks is affected by the financial conditions of a parent bank. This is confirmed by Popov and Udell in their research paper. Cetorelli and Goldberg (2009) also show that the existence of internal capital markets with foreign bank affiliates contributes to an international propagation of domestic liquidity shocks to lending by affiliated banks abroad.

There are actually several internal bank channels used to transfer assets and income from a parent bank to its subsidiary and the other way round. In this paper, we focus on intra-group loans and deposits as these correspond to the data made available on the topic of intra-group transfers by the latest update of the EU Regulation of MFI Balance Sheet Statistics (ECB/2013/33) (hereafter "the Regulation"). We use two inter-connected data sources to look at loan and deposit transfers within banking groups, both based on the Regulation: the Balance Sheet Items (BSI) dataset containing national balance sheet aggregates and the corresponding individual BSI (IBSI) data, i.e. the BSI aggregates broken down by

individual banks for a sample of approximately 300 MFIs across the euro area. For reasons of confidentiality the data have all been aggregated or anonymised.
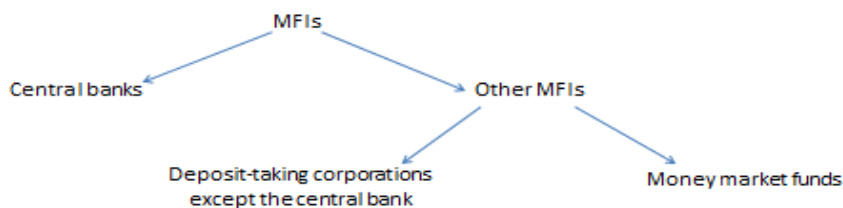
Macro-picture of inter-MFI lending in the Eurozone

Aggregate statistics and key features retrieved

Since December 2014 and the entry into force of Regulation (EU) No 1071/2013 of the European Central Bank of 24 September 2013 concerning the balance sheet of the monetary financial institutions sector (ECB/2013/33), the ECB collects monthly information on inter-MFI ("deposit-taking corporations except the central bank") loans and deposits as well as the corresponding intra-group positions as an "of which" of these items. The decomposition of the MFI counterpart sector as established by the statistical Regulation and ECB Guideline on Monetary and Financial Statistics is illustrated in Figure 1.

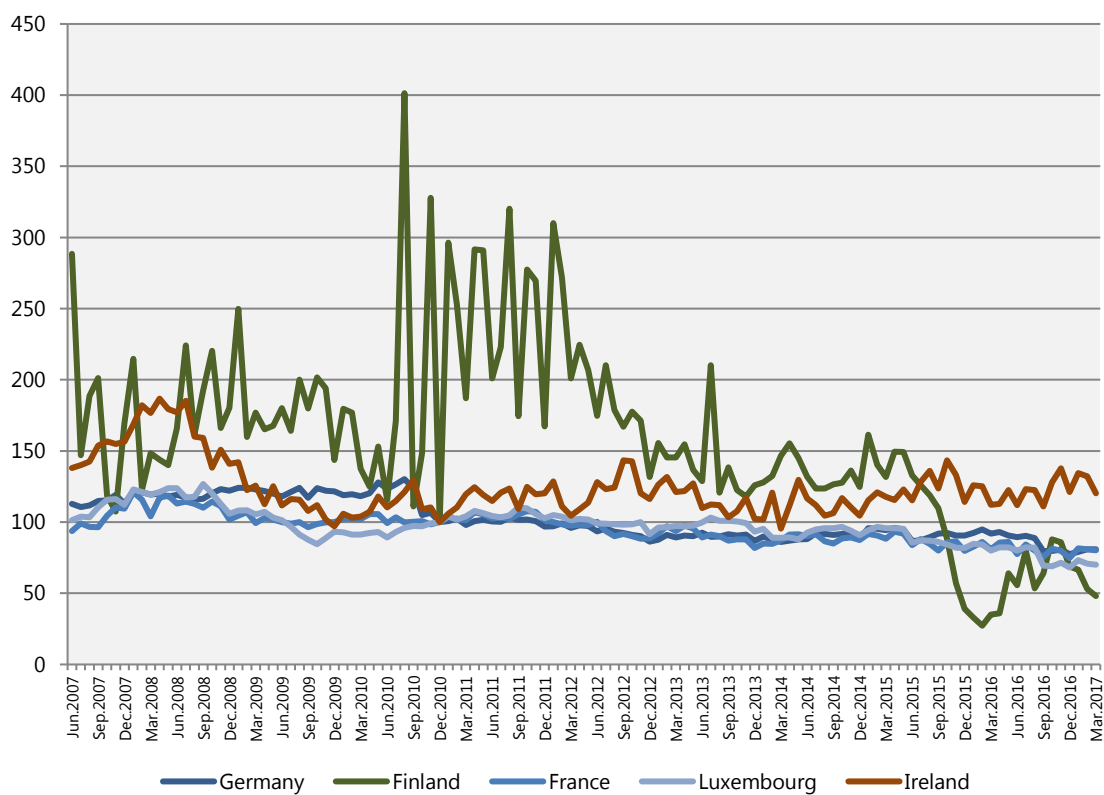The inter-MFI sector in the MFI statistical balance sheet

Figure 1

Source: ECB.

   At aggregate level, the size of the inter-MFI market shows high disparity between countries. Euro area Member States in Table 1 were classified according to the share of their inter-MFI loans within the total outstanding amount of loans granted to euro area counterparts at end December 2016. For Luxembourg, Ireland, France and Germany, the inter-MFI market approximately represents a third of the total lending to euro area counterparts. With the exception of Luxembourg for which the increase in loans to the Eurosystem since mid-2015 explains the decline in the inter-MFI loans ratio, this proportion has remained fairly stable over the last three years (see Figure 11 in Annex).

   Euro area countries also differ from one another with respect to the dynamics of cross-border banking activity. Figure 2 shows the monthly index of notional stocks for inter-MFI loans vis-à-vis "other euro area Member States" since June 2007. Although not as heavily represented as in France, Germany, Luxembourg or Ireland, the cross-border inter-MFI market in Finland shows a much higher volatility than in these countries. Thus the dynamics behind the inter-MFI market prove to be complex, and especially not necessarily correlated neither to the relative size of interbank activities at national level nor to the number of legally incorporated credit institutions in the respective country and as illustrated on Figure 3.

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Index of notional stocks for cross-border inter-MFI loans
Based on financial transactions; position vis-à-vis euro area only

Figure 2

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Share of inter-MFI loans in the total loans granted by MFI to euro area counterparts

Figure 3

- Intragroup loans share in the total balance sheet
- Number of branches of euro area based credit institutions (indicated on the chart)
- Number of credit institutions legally incorparted

Source: ECB. BSI dataset and lists of financial institutions.

Inter-MFI market in the Eurozone (assets)

Share of inter-MFI loans within the total outstanding amounts of loans granted by MFIs to euro area counterparts (data in %)

Table 1

Country	December 2014	December 2015	December 2016
LU	61.5	52.3	45.1
IE	37.6	41.0	40.7
FR	43.0	40.6	37.6
DE	31.8	30.1	27.0
AT	28.5	26.6	24.5
BE	25.4	24.1	20.9
IT	18.7	19.2	18.3
CY	12.8	10.9	13.1
ES	13.1	14.2	12.9
SI	14.7	13.3	12.0
PT	9.4	9.8	10.4
FI	12.1	11.4	12.6
NL	7.4	7.5	7.8
MT	20.7	16.4	9.6
LV	21.0	9.9	6.4
EE	4.2	7.6	4.1
GR	3.2	2.4	2.0
LT	1.9	2.4	1.6
SK	3.9	2.0	1.5

Source: ECB. BSI dataset.

Inter-MFI market in the Eurozone (liabilities)

Share of inter-MFI deposits within the total outstanding amounts of deposits placed by euro area counterparts (data in %)

Table 2

Country	December 2014	December 2015	December 2016
FR	44.5	42.7	40.8
LU	42.9	40.1	34.9
IE	35.5	32.9	31.6
AT	29.6	27.9	25.4
DE	27.7	26.3	24.5
IT	23.2	23.8	21.7
MT	31.3	28.3	21.5
FI	17.7	19.2	19.5
NL	12.2	13.5	14.3
ES	15.8	15.8	14.2
CY	12.5	11.9	13.5

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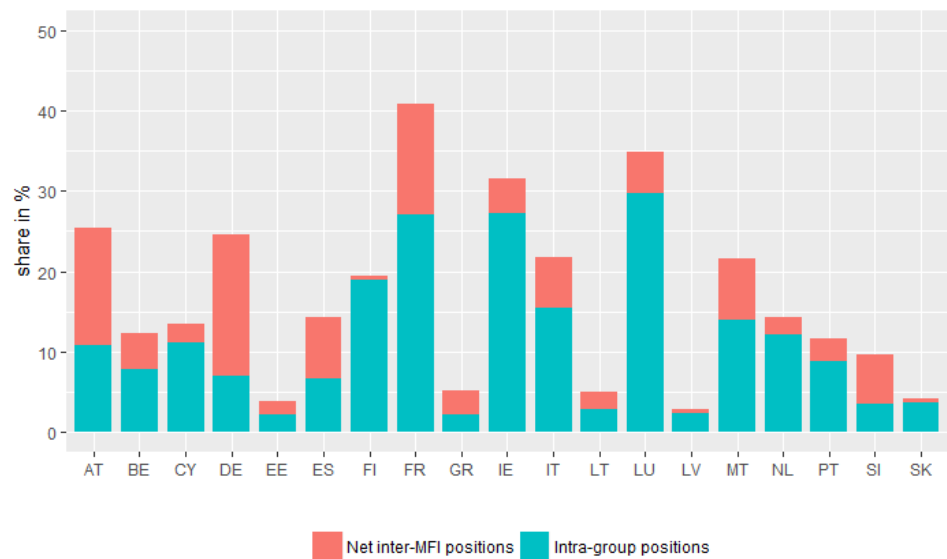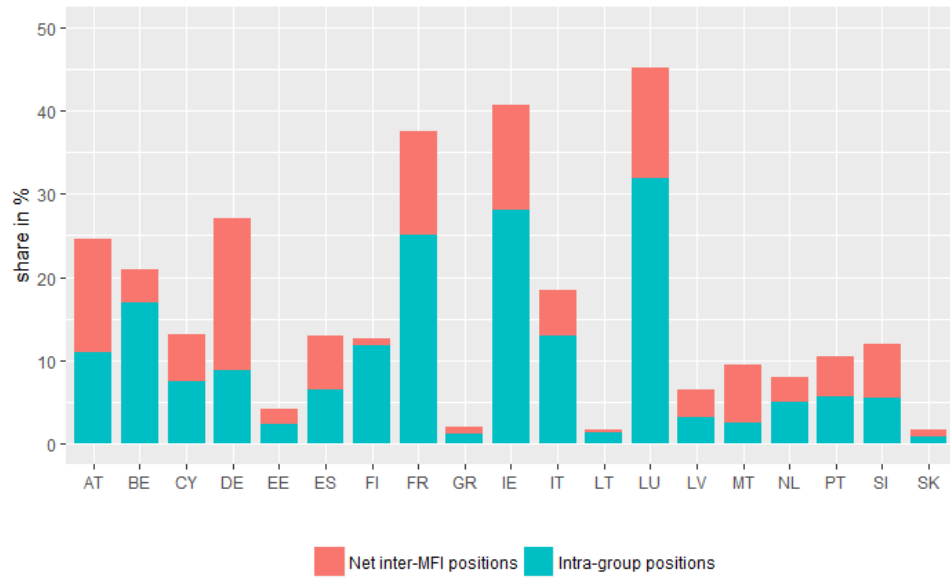|			
BE	13.2	11.5	12.3
PT	10.7	10.9	11.7
SI	16.4	12.1	9.6
GR	5.1	2.8	5.0
LT	10.7	3.8	4.9
SK	4.0	3.3	4.2
EE	13.4	3.1	3.8
LV	13.3	5.8	3.0

Source: ECB. BSI dataset.

Finally, and of specific interest for this paper, inter-MFI loans structurally differ across Member States. This is illustrated in Figure 4. Some countries are characterised by a high proportion of intra-group positions within their total inter-MFI lending: a relevant case is again represented by Finland where 94% of inter-MFI loans correspond to intra-group lending. On the other hand, Germany, where the inter-MFI market is more significant as compared to Finland, intra-group lending accounts for only 33% of the whole inter-MFI loans and similarly for deposits. However, looking at the aggregate figures for intra-group loans and deposits says very little about the dynamics driving these transactions. In Finland, a third of the financial market (loans to households and non-MFI deposits) is held by the former subsidiary of the Swedish bank Nordea, recently turned into a branch (see also paper from L. G. Goldberg, R. J. Sweeney and C. Wihlborg). One may therefore assume that most of intra-group transactions are driven by this single entity. What about the other countries? Are intra-group transactions the result of a strategy followed by specific MFIs in a given jurisdiction? Are they on the contrary a usual practise for parent bank to fund their subsidiaries or branches? Are foreign-owned banks equally involved in such transactions across the monetary union? This information can only be retrieved from data collected at the level of individual MFIs. These are presented in the next section.

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Structure of inter-MFI loans (upper chart) and deposits (lower chart) in the total corresponding position vis-a-vis euro area counterparts

Data with reference December 2016   Figure 4

Source: ECB. BSI dataset.
Note: Positions vis-à-vis the NCB are excluded.

The micro view: the individual MFI statistics

As main data source for the work presented in this paper, this section aims at briefly presenting the microdata collected under the ECB monetary statistics.

In 2012, the ECB started to receive on a regular basis from the euro area NCBs individual BSI data. The exchange, which was set up for monetary policy and financial stability purposes, was also supplemented with the one-off transmission of individual BSI and MIR data for historical periods to better support Eurosystem users. These data were intended and still are treated as strictly confidential so that their access is restricted to a limited number of named Eurosystem users. In 2014 the data transmission became permanent and started to also include the regular exchange of individual MIR data.

Another review of the IBSI and IMIR datasets was undertaken mid-2015 in order to address new Eurosystem users' request to expand the sample of MFIs covered in the data exchange and enhance the reporting scheme with higher granularity. The review also included data requirements formulated by the ECB Banking Supervision.

The IBSI statistics encompass information on the balance sheet of MFIs, both on the assets and liabilities side. The asset side indicators include cash, loans to households, NFCs and governments, debt securities, money market fund (MMF) shares/units, equity and non-MMF investment fund shares/units, non-financial assets (including fixed assets) and remaining assets. On the liabilities side, time series are collected for deposits included and not included in the broad money aggregate M3, debt securities issued, capital and reserves and remaining liabilities. The granularity of series allows the analysis by loan purposes for households' loans, e.g. loans for house purchase, and by maturity. Regarding banks deposits, information is collected broken down by type (overnight, with agreed maturity, redeemable at notice, repos), maturity and reference area of depositors (domestic versus other Monetary Union Members) with a focus on deposits placed by NFCs and households – granularity is higher for these two sectors. Finally, and of particular interest for this study, the IBSI reporting template includes since the 2015 review additional indicators on the inter-MFI business: (1) on the asset side, series on loans granted to the whole MFI sector are available broken down by counterpart area (domestic MFI versus MFI located in other euro are countries) together with the respective "of which" positions for intra-group lending - besides, the domestic counterpart sector breakdown "national central bank" is also collected; (2) on the liabilities side, the same five series on outstanding amounts are collected for deposits.

Following the remarks made in the previous section about inter-MFI lending such as captured by the aggregate dataset (BSI), it is worth looking at the representativeness of the corresponding figures calculated from the statistical balance sheet of individual MFI covered by the IBSI and IMIR reporting framework.

Figure 12 in Annex displays the representativeness of the IBSI sample with respect to the BSI aggregates for intra-group loans (Figure 12a) and the respective deposits (Figure 12b). An important aspect of intra-group positions is undoubtedly their volatility when compared to other balance sheet positions. Figure 12 also illustrates the disparity between countries as regards the representativeness of their national sample for intra-group banking activity. Cyprus for instance shows above 90% coverage for intra-group loans and deposits whereas countries such as Malta,

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Slovenia, Slovakia, etc. are for certain time periods far below 50%. Countries with a high coverage across time show to have credit institutions continuously involved in intra-group transfers. Other countries seem to be represented under the IBSI dataset by banks more sporadically engaged in intra-group banking activity. The interest of looking at individual MFI is therefore and precisely to be able to identify different behaviours across banks and countries and distinguish between intra-group activity as part of the banking groups' business model in funding the different entities of the group or intra-group transfers arising from specific events and aimed at covering specific risks or liquidity shortages.

To conclude this section and to the aim of broadly picturing the structure of the IBSI sample at national level, Figure 5 displays the distribution of assets according to the three legal forms of entities included in each panel. It should be noted that the chart does not reflect the actual ownership of the national banking sectors as it does not distinguish between domestic and foreign-owned subsidiaries or branches. However, the intuition is that intra-group transfers should be of greater relevance in proportion to the total inter-MFI lending in Member States where a significant part of the banking sector is held by subsidiaries and branches.

Structure of the banking sector as represented by the IBSI national samples

Data with reference December 2016   Figure 5

Source: ECB. IBSI dataset and RIAD (lists of financial institutions).
Note: The distribution of the different legal forms across samples is a proxy due to the reporting of aggregated groups by some countries, i.e. group of MFIs centrally reported under an entity playing the role of "central MFI" for the purpose of compiling individual MFI statistics.

Correlation indicators

A.   Correlation between national aggregates and individual MFI data

This section looks at net flows of lending for the whole inter-MFI sector and at the level of banking groups i.e. it analyses the difference between loan and deposit transactions on the balance sheet of MFIs.

In MFI statistics, transaction flows are normally corrected for "non-transactional factors" such as revaluations, reclassifications, loans write-offs, write-downs and exchange rate changes. However, in the particular case of intra-group loans and deposits, the information on adjustments ("ancillary series") to the differences in stocks is not available under the reporting framework applying to the individual MFI statistics. This information is only collected at the level of the whole MFI counterpart sector, i.e. including the central bank as well as money market funds. Net intra-group liquidity flows are therefore calculated as simple differences in stock. Nevertheless and based on the aggregated adjustments for the whole MFI sector, one may observe that more than 50% of the MFIs covered by the whole euro area sample from July 2007 to February 2017 (namely 304 credit institutions in total) report above 99 percent of observations for these ancillary series with zero values. Although sometimes significant in magnitude, empirically, adjustments therefore

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only affect a very small number of data points so that for the purpose of this analysis, differences in stocks are deemed a reasonable proxy to assess the dynamics of intra-group liquidity flows.

Assessing the level of correlation between (a) the national aggregates of net lending flows based on the BSI dataset, i.e. covering almost 100% of the MFI sector – "BSI aggregates" – and (b) the corresponding aggregates compiled from a subset of MFI reported under the IBSI dataset – "IBSI aggregates" – allows to assess the representativeness of the IBSI panel as regards the inter-MFI market which an indicator of data quality for the analysis we wish to carry out at "micro level". Simple correlation coefficients have been used between the relevant time series and results are displayed in Table 3.

For most of countries, correlation coefficients between BSI and IBSI are satisfying. For Estonia, the MFIs included in the IBSI panel do not have intra-group transfers despite their aggregated representativeness in the total balance sheet of the country (more than 80% on average across the relevant time period). For Cyprus, the low correlation for net intra-group lending is only due to a couple of observations which are outliers. For Ireland, Luxembourg and Malta, the lower correlation as compared to the other countries results from the lower coverage of the IBSI panel (respectively around 40%, 35% and 40%).

Correlation between BSI national aggregates and the
corresponding IBSI series [*)]

Table 3

Country	Inter-MFI net lending	Intra-group net lending *(of which of inter-MFI)*
AT	0.78	0.56
BE	0.96	0.81
CY	0.92	0.15
DE	0.93	0.79
EE	0.98	0.00
ES	0.90	0.85
FI	0.94	0.76
FR	-0.06	0.83
GR	0.99	0.93
IE	0.10	0.64
IT	0.67	0.72
LT	0.95	0.96
LU	0.73	-0.11
LV	0.86	0.86
MT	0.42	0.38
NL	0.95	0.97
PT	0.53	0.67
SI	0.82	0.84
SK	0.93	0.91

Source: ECB and authors' calculations. BSI and IBSI datasets.

[*)] IBSI series were compiled as national aggregates over the latest version of the IBSI
sample (reference date March 2017).

B. Cross-sector correlation

This section looks at the correlation between intra-group loans and deposits and the corresponding inter-MFI positions. Results are displayed in Table 4. The level of correlation between the total inter-MFI transactions and the sub-breakdown for intra-group transfers provides an idea of the structure of the interbank market for the different euro area countries. In most of cases, the trend of intra-group transfers follows the trend of the whole inter-MFI market (positive correlation coefficient). In theory there are three exceptions for Latvia, Slovenia and Slovakia which show a slight decorrelation of their domestic intra-group transfers within the total domestic inter-MFI. However, in practise, these countries have a very small domestic inter-MFI market (respectively about 10%, 20% and 30% - see also Figure 7). For comparison, French and Finnish MFIs carry out more than 80% of their inter-MFI transactions for loans and deposits within each other, i.e. within the domestic market. On the other hand, intra-group transactions with institutions located in other Member States are very much correlated to the total inter-MFI for these same countries, suggesting that their domestic credit institutions are strongly connected on the interbank market with cross-border parent institutions. This in fact corresponds to the structure of the banking sector in these jurisdictions, mostly foreign-owned. We see that cross-border intra-group transfers closely follow the

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total inter-MFI activity also in countries such as Luxembourg and the Netherlands, where the interbank market is at the same time well developed and many foreign-owned banks operate (see Figures 6 and 7).

On the contrary, countries with a more active domestic interbank market show significantly higher correlation for the domestic sector as regards intra-group transfers within the total inter-MFI. This is the case for Finland, France and Italy.

Correlation between total inter-MFI positions and intra-group positions
Linear correlation coefficient based on transaction flows;
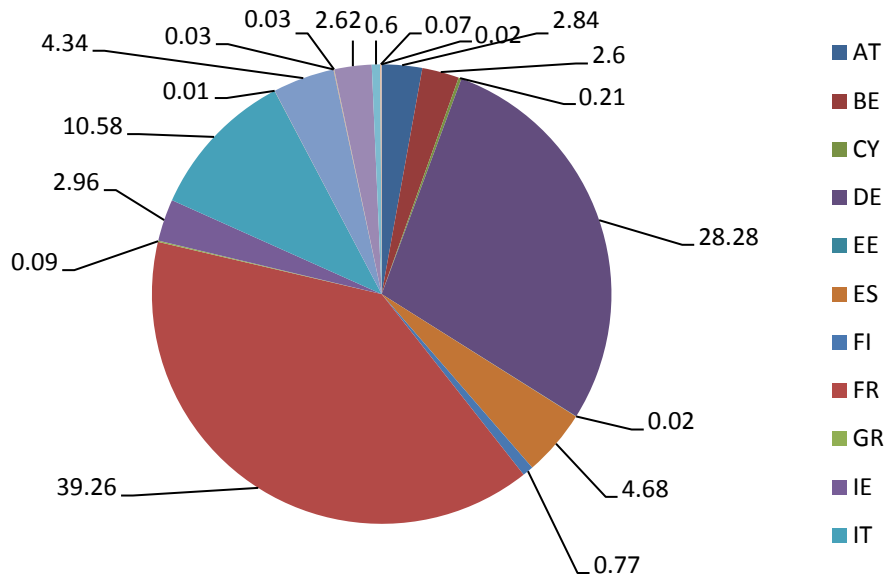time range January 2015 – March 2017

Table 4

Country	Loans		Deposits	
	domestic	other MUMs	domestic	other MUMs
AT	0.65	0.39	-0.06	-0.06
BE	0.87	0.52	0.88	0.82
CY	0.96	0.40	0.96	0.27
DE	0.22	0.74	0.23	0.76
EE	0.00	-0.09	0.00	0.10
ES	0.15	0.44	0.33	0.28
FI	0.92	0.49	0.98	0.55
FR	0.76	0.17	0.66	0.40
GR	0.30	0.45	0.29	0.87
IE	0.67	0.31	0.95	0.90
IT	0.76	0.36	0.74	0.29
LT	0.28	0.98	0.12	0.95
LU	0.47	0.80	0.53	0.96
LV	-0.31	0.74	-0.29	0.96
MT	0.11	0.84	0.18	0.57
NL	0.21	0.70	0.08	0.86
PT	0.53	0.68	0.76	0.66
SI	-0.14	0.89	-0.13	0.61
SK	-0.07	0.74	-0.06	0.99

Source: ECB and authors' calculations.
Note: Low correlation coefficients were high-lighted in red. High correlation coefficients were high-lighted in green.

Distribution of inter-MFI loans across euro area countries
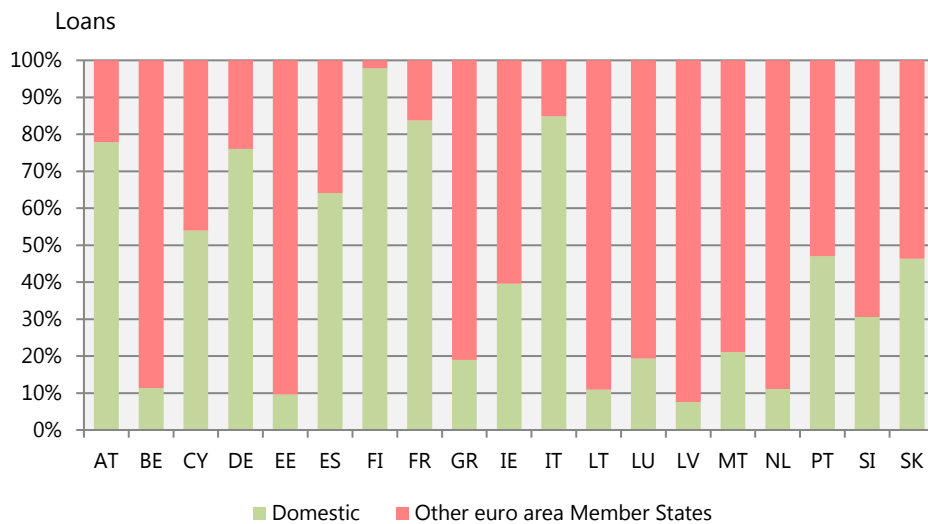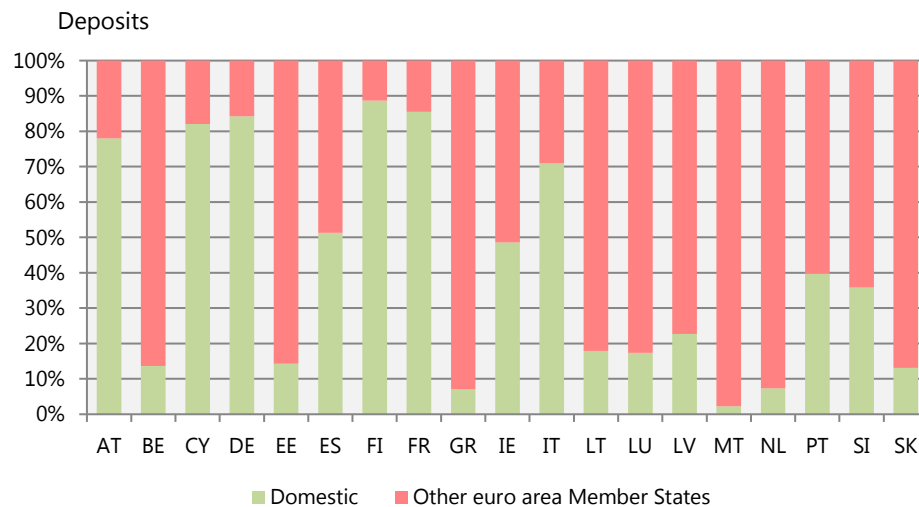Data in percentage; reference date March 2017

Figure 6

Source: ECB. BSI dataset.

Geographical distribution of inter-MFI positions within euro area countries
Data in percentage; reference date March 2017

Figure 7

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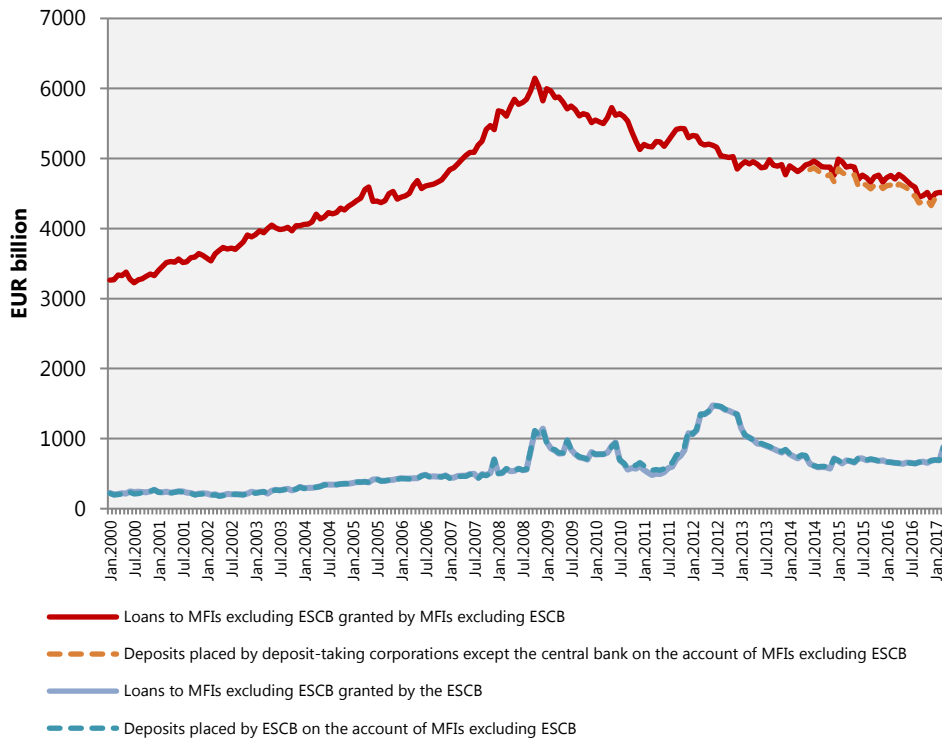
Deposits

Source: ECB. BSI dataset.

Intra-group liquidity – an alternative to credit institutions' funding?

Intra-group liquidity transfers – a key factor in shaping interbank markets

The basic business of credit institutions is to provide credit to the real economy by granting loans. To this aim, credit institutions may obtain funding on the interbank market or by reverting to their national central bank. The use of the interbank market used to prevail in the euro area before the financial crisis. Today in the euro area many credit institutions only have access to the central bank money. The liquidity of the interbank market did not recover its pre-crisis level (see Figure 8): credit institutions do not trust each other as they used to. National central banks are *a priori* the obvious alternative to interbank funding when the confidence between banks on financial markets is impaired. However, with the development of cross-border banking groups in the Eurozone, favoured by the increasing market integration of the monetary union, intra-group transfers may also constitute a source of funding for banks. Logically enough, from the lender's perspective, the perception of counterpart risk is not the same whether the counterpart is part of the same banking group or whether it is an entity out of its scope of governance.

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Overview of the inter-MFI market in the euro area since 2000
Outstanding amounts; euro area geographical counterpart only

Figure 8

Loans to MFIs excluding ESCB granted by MFIs excluding ESCB

Deposits placed by deposit-taking corporations except the central bank on the account of MFIs excluding ESCB

Loans to MFIs excluding ESCB granted by the ESCB

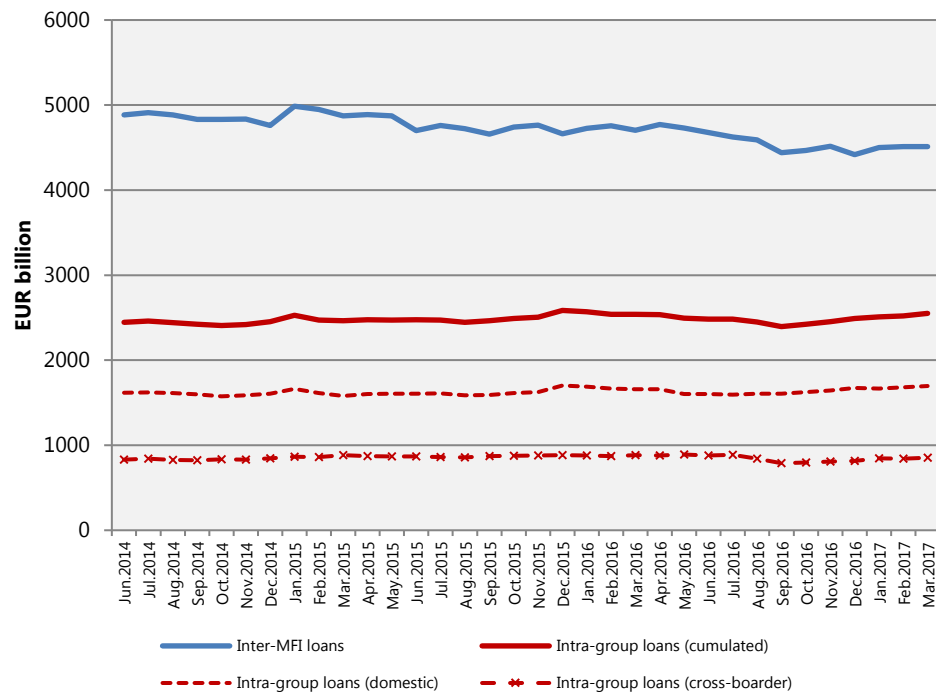Deposits placed by ESCB on the account of MFIs excluding ESCB

Source: ECB. BSI dataset.

As a matter of fact, and for the time span permitted by the available history of the BSI data on intra-group positions (reported as of June 2014 only as a result of the entry into force of Regulation ECB/2013/33), *intra-group loans* (and equally on the liability side *intra-group deposits*) are far from being negligible in the total inter-MFI balance, representing across time approximately 50% of the outstanding amounts on the total euro area MFI balance sheet (see Figure 9). This may also be observed on Figure 10 showing that intra-group flows contribute to the total inter-MFI lending along two aspects: (1) in terms of absolute magnitude (see for instance transactions for the third quarter of 2016 and the first quarter of 2017); (2) in terms of influencing the sign of the total lending at certain periods in time (see for instance observations for 15Q4 and 16Q4). This suggests that there exist, on the one hand, active internal capital markets within banking groups operating in the Eurozone and, on the other hand, that such markets are not only driven by the economic factors traditionally influencing the "net interbank" market. This is the object of the next section.

Intra-group loans in the euro area
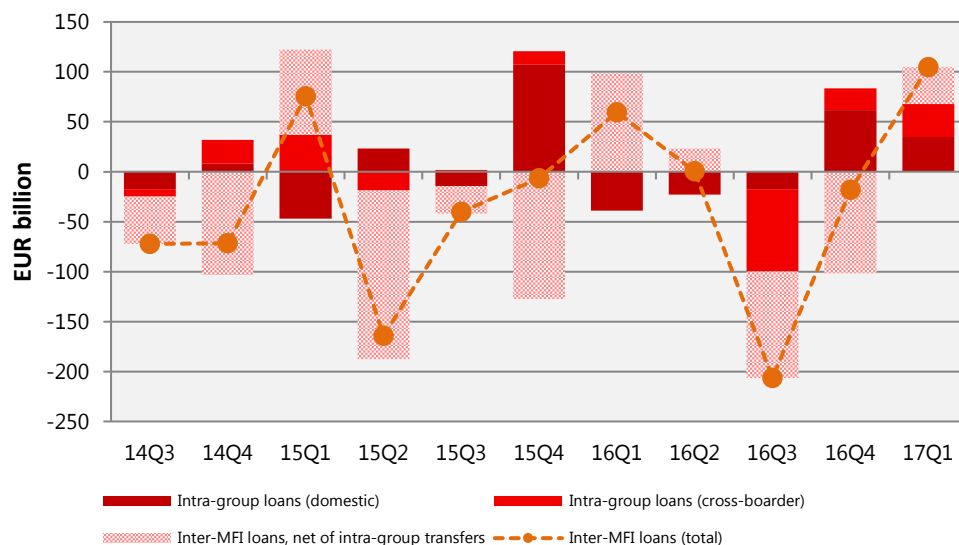Outstanding amounts; euro area geographical counterpart only

Figure 9

Source: ECB. BSI dataset.

Note: Here the scope of institutions as counterpart for intra-group and inter-MFI loans only covers deposit-taking corporations excluding the central bank.

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Intra-group loans in the euro area

Quarterly financial transaction flows; euro area geographical counterpart only

Figure 10

Source: ECB and authors' calculations. BSI dataset.

Note: Here the scope of institutions as counterpart for intra-group and inter-MFI loans only covers deposit-taking corporations excluding the central bank.

Investigating possible drivers of intra-group lending in the euro area

This section describes the panel data model used to analyse intra-group transfers in the balance sheet of euro area MFIs. Our panel data covers all euro area countries (categories) over the time span December 2014 – March 2017 corresponding to the availability of the data on intra-group loans and deposits under the BSI and IBSI dataset.

A.   Panel analysis using the BSI aggregates

− The variable to explain at country level $Y_{i,t}$ is the **net intra-group lending** at country level within the euro area, i.e. the difference between the national aggregated flow of loans granted to domestic and euro area cross-border MFIs within the banking group and the corresponding deposit flow.

− The first predictor variable $X_{i,t}^1$ is the **concentration** of national markets compiled from the IBSI dataset as the Herfindahl-Hirschmann index of the share of loans granted to the non-MFI sector. Figure 13 in Annex illustrates, for information, the concentration level at end December 2016.

− The second predictor variable $X_{i,t}^2$ corresponds to the **size of national banking sectors** calculated as the respective share of loans granted to the non-MFI sector over the total euro area aggregate.

− The third predictor variable $X_{i,t}^3$ is a structural indicator on the **ownership of the banking system** based on the individual BSI dataset, i.e. for each country the total assets share of foreign-owned credit institutions over the whole

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sample. It should be stressed that is a very broad indicator of which the coefficient, as a result of the panel analysis, must be interpreted cautiously. There are several reasons for that, amongst which: (a) the IBSI dataset only provides partial coverage of the reporting population underlying the aggregate MFI balance sheet statistics – between 33% and 96% depending on countries at end March 2017 (latest available reference date - average coverage: 73% - median coverage: 78%); (b) the definition of ownership is, according to the rules applied in RIAD, based on the major share-holder of the bank, leading sometimes to border-line cases where the bank is "almost" domestic or foreign-owned; (c) the reporting panel for IBSI includes aggregate groups for which the ownership is difficult to assess (some group includes hundreds of MFIs) – for the purpose of this analysis, these were set to "domestic".

– The fourth predictor variable $X_{i,t}^4$ is a measure of the "**net Eurosystem funding**" compiled again from the balance sheet of MFIs, i.e. using the difference between monthly changes in deposits placed by the domestic NCB (intermediary for the ECB money) and the corresponding loans (i.e. deposits replaced by the borrowers on its account at the NCB).

– The fifth predictor variable $X_{i,t}^5$ corresponds to **the issuance of debt securities** held by euro area counterparts (all maturities included) compiled from the MFI Balance Sheet Statistics. The assumption is that parent banks may issue bonds in order to finance their subsidiairies and branches which would be reflected in the intra-group deposits on the balance sheet of the entities of the group.

– Finally, the last predictor variable plugged into the panel data model $X_{i,t}^6$ is the **leverage ratio** of the euro area consolidated national banking sectors taken from the ECB Consolidated Banking Data. It corresponds to the ratio of total consolidated assets over total equity (commonly referred to in the litterature as "banks' capital"). This indicator being reported on a quarterly basis, we use linear interpolation in order to fill in the missing observations for the monthly time series. For the sake of clarity, we here remind that the interpretation of the leverage ratio is the following: the higher the ratio the more capital the bank has under the liability side of its balance sheet to finance its assets relative to its total amount of borrowed funds; hence the safer it is.

We test both a fixed effects and a random effects model for the panel data analysis. The model describes as follows:

$$Y_{i,t} = \beta X_{i,t} + \alpha + u_{i,t} + \varepsilon_{i,t}$$

Taking into account all variables for the regression leads to regression coefficients which are not significant. See Table 7 in Annex. However, the p-values obtained indicate that the size of the banking sector together with the Eurosystem funding may be the best regressor candidates to determine a valid model. We restrict the regression to these two variables and obtain the results displayed in Table 5. They are not fully satisfying in terms of significance – certainly we do not interpret them as causal. They confirm however the existence of a correlation between intra-group activity and the effect of the size of the banking sector together with the Eurosystem funding channelled through the Eurozone by means of transfers between parent banks and their subsidiaries and branches: the smaller the banking sector, the higher the intra-group activity; the higher the level of Eurosystem funding, the higher the magnitude of intra-group transactions.

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Results of the restricted panel regression

Table 5

Variables	Fixed effects model	Random effects model	p-value
X_2 – Size of the banking sector	-2,293*	-47.89*	**0.083**
Standard Error	(1,348)	(26.51)	
X_4 – Eurosystem funding	0.000637*	0.000587	**0.090**
Standard Error	(0.000367)	(0.000364)	
Constant	11,807*	-6.941	**0.097**
Standard Error	(7,099)	(242.8)	
Observations	513	513	
R-squared	0.011		
Number of countries	19	19	
Log likelihood	-5036	.	
Pseudo R2	.	.	
Standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

In the above regression, we use at dependent variable the net lending taking therefore negative values. To give us an idea of the dependence in magnitude of intra-group flows with the size of banking sector, we also run the regression with net intra-group lending flows in absolute value as dependent variable. We use a fixed effects model as the random effects model lead to a negative variance of the time effect. We also allow in the estimation to test for residual cross-sectional dependence after the introduction of time fixed effects to account for common shocks. The estimated coefficient is fairly significant which we can interpret as the largest banking sector being responsible for the largest intra-group transactions. This follows the intuition that large jurisdictions have on their territory large banking groups operating and being involved in internal capital markets with their cross-border subsidiaries or branches. The reversal cannot be observed since, basically, banking group X in "large country" A will provide funding to subsidiaries/branches X_1, X_2, X_3, etc. in smaller jurisdictions. On the balance sheet of X_1, X_2 or X_3, the final flow is of course smaller than the aggregated one recorded by X. And most likely, subsidiary X_1 will not be involved in intra-group transactions beyond the ones with its parent bank.

Results of the restricted panel regression
Dependent variable: absolute net intra-group lending flows

Table 6

	Estimate	Standard Error	t-value	Pr(>|t|)
X2_size_banking_sector	2266.1	938.29	2.4151	0.01611*
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1				

B.   Panel analysis carried out at bank-level

We showed earlier in this paper that intra-group lending is highly correlated with the overall interbank lending in the IBSI sample. We now provide some bank-level evidence on the correlation between intra-group lending and other sources of financing for MFIs.

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The second column in Table 7 presents the results of a panel regression using changes in net intra-group lending – loans minus deposits – outside the domestic economy (dependent variable *Y*) against the changes in holdings of domestic sovereign bonds (regressor *X*). The economic idea behind the model is that MFIs reducing their holdings of domestic sovereign bonds, i.e. going short on the sovereign bonds market, use the liquidity retrieved to provide funding to other entities of the same banking group when these are cross-border.

Columns three and four present separate evidence that changes in intra-group loans and deposits are related to the issuance of debt securities. While net intra-group inflows of the issuing subsidiaries are not significantly related to bond issuance, both loans and deposits are found to be significantly related to changes in bonds issued. This might suggest that once bonds are issued by some subsidiary in a country, funding is redirected elsewhere outside that jurisdiction.

All regression exercises here control for time and random effects at MFI level. We do not interpret them as causal but we use the regressions to document correlations. In particular, the Haussmann test carried out the fixed versus random effects models favour the results obtained from the random effects model.

Finally, we only obtain some significance between (net) flows going or coming from outside the jurisdiction, while movements within the same jurisdiction do not seem to be related to other specific sources of funding for MFIs. This supports the view that intra-group lending is mostly relevant as a cross-border phenomenon.

Results of the regression at individual MFI level

Table 7

Variables	Change in net intra-group lending	Change in intra-group loans	Change in intra-group deposits
Change in holdings of domestic government debt	-0.0402**		
Standard Error	(0.0196)		
Newly issued debt securities		0.0360***	
Standard Error		(0.00578)	
Newly issued debt securities			0.0397***
Standard Error			(0.00692)
Random effects by MFI	YES	YES	YES
Time dummies	YES	YES	YES
Observations	12,201		
Number of Banks	290		
Standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

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Conclusion

The liquidity management of central bank money within the banking sector is a key aspect of monetary policy. As stressed by Cetorelli and Goldberg (2011), internal capital markets plays a role in it by allowing managing cross-border liquidity, substituting this way banks' funding via the domestic central bank or the "traditional" interbank market.

This paper aims at exploring the information about liquidity redistribution within the euro area domestic market through two relatively new data sources: the new balance sheet items on intra-group positions provided by Regulation ECB/2013/33 and the ECB micro-dataset on individual MFI Balance Sheet Statistics.

The statistical information provided by intra-group loans and deposits allows for a segmentation of the interbank market which proves to be useful in an economic context where the interbank market remains fragile and trust between credit institutions is still to be rebuilt to reach again its pre-crisis level. At the same time, the increasing market integration in the Monetary Union, and to some extent, within the whole European Union, favour the development of large cross-border banking groups. These two phenomena on the European market makes the analysis of intra-group lending a relevant work to understand how liquidity, and in particular, from an ECB perspective, the central bank money is channelled through euro area countries.

The national aggregates allow building structural indicators in order to assess the size and nature (domestic or cross-border) on intra-group lending within the euro area. We show that for certain countries, intra-group lending is a large part of the inter-bank market. We also show that banking sectors in new euro area Member States, very much foreign-owned, is quite dependent on funding from parent banks in other jurisdictions.

The use of national aggregates for panel data analysis is on the other limited by the low number of observations for the items newly collected under Regulation ECB/2013/33 and reported for most of countries since December 2014 only. We are therefore aware that the results of the regression estimated in this work can only give a broad indication on possible correlations between net intra-group lending and macro-financial variables such as the local size of national banking sectors or the Eurosystem funding. In a nutshell, our paper indicates that the Eurosystem funding plays a role in intra-group transactions by enhancing the funding of smaller institutions by the parent bank within a banking group.

The individual MFI statistics are a precious input for econometrical analysis on balance sheet data owing to the granularity of the dataset: with approximately 300 individuals, results of the regression are more likely to lead to significant coefficients allowing a proper interpretation of the correlation between variables. However, due to the partial coverage of the sample at national level, conclusions should be rather drawn at the level of the euro area as a whole with a general distinction between the domestic and euro area cross-border sectors. This is the approach we followed in Section B when identifying possible linkages between the issuance of debt securities and intra-group transfers to cross-border institutions.

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Using Microdata from Monetary Statistics to Understand Intra-Group Transactions and their
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The work initiated in this paper must be further enhanced in order to fine-tune the panel data analysis following for instance the approach of Affinito (2013) who carries out his regression using an endogenous covariate. Besides, the individual MFI Balance Sheet Statistics, thanks to the meta-information on institutional reporters contained in the ESCB Register of Institutions and Affiliates Database, can allow network analysis to better understand how credit insitutions, based on some of their key characteristics (structure of the balance sheet or cross-border presence) interact with each other.

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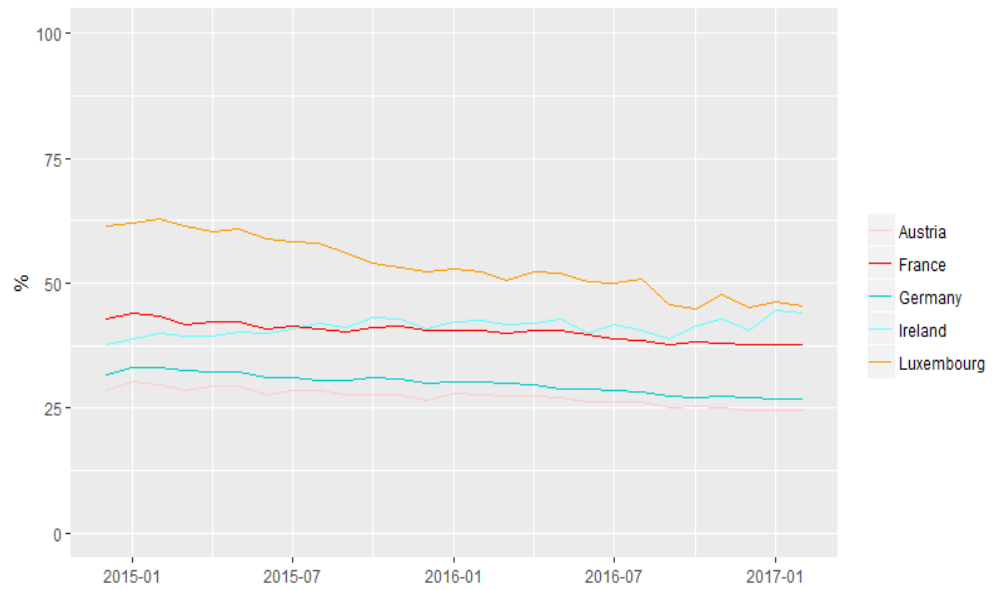
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Annex

Share of inter-MFI loans in the total loans granted by MFI to euro area counterparts

Figure 11

Source: ECB.

Using Microdata from Monetary Statistics to Understand Intra-Group Transactions and their
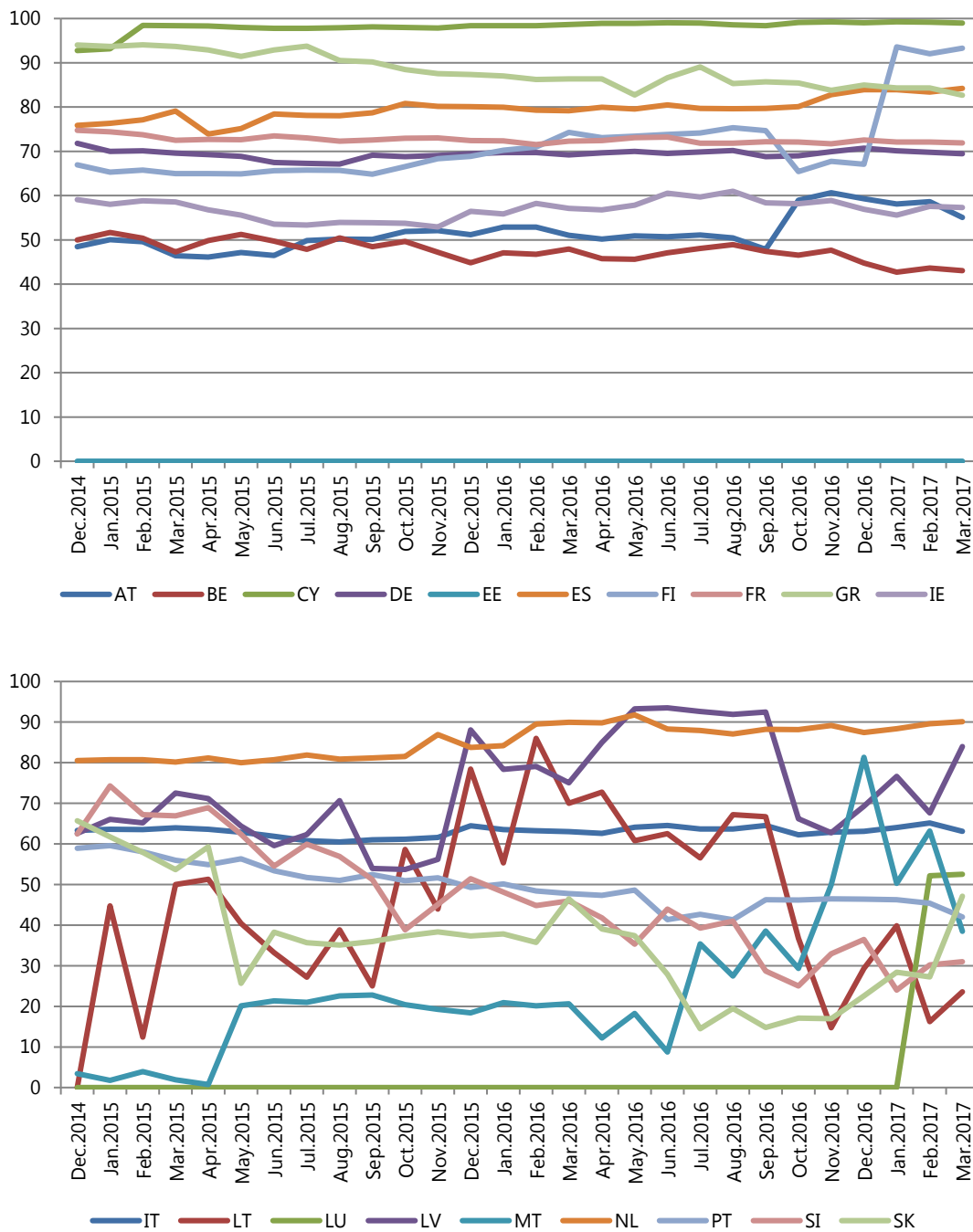Implication in Financial Stability Issues

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Representativeness of the IBSI sample in the national BSI aggregates

Intra-group loans; values in percentage   Figure 12a
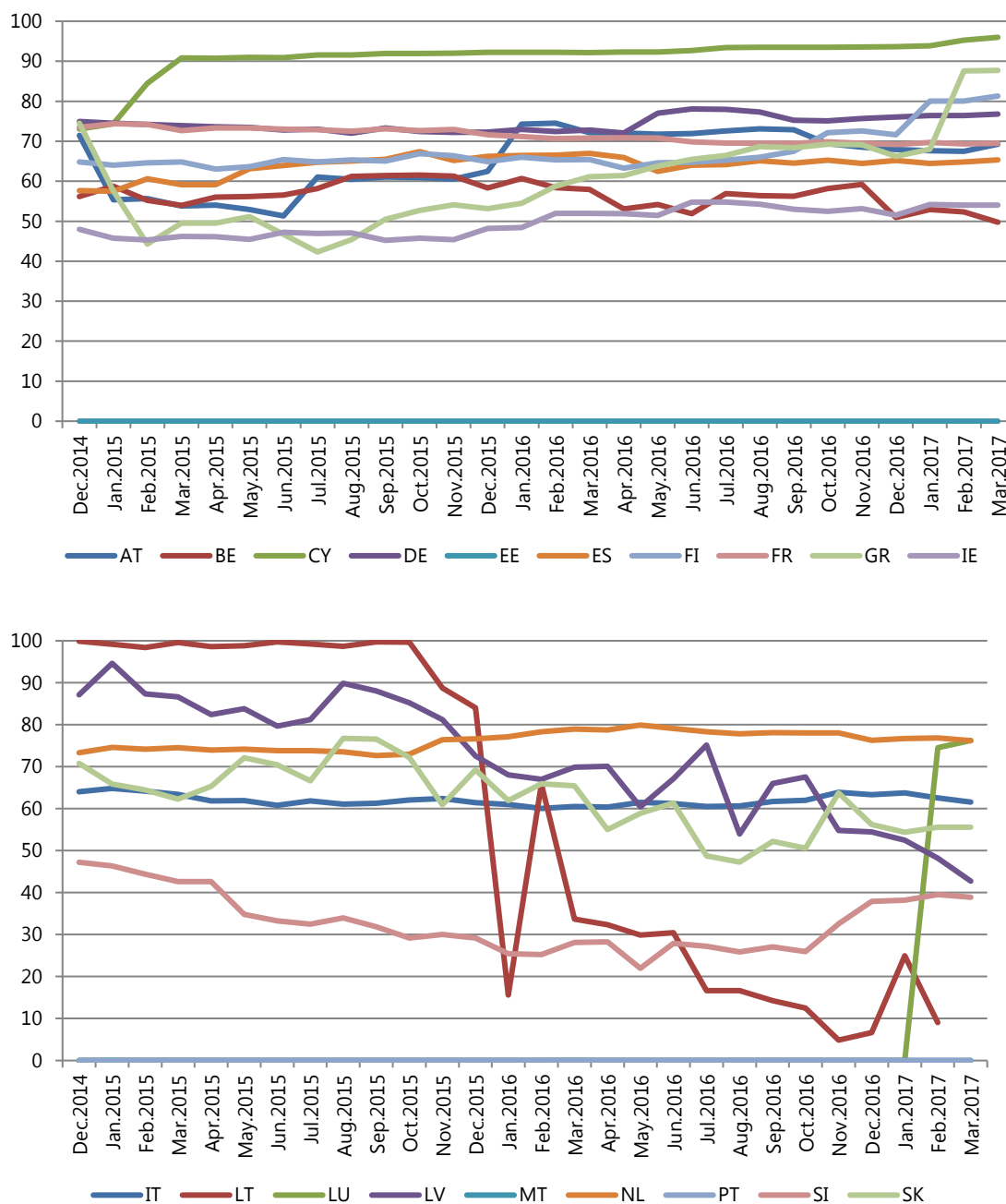

Source: ECB.

Note: MFIs included in the IBSI sample for Estonia do not hold intra-group loans from euro area MFIs.

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Representativeness of the IBSI sample in the national BSI aggregates
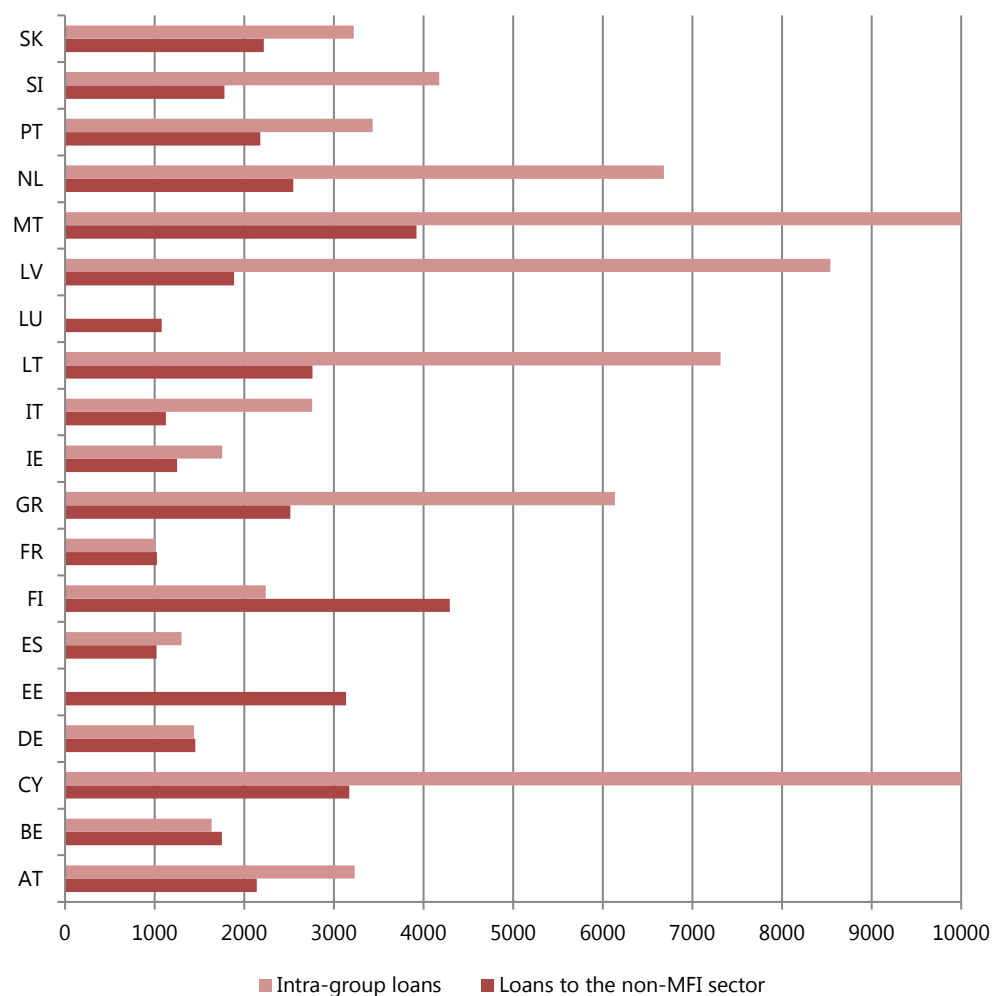
Intra-group deposits; values in percentage

Source: ECB.

Note: MFIs included in the IBSI sample for Estonia, Malta and Portugal do not hold intra-group deposits from euro area MFIs.

Using Microdata from Monetary Statistics to Understand Intra-Group Transactions and their Implication in Financial Stability Issues

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Herfindahl-Hirschman index

Based on outstanding amounts at end of period; data with reference December 2016

Figure 13

Intra-group loans ■ Loans to the non-MFI sector

Source: ECB. IBSI dataset and authors' calculations.

Note: 1) Data on intra-group loans for Luxembourg are not available. 2) The non-MFI sector comprises general government, OFIs, NFCs and households.

Using Microdata from Monetary Statistics to Understand Intra-Group Transactions and their
Implication in Financial Stability Issues

Results of the panel regression including all variables described in Section 2.1

Table 7

Variables	Fixed effects model	Random effects model	p-value
X_1 – Concentration index of banking business	-93.66	10.97	**0.708**
	(429.8)	(29.31)	
X_2 – Size of the banking sector	-2,217	-50.10	**0.253**
	(1,368)	(43.84)	
X_3 – Foreign ownership of the banking sector	-57.25	-3.070	**0.676**
	(132.1)	(7.337)	
X_4 – Eurosystem funding	0.000624*	0.000586	**0.109**
	(0.000371)	(0.000365)	
X_5 – Issuance of debt securities held by the euro area	-0.0196	-0.00961	**0.844**
	(0.0516)	(0.0489)	
X_6 – Leverage ratio	-115.0	-0.786	**0.992**
	(289.1)	(78.95)	
Constant	16,894	-108.2	**0.930**
	(14,525)	(1,227)	
Observations	513	513	
R-squared	0.012		
Number of countries	19	19	
Log likelihood	-5036	.	
Pseudo R2	.	.	

Standard errors in parentheses

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

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IFC-National Bank of Belgium Workshop on "*Data needs and Statistics compilation for macroprudential analysis*"

Brussels, Belgium, 18-19 May 2017

Using microdata from monetary statistics to understand intra-group transactions and their implication in financial stability issues[1]

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European Central Bank

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[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.

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Using Microdata from Monetary Statistics to Understand Intra-group Transactions and their Implication for Financial Stability

Working Paper (May 2017)

- This presentation **should not** be reported as representing the views of the European Central Bank (ECB).

- The views expressed are those of the authors and do not necessarily reflect those of the ECB.

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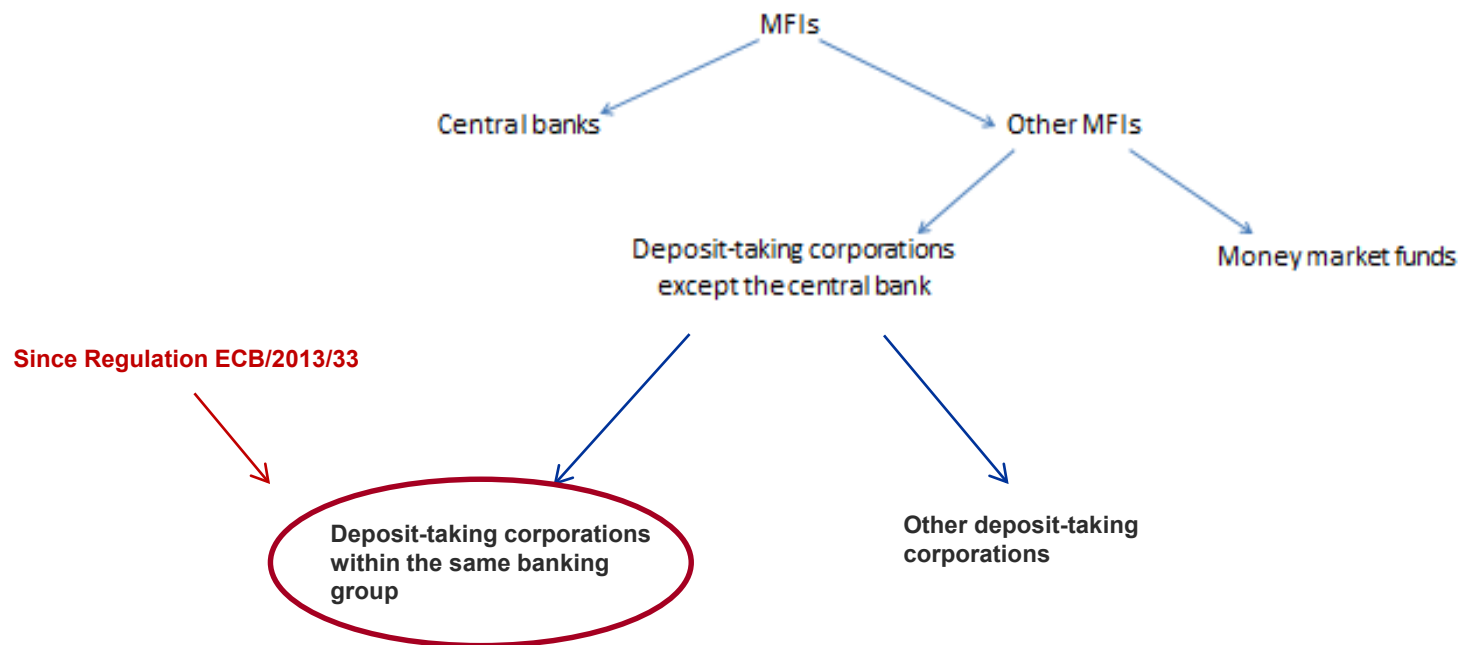
Overview

1	Macro-picture of inter-MFI lending in the Eurozone
2	The individual MFI statistics
3	Intra-group liquidity – an alternative to credit institutions' funding?
4	Investigating possible drivers of intra-group lending in the euro area
5	Conclusion and way forward

Roadmap

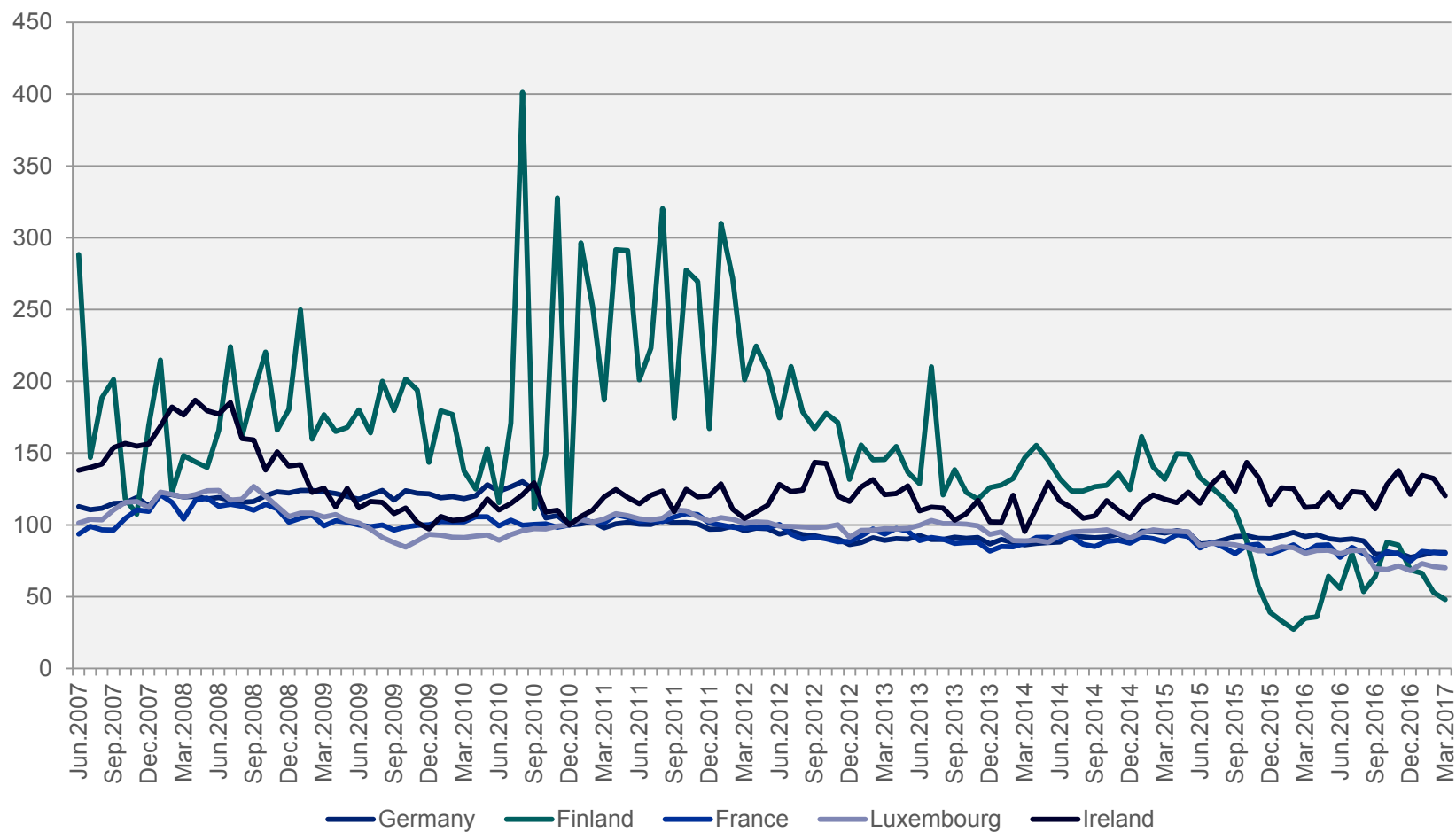| 1	**Macro-picture of inter-MFI lending in the Eurozone**
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The "MFI sector" in the euro area MFI statistical balance sheet

- MFI Balance Sheet Statistics collected under an EU Regulation (four since the beginning of the Monetary Union) + ECB Guideline on Monetary and Financial Statistics.

- The latest regulation into place is Regulation (EU) No 1071/2013 of the ECB of 24 September 2

MFIs

Central banks

Other MFIs

Deposit-taking corporations except the central bank

Money market funds

Since Regulation ECB/2013/33

Deposit-taking corporations within the same banking group

Other deposit-taking corporations
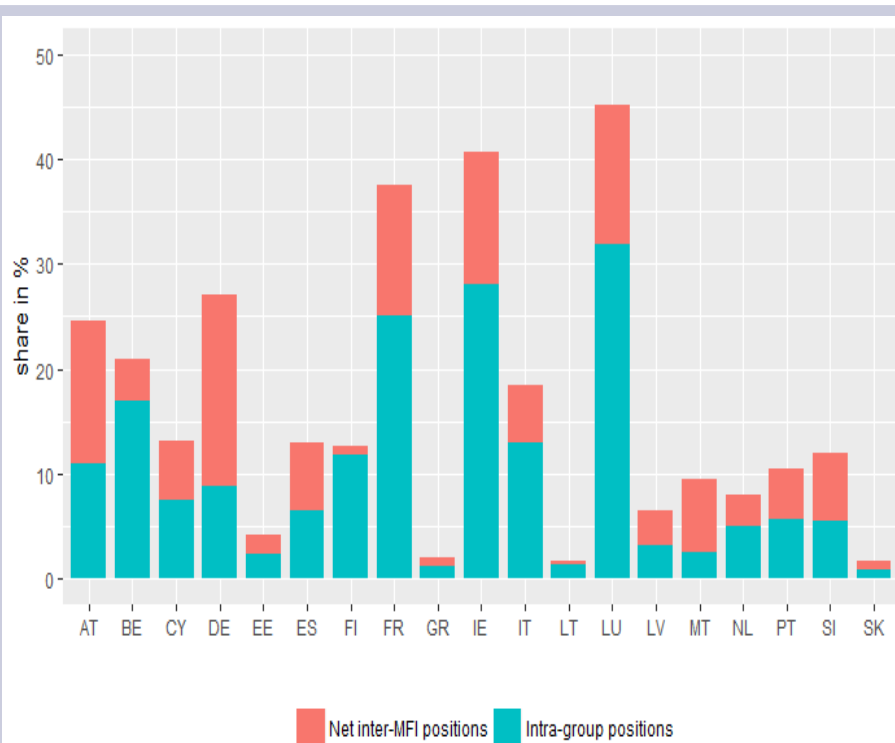
Cross-border inter-MFI loans

→ Monthly index of notional stocks reported for cross-border inter-MFI loans

How are inter-MFI lending positions structured?

→ Intra-group positions are a relevant share of total inter-MFI lending

(*data with reference end December 2016*)

Loans	Deposits

Roadmap

1	Macro-picture of inter-MFI lending in the Eurozone
2	**The individual MFI statistics**
3	Intra-group liquidity – an alternative to credit institutions' funding?
4	Investigating possible drivers of intra-group lending in the euro area
5	Conclusion and way forward

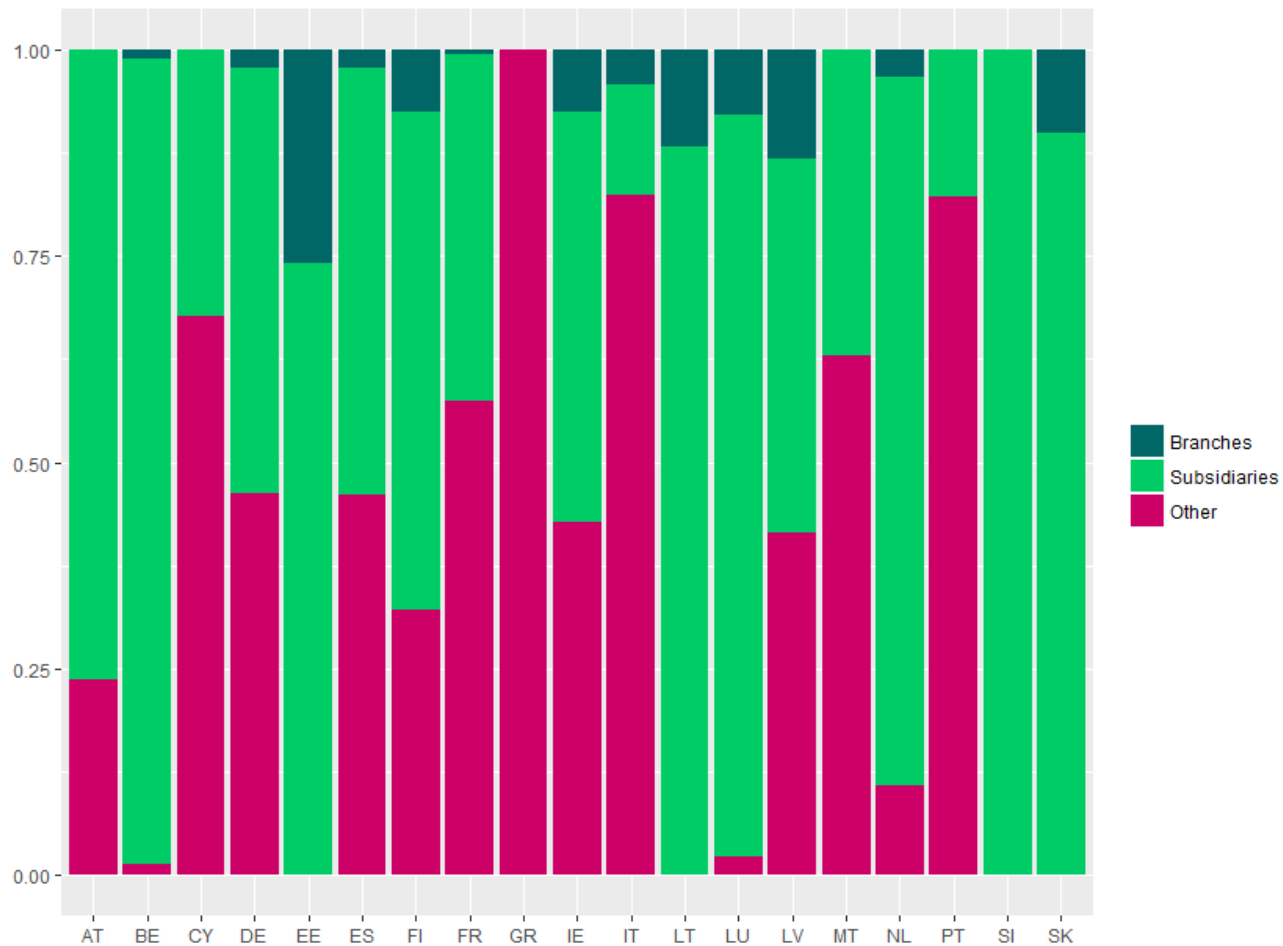# Two data sources for intra-group lending:

- **National aggregate MFI statistics (BSI)** → key country characteristics and dispersion across euro area countries

- **Individual MFI statistics (IBSI)** → same BSI items but reported at the level of individual MFI → panel data analysis with higher granularity → better identification of countries' national specificities

The IBSI panel:

- **Selection criteria:**
  - Bank size
  - Active participation in monetary policy operations
  - Representativeness

- Role of non deposit-taking or credit-granting specialised credit institutions in the sector of savings and cooperative banks as a channel of liquidity injection

- Selected agents are notified by their NCBs; data are first collected by NCBs

- Initial selection of approximately **300 MFIs** belonging to **115** headquarters: parent heads, some branches and some subsidiaries included

Structure of the banking sector as represented by the IBSI national samples
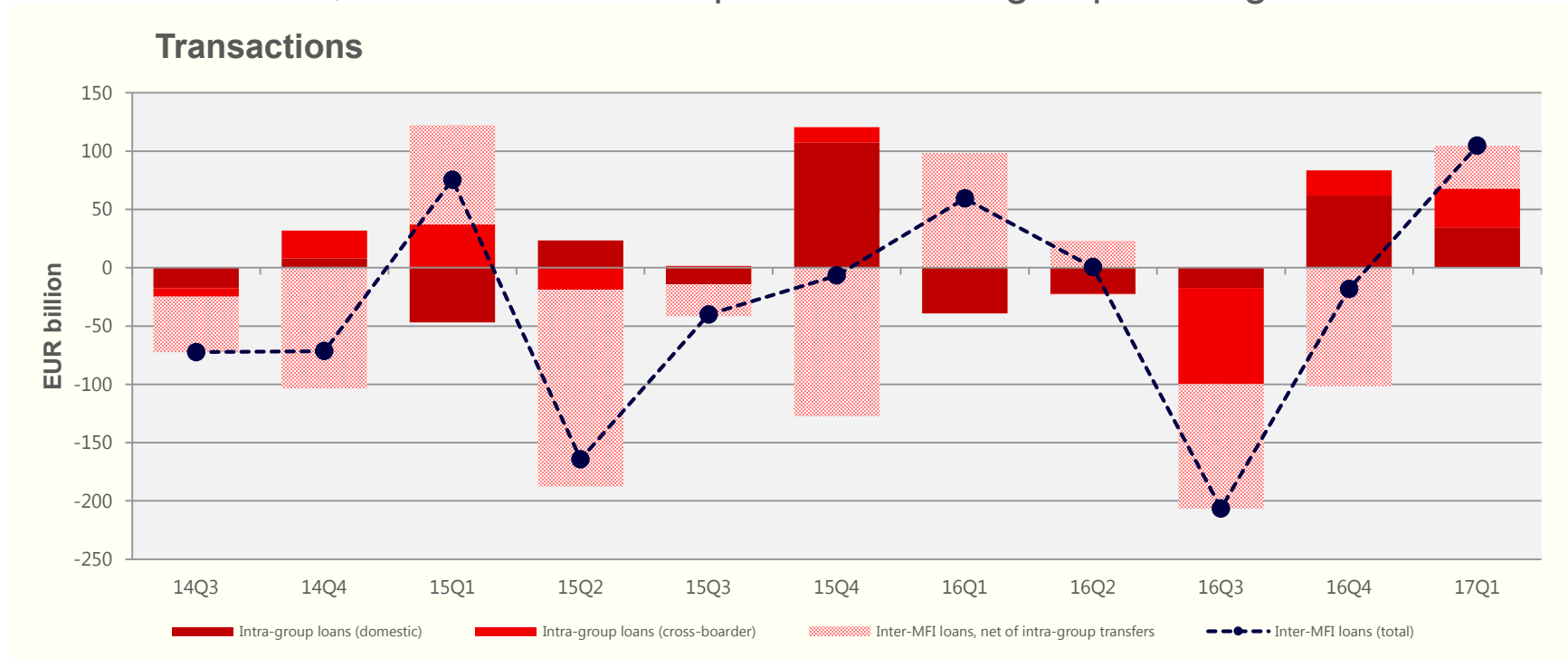
Data with reference December 2016

Roadmap

1	Macro-picture of inter-MFI lending in the Eurozone
2	The individual MFI statistics
3	**Intra-group liquidity – an alternative to credit institutions' funding?**
4	Investigating possible drivers of intra-group lending in the euro area
5	Conclusion and way forward

Intra-group liquidity – an alternative to credit institutions' funding?

- Basic business of credit institutions → providing credit to the real economy by granting loans.

- Two ways to obtain short-term funding:
  - ✓ interbank market; *pre-crisis setting*
  - ✓ national central bank; *post-crisis habit* + some banks cannot access the interbank market anymore

- The liquidity of the interbank market did not recover its pre-crisis level.

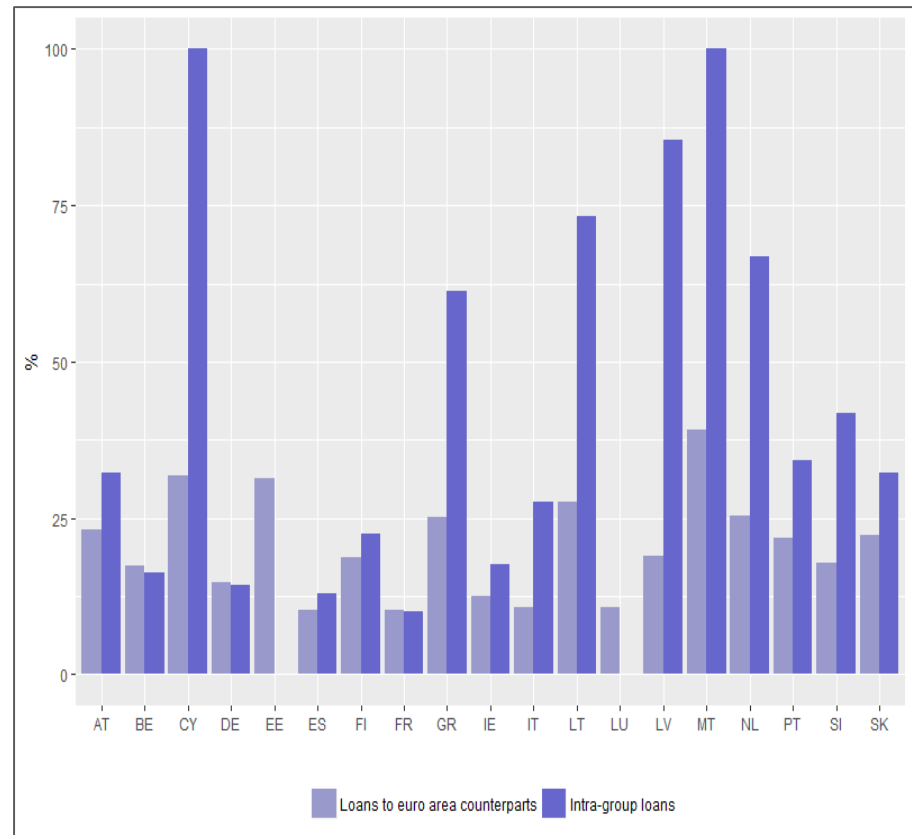- In this context, what should we expect from intra-group lending?

Transactions

Intra-group loans (domestic)　　Intra-group loans (cross-boarder)　　Inter-MFI loans, net of intra-group transfers　　- ● - Inter-MFI loans (total)

Roadmap

1	Macro-picture of inter-MFI lending in the Eurozone
2	The individual MFI statistics
3	Intra-group liquidity – an alternative to credit institutions' funding?
4	**Investigating possible drivers of intra-group lending in the euro area**
5	Conclusion and way forward

Explaining net intra-group lending compiled from MFI statistics:

- **Concentration of national markets?**
  - ➲ "predictor variable" compiled from IBSI dataset - Herfindahl-Hirschmann index of the share of loans granted to the non-MFI sector

- **Relative size of national banking sectors** as regards the lending business to the euro area non-MFI sector?

- **Ownership of the banking system?**
  - ➲ structural indicator based on the individual BSI dataset + information in RIAD "Register of Institutions and Affiliates Database"

Herfindahl-Hirschmann index at December 2016

Explaining net intra-group lending compiled from MFI statistics:

- "**Net Eurosystem funding**"? Seen as difference between monthly changes in deposits placed by the domestic NCB and the corresponding loans, i.e. deposits replaced by the borrowers on its account at the NCB

- **Issuance of debt securities** held by euro area counterparts - do parent banks issue bonds in order to finance their subsidiaries and branches?

- **Leverage ratio** (compiled from the ECB Consolidated Banking Data) – Does the level of solvency of a banking sector impact the dynamics of intra-group transactions?

Roadmap

1	Macro-picture of inter-MFI lending in the Eurozone
2	The individual MFI statistics
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4	Investigating possible drivers of intra-group lending in the euro area
5	**Conclusion and way forward**

Three variables show to be significantly correlated to intra-group lending at individual MFI level

- **Size of the banking sector** → structural dimension – "big" parent banks finance many smaller cross-border credit institutions

- **Eurosystem funding** → liquidity redistribution through internal banking channels ("micro financial system") – to be better quantified!

- **Issuance of debt securities** → countries with a better integrated and developed financial sector may provide funding to entities having less access to financial markets

→ participates to market integration in the euro area

Way forward

- **Network analysis** making more extensive use of banking group information in RIAD

- **Fine-tuning of the panel data analysis** by better specifying entities solo banks versus subsidiaries versus branches - *clustering*

Thank you
for your attention

Questions?