ECONSTOR
Make Your Publications Visible.

A Service of

ZBW Leibniz-Informationszentrum Wirtschaft
Leibniz Information Centre for Economics

Rousová, Linda; Rodríguez Caloca, Antonio

Working Paper

Disentangling euro area portfolios: New evidence on cross-border securities holdings

ECB Statistics Paper, No. 28

Provided in Cooperation with:
European Central Bank (ECB)

Suggested Citation: Rousová, Linda; Rodríguez Caloca, Antonio (2018) : Disentangling euro area portfolios: New evidence on cross-border securities holdings, ECB Statistics Paper, No. 28, ISBN 978-92-899-3357-5, European Central Bank (ECB), Frankfurt a. M., https://doi.org/10.2866/561114

This Version is available at:
https://hdl.handle.net/10419/194011

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

WWW.ECONSTOR.EU

Mitglied der Leibniz-Gemeinschaft

EUROPEAN CENTRAL BANK

EUROSYSTEM

Statistics Paper Series

Linda Fache Rousová,
Antonio Rodríguez Caloca

Disentangling euro area portfolios: new evidence on cross-border securities holdings

No 28 / May 2018

Disclaimer: This paper 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.

Contents

Abstract **2**

1 Introduction **3**

2 Data sources **5**

2.1 Security-by-security datasets: SHSS and CSDB 5

2.2 Extending the SHSS timespan by the use of SHES 6

3 Theoretical considerations **9**

3.1 Definition of financial integration and the main categories of measures 9

3.2 The design of SHSS quantity-based indicators 10

4 SHSS indicators of financial integration **15**

4.1 Aggregate SHSS indicators − composite, debt securities and equity markets 15

4.2 SHSS indicators for the main holder and issuer sectors 17

4.3 Robustness checks: a comparison with other data sources 20

Box Euro area securities traded cross-border: micro evidence 23

5 Main drivers of changes in financial integration since the financial crisis **27**

5.1 The growing role of the OFI sector 27

5.2 Developments in the government debt market 29

6 Conclusions **32**

7 References **34**

Abbreviations **36**

Acknowledgements **37**

Abstract

This paper presents a detailed set of new, quantity-based indicators of financial integration in the euro area. The indicators are based on granular data from securities holdings statistics and help us disentangle the main drivers of the portfolio changes observed since the financial crisis. Three key developments since the crisis stand out. First, we find that financial integration in equity is less than that in the debt market, although the equity market was the main contributor to the partial recovery in financial integration observed since mid-2012. Second, we observe a gradual shift in cross-border investment activity from the banking sector towards other non-bank financial entities. In particular, our results show that euro area banks significantly decreased their investment in debt securities issued by banks in other euro area countries and that this decrease explains around 55% of the decline in financial integration in the debt market observed since the crisis. Finally, we find that the sharp decrease in financial integration between 2009 and 2012 was mainly driven by foreign investor flight from government debt securities, a trend that has since reversed.

Keywords: securities holdings statistics, security-by-security data, micro-data, financial integration, quantity-based indicators, securities, international financial markets

JEL codes: F36, G1, G10, G15.

1 Introduction

Financial integration stemming from cross-border investment can help foster financial stability and growth. For instance, it can provide a broader and deeper source of funding to the economy and increase the resilience of the financial system due to increased risk-sharing (see e.g. Baele et al., 2004). It also supports the smooth and balanced transmission of the single monetary policy (Draghi, 2014). To promote the benefits of deeper and more integrated capital markets, the European Commission developed a plan on 'Building a Capital Markets Union' to encourage capital to move across borders in Europe (European Commission, 2015).

But how much capital already moves across borders within the euro area? Are there significant differences between the different types of markets, countries or regions? Have there been any changes in cross-border investment patterns? If so, which market segments, countries or investors drove these developments the most?

Using new granular data from securities holdings statistics, this paper sheds light on cross-border investment patterns in the euro area securities market between 2009 and 2015. For instance, it shows that the level of cross-border investment within the euro area (as a percentage of total euro area investment) is significantly higher in the debt securities market (around 30%) than in the equity market (around 15%). At the same time, the paper also highlights that the cross-border investment share in the debt market has fluctuated more than the cross-border investment share in the equity market. This further confirms the results in existing literature that the debt market is more pro-cyclical and volatile than the equity market (e.g. Kose et al., 2009; Becker et al., 2007; Special Feature A of ECB, 2016).

Overall, the share of intra-euro area cross-border holdings of debt securities declined significantly between 2009 and mid-2012, although this share has recovered somewhat since then. This decline in cross-border holdings of debt securities from 2009 to mid-2012 is mostly the result of a sharp fall in cross-border investment in government debt issued by the euro area countries that were most hit by the euro area sovereign debt crises. The investors most responsible for the decline in cross-border holdings of debt securities between 2009 and mid-2012 were euro area banks. Since mid-2012, non-bank financial entities (i.e. other financial institutions except insurance corporations and pension funds) have been the main drivers of the gradual increase in cross-border securities holdings in both the debt and equity markets. The bottoming out in mid-2012 was partly due to strengthened investor confidence following two important policy actions in that year. Those two actions were the announcement of the ECB's Outright Monetary Transactions and the agreement to create the banking union. But the shift in cross-border investment activity from banks towards other non-bank financial entities did not start in mid-2012. Rather, it has been a gradual shift since the financial crisis, which coincided with more stringent supervisory rules imposed on the regulated banking sector.

Our findings have the advantage of being based on a large set of indicators built from one single source, the securities holdings statistics by sector (SHSS) data. Since no methodological or measurement differences arise within this one data set, our indicators are comparable across the different holder and issuer sectors, and across the different types of securities. In addition, the SHSS data fully cover the euro area, both in terms of countries and economic sectors. The high level of data granularity also allows us to 'drill down' to an unprecedented level of detail (see Fache Rousová and Rodríguez Caloca, 2015). Moreover, all presented indicators are quantity-based rather than price-based, which has the advantage that they tend to be less influenced by diverging or converging trends in domestic macroeconomic fundamentals of the different euro area countries. From this point of view, quantity-based indicators provide a more direct measurement of the state of financial integration, and are thus more suitable for its regular monitoring (see ECB, 2016).

The rest of the paper is organised as follows. Section 2 introduces the security-by-security data sources used for SHSS indicators and explains how the SHSS timespan is extended until 2009 by the use of securities holdings experimental statistics (SHES). Section 3 discusses the definition of financial integration and the three main categories of measures used in the literature. In addition, it introduces the theoretical design of the new SHSS indicators. Section 4 presents the actual indicators, starting from a highly aggregated level and drilling down to sector-specific indicators. Using comparisons with other aggregated data sources, this section also discusses the robustness of our results. Section 5 identifies the main drivers of changes in financial integration between 2009 and 2015. In particular, it discusses the role of the general government as an issuer sector, and the structural shift on the investor side away from banks and towards other non-bank financial entities. Section 6 contains a brief conclusion.

2 Data sources

2.1 Security-by-security datasets: SHSS and CSDB

The main data source used for this paper is SHSS data. These data are collected by the European System of Central Banks and include quarterly information on holdings of individual securities by institutional sectors in the euro area. Since the data are collected on a security-by-security basis and cover all holding sectors in the euro area, they provide a wide range of new breakdowns. The high data granularity and comprehensive scope mean that SHSS information has been used for a variety of purposes, including monetary policy (e.g. Koijen et al., 2016), financial stability surveillance and macroprudential policy (e.g. Hüser et al., 2017). SHSS information has also been used for market analysis (e.g. Bisschop et al., 2016).[1, 2]

One advantage of the very granular collection on a security-by-security basis is that it makes it possible to link the data with reference data on individual securities. Therefore, one of the main steps in SHSS compilation is linking the information they contain on the holders of the securities with information from the Centralised Securities Database (CSDB), which contains reference information on over 6 million outstanding securities. The CSDB is a multi-purpose platform operated by the European System of Central Banks, and provides detailed information on individual issuers (such as name, sector, country of residence), types of securities (for example debt securities v listed shares) and the characteristics of the securities (such as maturity, price and yield).[3] As a special module, the CSDB also contains information on ratings of individual securities and issuers (also known as the ECB's ratings database). The matching between SHSS data and CSDB data is facilitated by a common security identifier in both datasets – an International Securities Identification Number (ISIN).

The SHSS-CSDB combined dataset is particularly suitable for measuring financial integration because it includes information on both the holder country (from SHSS data) and the issuer country (from the CSDB). This in turn implies that domestic securities holdings can be distinguished from those held cross-border. Securities held cross-border can be further split into intra- and extra-euro area cross-border holdings. In addition, the SHSS coverage of the euro area is complete both in terms of countries and economic sectors. This has the advantage of allowing a large set of indicators to be built from a single source and removes methodological or

1 For comprehensive information about SHS data, including the distinction between the SHS Sector (SHSS) and SHS Group (SHSG) modules, the mechanism of collecting security-by-security information, and diverse examples on the use of SHS data from monetary and macro-prudential perspectives, see ECB (2015).

2 Selected aggregates derived from the SHSS data are available for public use in the ECB's Statistical Data Warehouse. The granular SHSS information is not accessible to the public owing to data confidentiality and contractual rules.

3 For more information, see the publication entitled "The Centralised Securities Database in brief" on the ECB's website.

measurement differences between those indicators. The only exception to this is Eurosystem holdings, which are not covered in SHSS data.

In terms of the type of financial instrument, the dataset is also comprehensive as it covers four main security types: short-term debt, long-term debt, listed shares, and investment funds shares. Moreover, the detailed CSDB information on the type of security is important from a theoretical point of view. This is because a prerequisite for any measurement of financial integration is the identification of the same assets in terms of risk-adjusted returns (e.g. Adam et al., 2002).

The SHSS data also have a comprehensive coverage. To assess how comprehensive SHSS data are, the granular SHSS data can be aggregated and compared to benchmarks from aggregate statistics such as those from the euro area accounts (EAA). The results show that SHSS covers around 93% of the holdings of debt securities and listed shares by euro area sectors from EAA (see Table 1). The differences in coverage across the holding sectors typically reflect the differences in the way SHSS data are collected. The coverage exceeds 92% for the financial sectors as those sectors are mostly subject to direct SHSS reporting. But the coverage is somewhat lower for non-financial sectors, which usually do not report the data directly. For these sectors, the information is typically obtained through custodian reporting by financial institutions in the euro area.

Table 1

Securities holdings of debt securities and listed shares by euro area sectors in Q4 2015

(EUR billion, market values)

	SHSS	EAA	SHSS coverage (in percentages)
Euro area financial sectors	**16,801**	**17,855**	**94%**
Monetary financial institutions (MFIs)	5,653	5,950	95%
Other financial intermediaries and auxiliaries (OFIs)	7,471	7,893	95%
Insurance corporations and pension funds (ICPFs)	3,677	4,012	92%
Euro area non-financial sectors	**3,364**	**3,764**	**89%**
Non-financial corporations (NFCs)	1,122	1,376	82%
General government	550	712	77%
Households	1,691	1,677	101%
Total	**20,165**	**21,619**	**93%**

Sources: ECB (SHSS, BSI and EAA) and authors' calculations.
Notes: Holdings by MFIs exclude Eurosystem holdings. Eurosystem holdings are not covered in the SHSS data. To obtain a corresponding benchmark, Eurosystem holdings of debt securities available from MFI's balance-sheet items (BSI) are excluded from the EAA aggregate.

2.2 Extending the SHSS timespan by the use of SHES

The SHSS data collection started in early 2014, with the first data referring to the end of December 2013. To extend the timespan of our analysis back to 2009, we use

securities holdings experimental statistics (SHES), which were collected before the SHSS. While SHSS data are collected on the basis of two legal texts (ECB Regulation and Guideline),[4] the SHES were collected on a voluntary and best-efforts basis. They are thus subject to some quality limitations such as lower coverage. In particular, because there was no sound legal basis on the level of the euro area before 2013, not all euro area countries had a comprehensive security-by-security data collection in place. This meant these countries could not cover holdings by all sectors in a comprehensive manner.

There is one gap in the SHES data, which is due to a late start in registering Estonian and Maltese holdings. The former are not available for the first year of SHES (2009) and start only in the first quarter of 2010. The latter are missing in SHES and start only in the fourth quarter of 2013 (i.e. when SHSS collection began). However, from a euro area perspective this gap is almost negligible, because the holdings by the residents of these two countries represent less than 0.2% of total euro area holdings (based on the SHSS average from the end of 2013 to the end of 2015).

Furthermore, a time-series analysis reveals that SHES coverage of domestic holdings is either particularly low or contains significant structural breaks in four euro area countries (Greece, Spain, Ireland and Cyprus). Of these, the gaps in Greek and Spanish domestic holdings require particular attention. This is because domestic holdings in these two countries account for around 15% of euro area domestic holdings (according to SHSS). The low coverage in the remaining two countries is of less concern. This is because the low coverage in Ireland is only limited to the first three quarters of 2009, while the impact of Cyprus on euro area totals is very minor (according to SHSS, holdings by Cyprus represent around 0.1% of total euro area holdings).

When compared to aggregate information from balance of payments (b.o.p.) statistics, the coverage of SHES cross-border holdings is found to be satisfactory in most euro area countries, as most countries record a coverage rate of more than 85%. This is because the security-by-security information on cross-border holdings was collected in most euro area countries as early as 2008 as part of the compilation of b.o.p. statistics.[5]

To overcome the main SHES limitations, we supplement the domestic holdings of Greece and Spain in SHES data with the Greek and Spanish national contributions to EAA. Specifically, we obtain from these sources aggregate information on domestic holdings of debt securities and listed shares for the six main holder and issuer sectors:

1. monetary financial institutions (MFIs);

2. other financial intermediaries and auxiliaries (OFIs);

---

4 The legal basis for the SHS data collection consists of Regulation ECB/2012/24 and Guideline ECB/2013/7, which were amended in 2015 by Regulation ECB/2015/18 and Guideline ECB/2015/19.

5 See Article 2(6) and Table 13 of Guideline ECB/2004/15.

3. insurance corporations and pension funds (ICPFs);

4. general government;

5. non-financial corporations (NFCs); and

6. households.[6]

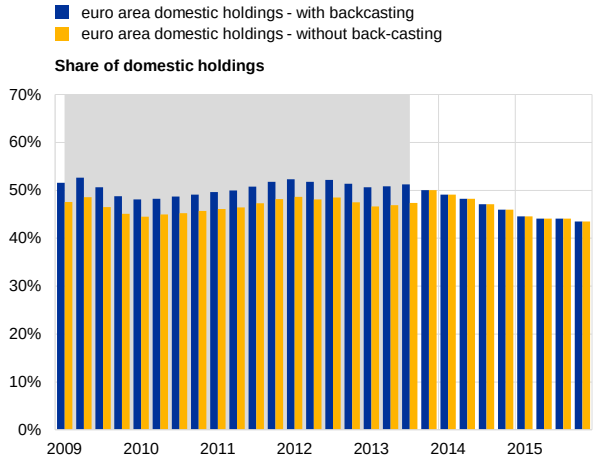
Afterwards, we aggregate the initial security-by-security holdings by the six holder and issuer sectors, the holder and issuer country, and the instrument type to create a macro-aggregated version of our micro dataset. Finally, we replace in this dataset the SHES domestic holdings of Greece and Spain with the information from Greek and Spanish national contributions to EAA.

The resulting 'back-casted' domestic holdings of Greece and Spain based on the national contributions to EAA are in line with those obtained from the SHSS micro-data. At the end of 2013, the SHSS domestic holdings covered around 80% and 70% of the corresponding EAA aggregates for Spain and Greece respectively.

Chart 1

The impact of back-casting on euro area domestic holdings of debt securities and listed shares

(percentages of total euro area holdings from EAA)



Sources: ECB (SHSS, SHES and EAA) and authors' calculations.
Notes: The shaded area indicates the period based on SHES data before Q4 2013. SHES data exclude Malta both in the back-casted and non-back-casted series. Data for Estonia are available since Q1 2010.

The resulting euro area domestic holdings over the full time period from 2009 to 2015 are characterised by a smooth time series, without an observable structural break between the end of SHES and the start of SHSS data, i.e. between the third and fourth quarters of 2013 (Chart 1).

In the following sections, we use the resulting back-cast dataset for the construction of new quantity-based indicators of financial integration. For simplicity, we refer to those as SHSS indicators, even though the indicators for the whole timespan are based on the combination of SHSS and SHES data, and the latter are supplemented by information from Spanish and Greek national contributions to EAA.

[6] The national contributions to EAA data for Greece were downloaded from the Bank of Greece website whereas the corresponding data for Spain were provided directly by the Statistics Department of Bank of Spain.

3 Theoretical considerations

3.1 Definition of financial integration and the main categories of measures

In this paper, we follow the definition of financial integration developed by Baele et al. (2004). This definition has been adopted by the ECB and regularly used in its annual reports on financial integration in Europe, which started to be published in 2007 (for the first report, see ECB, 2007). According to this definition, the market for a given set of financial instruments and/or services is fully integrated if all potential market participants with the same relevant characteristics encounter the following:

1. a single set of rules when they decide to deal with those financial instruments and/or services;

2. equal access to those financial instruments and/or services; and

3. equal treatment when they are active in the market.

The seminal work of Baele et al. (2004) considers three broad categories of measures of financial integration: price-based measures, news-based measures, and quantity-based measures. Measures in the first category aim at capturing discrepancies in prices or returns on assets caused by the geographic origin of the assets and are based on the 'law of one price'. This law states that if assets have identical risks and returns then they should be priced identically, regardless of where they are transacted. Hence, in a fully integrated market (according to the above definition), the prices of assets with sufficiently similar (risk) characteristics and returns should not vary with their geographic origin. The second category comprises measures that are designed to distinguish the 'information effects' from other frictions or barriers. The rationale for these measures is that, if there are no barriers to international investment, purely local shocks can be generally diversified away by investing in assets from different regions and, therefore, local news – as opposed to common news – should have little impact on prices. The last category refers to quantity-based measures which aim at quantifying the effects of frictions faced by the demand for – and supply of – investment opportunities. They are based on (cross-border) quantities and flows of assets.

The last category of quantity-based measures has been gaining importance in recent years. One reason is that they tend to be less influenced by diverging or converging trends in domestic macroeconomic fundamentals of the different euro area countries. They therefore provide a more direct measurement of the state of financial integration than price-based measures (see also ECB, 2016).

In particular, Baele et al. (2004) highlight that the measures of financial integration strongly depend on the assumption implied by the law of one price that the assets are identical (or at least comparable) in terms of their risk characteristics and returns.

However, as the macroeconomic fundamentals of the individual euro area countries continue to differ, this assumption tends to be unrealistic in the euro area context.

Moreover, even if the prices of assets are the same, it does not necessarily mean that the market for these assets is integrated. For illustration, consider two economies with identical characteristics that exist in autarky. The equilibrium price(s) of the asset(s) in the two economies will be identical, even though the two economies are closed. In other words, the causality runs only in one direction (from a fully integrated market to the same prices) but not vice-versa. Since quantity-based measures are based on asset quantities and flows, they do not suffer from the same criticism.[7]

Against this backdrop, our paper focuses on quantity-based measures of financial integration. By doing so, we help fill in an existing gap because the traditional toolkit of quantity-based indicators for securities is relatively limited (for more details, see Section 4.3 and our previous work in Fache, Rousová and Rodríguez, Caloca, 2015). Nonetheless, some gaps will remain. For instance, the quantity-based measures of financial integration can be based either on asset quantities or flows but we only consider measures based on asset quantities. The reason for this is that SHSS data on transactions, which could be used as proxy for flows, are limited (the full coverage for the euro area starts in Q4 2015), and therefore do not currently allow for the construction of time series over several years.

3.2 The design of SHSS quantity-based indicators

To measure euro area financial integration, a very simple – but intuitive – quantity-based indicator is used throughout this paper. This indicator is the share of intra-euro area cross-border securities holdings (i.e. non-domestic but within euro area holdings) in total euro area securities holdings (i.e. in the sum of domestic holdings, intra-euro area cross-border holdings and non-euro area holdings).

More specifically, let $\mathrm{i} = 1, \ldots, \mathrm{N}$ be individual euro area countries and $\mathrm{j} = 1, \ldots, \mathrm{M}$ all issuer countries available in the SHSS dataset (i.e. both euro area and non-euro area countries). In addition, let H_{ij} denote holdings by country i of securities issued by country j,[8] H_{EACB} intra-euro area cross-border securities holdings, and H_T total euro area securities holdings. Then our composite indicator of financial integration can be calculated as follows:

$$I_{Composite_{EA}} = \frac{H_{EACB}}{H_T} = \frac{\sum_{i=1}^{N}\sum_{j=1, j\neq i, i\in EuroArea}^{M} H_{ij}}{\sum_{i=1}^{N}\sum_{j=1}^{M} H_{ij}}$$

[7] For instance, any (positive) cross-border flow of an asset captured by a quantity-based measure would directly imply that market participants from one economy have access to the market in the second economy, i.e. that the two economies are integrated to a certain extent.

[8] To obtain a comparable measure for both debt securities and equity, we use market values to measure the value of holdings. Robustness checks using nominal values for debt securities suggest that the choice of valuation does not play a significant role for the main results presented in this paper.

The values of this indicator vary between 0 and 1 (or between 0% and 100% if expressed in percentages). A value of 0 implies that there are no intra-euro area cross-border holdings, i.e. all euro area assets are held either domestically or by non-euro area residents. This suggests that euro area residents (from other countries than the domestic country) do not have equal access to the securities markets of the country where the issuer is based and, therefore, the euro area securities market is not fully integrated according to the above definition. On the other hand, a value of 1 does not imply a fully integrated market. A value of 1 can be obtained only if there are no domestic holdings and no holdings by non-euro area residents. Hence, under this scenario, domestic residents and residents from other euro area countries also do not have equal access to the market, which is required for full integration. Hence, the theoretical point of full integration lies between 0 and 1. This theoretical point of full integration will be discussed in the next section.

3.2.1 The theoretical benchmark of full integration

In this section we give an account of the theoretical benchmark of full financial integration. In a fully integrated market, the country of issuance should not play a role in investment decisions. Therefore, in a fully integrated market the allocation of investment across countries within the fully integrated area (in our case, the euro area) can be assumed to reflect the supply of assets by those countries, i.e. it should be proportional to the outstanding amounts of securities issued by residents of each (euro area) country. In particular, this assumption implies that there is no 'home bias', i.e. that market participants do not prefer domestic assets over assets from other countries within the fully integrated area. Another implication is that countries with large outstanding stocks of securities should invest relatively less cross-border, compared to countries with low outstanding stocks of securities. It also implies that to reflect full financial integration, the level of our indicator calculated for two different markets/financial instruments does not necessarily have to be the same.

More specifically, let s_i represent the share of the amounts of securities issued by country i in total amount outstanding of securities issued by all euro area countries. Then if residents of country i decide to invest the amount of H_{EA_i} in euro area securities, they should invest $s_i * H_{EA_i}$ in domestic securities and $(1 - s_i) * H_{EA_i}$ in securities issued by other euro area countries. It follows that, under this theoretical scenario, the intra-euro area cross-border share for a euro area country i can be expressed as

$$Theoretical\ Benchmark\ (TB)_i = \frac{H_{EACB_i}}{H_{T_i}} = \frac{(1 - s_i) * H_{EA_i}}{H_{T_i}} = (1 - s_i) * k_i,$$

where H_{T_i} denotes the total holdings of securities by euro area country i and k_i denotes the share of securities holdings that residents of country i decided to

allocate to the euro area.[9] Furthermore, to obtain the theoretical benchmark of full integration for the euro area as a whole, we weight the individual intra-euro area cross-border shares (TB_i) by the amounts which those countries invest in euro area securities, i.e. the weights equal the share of euro area securities held by country i (H_{EA_i}) in total euro area securities holdings (H_{EA_T}).[10]

$$Theoretical\ Benchmark\ (TB)_{EA} = \sum_{i=1}^{N} \frac{H_{EA_i}}{H_{EA_T}} * (1 - s_i) * k_i = \sum_{i=1}^{N} \frac{H_{EA_i}}{H_{EA_T}} * TB_i$$

When the actual value of our indicator lies below this theoretical benchmark, holdings by some (if not all) euro area countries suffer from 'home bias'. We can therefore interpret an increase in our indicator as a sign of further euro area integration. This follows from the above definition of financial integration because an increase in the indicator implies that euro area residents held relatively more euro area cross-border securities[11] and were thus able to access those securities more easily.[12]

In fact, the theoretical benchmark for securities holdings was 66% at the end of 2015, while the actual value of our indicator in this period lay far below this theoretical benchmark – at around 26% (see Section 4). Since the gap between these two levels is relatively large and the euro area securities market still needs to change greatly before it is fully integrated, we use a simplified interpretation throughout our paper and directly interpret an increase in our indicator as an increase in euro area financial integration.

3.2.2 The design of SHSS quantity-based sub-indicators

The richness of SHSS data allows us to construct analogous indicators for various combinations of holder and issuer sectors and different types of securities. When creating these analogous indicators we follow a top-down approach, i.e. we start from the most aggregated level and then refine our focus by drilling down to more

---

9 Since we are not interested in this paper in the integration between the euro area and the rest of the world, we do not impose any restrictions/assumptions on k_i and consider it to be an exogenous parameter. From an economic point of view, it is also reasonable to assume that an investor in a fully integrated area first decides about the asset allocation between the integrated area and the rest of the world, and only then decides about the exact asset allocation within the integrated area.

10 The construction of the theoretical point of full integration is motivated by – but differs from – the approach used for the construction of quantity-based FINTEC (see Statistical Annex of ECB, 2016). One difference is that to construct these weights, the quantity-based FINTEC uses the share of securities issued by country *i* (i.e. the supply side instead of the demand side), although the issuance of securities by a country does not reflect the investment amounts, which are to be allocated to the individual countries. As a result, the FINTEC approach relies on the assumption that the outstanding stock of securities issued by a country equals the holdings of securities by this country, although this assumption usually does not hold in practice. For instance, the outstanding amount of debt securities issued by Spain is about 60 % higher than the holdings of debt securities by Spanish residents, according to the ECB's securities issues statistics (SEC) and SHSS holdings at the end of 2015.

11 An increase in the indicator can occur in three different cases (ceteris paribus): (i) euro area cross-border holdings increase, (ii) domestic holdings decrease, (iii) holdings of non-euro area securities decrease. In all three cases, the *relative* importance of euro area cross-border holdings increases.

12 Such an interpretation follows the spirit of similar indicators presented in Baele et al. (2004), although Baele et al. do not develop the notion of the theoretical benchmark. Baele et al. thus (silently) rely on the assumption that the values of those indicators are below the theoretical benchmark.

granular levels. Less aggregated indicators (sub-indicators) are constructed based on the value of securities holdings in a given market segment. This in turn means that a more aggregated (composite) indicator can be interpreted as a weighted average of the individual sub-indicators.

For instance, let D and E denote holdings of debt securities and equity respectively, and let us assume that $H_T = D_T + E_T$. The composite indicator can then be expressed as follows:

$$I_{Composite} = \frac{H_{EACB}}{H_T} = \frac{D_{EACB} + E_{EACB}}{H_T} = \frac{D_{EACB}}{D_T} * \frac{D_T}{H_T} + \frac{E_{EACB}}{E_T} * \frac{E_T}{H_T} =$$

$$= I_{Debt} * W_{Debt} + I_{Equity} * W_{Equity}$$

Hence, the weights of the two sub-indicators (denoted as W) correspond to the market shares of the two instrument types, while the construction of the two sub-indicators (I_{Debt}, I_{Equity}) is analogous to the construction of the composite indicator, i.e.

$$I_{Debt} = \frac{D_{EACB}}{D_T}, \quad I_{Equity} = \frac{E_{EACB}}{E_T}$$

An alternative way of drilling down is to calculate the shares of intra-euro area cross-border holdings of the individual elements (e.g. instrument types, sectors, countries) in total holdings. These shares represent unweighted contributions of the individual elements to the underlying composite indicator, while at the same time they are the weighted contributions of the individual sub-indicators.

Using the example of debt securities and equity holdings, the two individual contributions (denoted as C_{Debt} and C_{Equity}) can be broken down as follows:

$$I_{composite} = \frac{H_{EACB}}{H_T} = \frac{D_{EACB} + E_{EACB}}{H_T} = \frac{D_{EACB}}{H_T} + \frac{E_{EACB}}{H_T} = C_{Debt} + C_{Equity},$$

where $C_{Debt} = \frac{D_{EACB}}{H_T} = I_{Debt} * W_{Debt}$ and $C_{Equity} = \frac{E_{EACB}}{H_T} = I_{Equity} * W_{Equity}$

When investigating the underlying drivers of changes over time, this alternative way of drilling down is easier to interpret than the first one. If a given contribution increases by a certain percentage point, this is translated into an equal increase in the composite indicator, other things being equal. However, this is not the case for the individual sub-indicators obtained by the first drilling down approach, since changes in these sub-indicators affect the composite indicator in proportion to its weight. Therefore, a large increase in a sub-indicator with a low weight would be translated into a relatively small increase in the composite indicator.[13]

The securities market for the purposes of this paper includes both debt securities and equity (i.e. listed shares) but excludes investment fund shares. As highlighted by

[13] See for instance panel A of Chart 10, which shows that the evolution of the sub-indicator for the countries included in the group B2 does not have a visible impact in the composite indicator, owing to the low weight of countries in group B2.

Felettigh and Monti (2008), the inclusion of cross-border holdings of investment fund shares would bias the instrument and geographical composition of portfolio assets in the absence of information on the ultimate issuer(s).

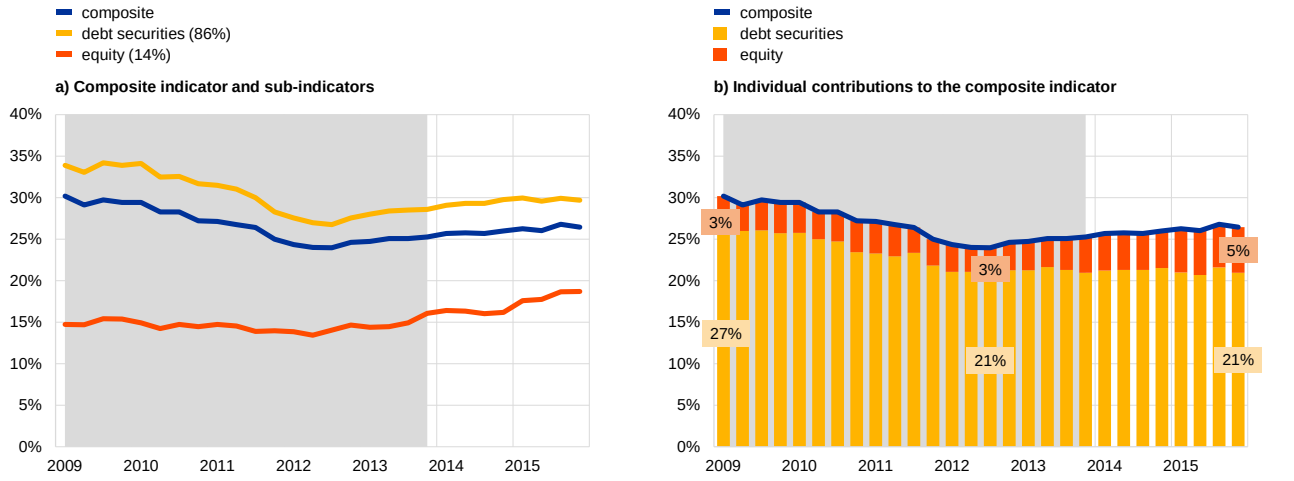
4 SHSS indicators of financial integration

4.1 Aggregate SHSS indicators – composite, debt securities and equity markets

The composite indicator in Chart 2 is the most aggregated indicator of financial integration in the euro area securities market. It shows that the share of intra-euro area cross-border holdings of securities declined from around 30% at the beginning of 2009 to less than 24% in the third quarter of 2012. It has picked up to around 26% since then. The bottoming out occurred around mid-2012, when the ECB announced the Outright Monetary Transactions programme and the agreement to create the banking union was reached. This u-shaped pattern is characteristic of most other quantity-based indicators of euro area financial integration on an aggregate/composite level, including those constructed from other data sources such as the Financial Integration Composites (or FINTEC indicators) presented in ECB (2016).

Chart 2

Share of euro area cross-border holdings by instrument type



Sources: ECB (SHSS, SHES, and EAA) and authors' calculations.
Notes: In Panel A, the average weight of the sub-indicators in the composite indicator is shown in brackets. The shaded area indicates the period based on SHES data before Q4 2013. See Section 2.2 for more details about the dataset used.

The two other indicators in Panel A of Chart 2 measure the level of financial integration in the markets for debt securities and equities respectively. The differences in the indicators for these two categories of security highlight the differences between the two markets. First, the level of financial integration for debt securities (mostly over 30%) is more than 10 percentage points higher than that for equities over the whole period. Similarly, the gap between the indicator and the corresponding theoretical benchmark is also higher for the equity market than for the

debt securities market.[14] Second, the u-shaped pattern is not characteristic of the equity market. Instead, the equity indicator remains flat until around mid-2012 when it starts to increase.

Panel B of Chart 2 reveals that the factors contributing to changes in the composite indicator vary over time. The decline between 2009 and mid-2012 can be mostly attributed to the decline in cross-border holdings of debt securities, whereas the subsequent increase in cross-border holdings is mainly due to increasing integration in the equity market.

The development of indicators that distinguish between different types of securities is important from an economic point of view, since cross-border holdings of debt and equity are not directly substitutable. For instance, the literature on the benefits and costs of financial globalisation suggests that the composition of capital flows matters for the 'quality' of financial integration (see Kose et al., 2009, and Special Feature A of ECB, 2016, for more details). In particular, cross-border equity flows are considered to be more stable and less prone to sudden stops than debt flows. Debt flows appear to be more volatile and generate the greatest risks from financial openness, especially if they are of short maturity (see e.g. Bekaert et al., 2001; Stiglitz, 2000; Wei, 2006). One reason for the more volatile nature of cross-border debt flows is that debt financing is provided for a limited period only and thus imposes roll-over risk for the borrower. Roll-over risk is therefore negatively related to maturity, i.e. the shorter the maturity, the higher the risk. On the other hand, foreign direct investment (FDI) – which represents a part of cross-border debt securities and equity holdings in SHSS data – is undertaken by foreign firms for control purposes and tends to be motivated by long-term strategic decisions.[15] Moreover, FDI is also considered to bring more benefits to the host country than other types of financial flows. Not only does FDI ease financing conditions in the host country, it can also raise firm productivity through transfer of technology and managerial expertise (see, for example, Javorcik, 2004).

This suggests that the euro area securities market may have shifted towards a more resilient type of financial integration after the crisis. In particular, although the overall level of financial integration at the end of 2015 remains below that observed in 2009, the financial integration at the end of 2015 may be of better 'quality' than that in 2009.

---

[14] At the end of 2015, the theoretical benchmarks for debt securities and equity markets equalled 67 % and 58 % respectively, while the actual values of the indicators were at 30 % and 19 % respectively. As a result, the financial integration gap (deficit) between the indicator and the corresponding theoretical benchmark accounted for around 37 percentage points in the debt securities market, which is somewhat above – but close to – half of the theoretical benchmark value. However, in the case of the equity market, the gap (at around 39 percentage points) is relatively larger as it corresponds to almost two thirds of the theoretical benchmark value.

[15] The IMF's sixth edition of "Balance of Payments and International Investment Position Manual" (see IMF, 2008) defines in paragraph 6.8 direct investment as "cross-border investment associated with a resident in one economy having control or a significant degree of influence on the management of an enterprise that is resident in another economy". Such control or significant degree of influence is further detailed in paragraph 6.12 (a) and the definition is based on the share of the cross-border investor on the equity of the resident company. More precisely, those investments that entitle to 10 percent or more of the voting power will qualify under the direct investment functional category in balance of payments statistics.

4.2 SHSS indicators for the main holder and issuer sectors

The unique SHSS combination of information on both the holder and issuer side enables us to create SHSS indicators specific to each side. The six sectors considered in this paper are:

1. monetary financial institutions (MFIs);
2. other financial intermediaries and auxiliaries (OFIs);
3. insurance corporations and pension funds (ICPFs);
4. general government;
5. non-financial corporations (NFCs); and
6. households.[16]

The former three belong to the financial sectors, while the latter three are the non-financial sectors.

To be more precise, the MFI sector includes deposit-taking corporations except for the central bank and money market funds (MMFs).[17] For simplicity, we refer to this sector as the banking sector. The OFI sector includes non-MMF investment funds, financial vehicle corporations, captive financial institutions and money lenders, as well as other financial auxiliaries and financial intermediaries. Thus the OFI sector comprises all financial institutions other than banks, MMFs and ICPFs. We sometimes refer to this sector as the non-bank financial sector.[18] The activities of this sector by and large meet the Financial Stability Board's broad definition of 'shadow banking' (FSB, 2016). However, we do not use the term 'shadow banking' in this context since the sector includes entities such as special financial institutions and holding companies, which may not engage in shadow banking activities (see Doyle et al., 2016).

4.2.1 Main holder sectors

Chart 3 presents the SHSS indicators for the financial and non-financial holder sectors, while also distinguishing between the debt securities and equity markets. In both markets, euro area financials hold much more cross-border securities than non-financials. The difference is particularly pronounced in the equity market, in

16 The sector breakdowns available in SHSS data are even more granular and follow the European System of Accounts (ESA) 2010 standard (see EU Regulation No 549/2013 of 21 May 2013 on the European system of national and regional accounts in the European Union). More detailed information can be found in Regulation ECB/2012/24 as amended by Regulation ECB/2015/18.

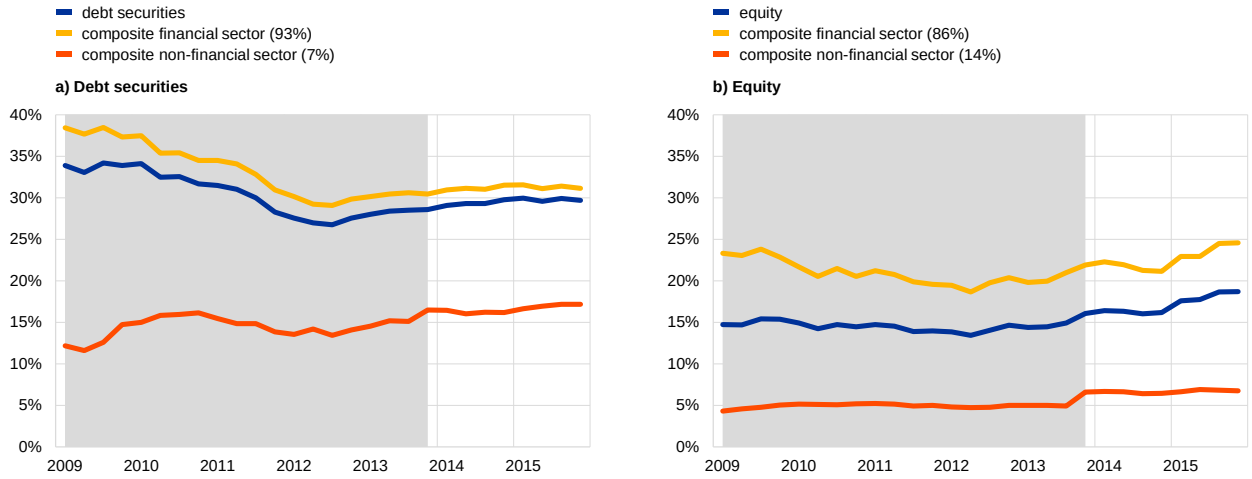
17 Financial instruments issued by money market funds fall under the category of investment funds shares, which is not studied by this paper. Therefore, the inclusion of money market funds in the MFI sector is only relevant from the holder's point of view.

18 This term is also used in the ECB's Report on Financial Structures (ECB, 2016b), However, there is a minor difference between our paper and ECB (2016b). In our case the sector excludes MMFs, while MMFs belong to this sector in ECB (2016b).

which only around 5% of securities held by non-financial sectors come from other euro area countries. In fact, euro area non-financials invest around 95% of their equity holdings either domestically (86%) or in non-euro area countries (9%).

Chart 3

Share of euro area cross-border holdings: financial v non-financial holder sector sub-indicators



Sources: ECB (SHSS, SHES and EAA) and authors' calculations.
Notes: The average weight of the sub-indicators in the composite indicator is shown in brackets. The shaded area indicates the period based on SHES data before Q4 2013. See Section 2.2 for more details about the dataset used.

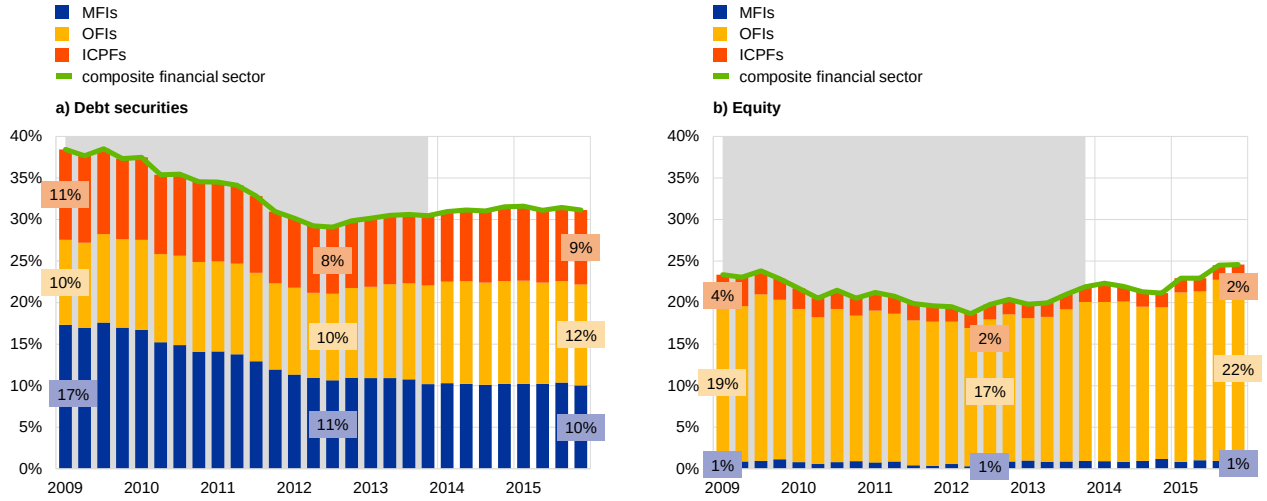
The role of the three financial sectors as cross-border investors greatly varies across the two main asset classes (Chart 4). In the debt market, all three sectors are similarly important, whereas cross-border equity holdings by the financial sector are clearly dominated by the OFI sector. Moreover, the relevance of the different sectors has been shifting over time: the OFI sector has been gaining it, while the banking sector has been losing it.

Chart 4 also clearly shows that the deterioration in the level of financial integration before mid-2012 in the debt market is not common to all financial sectors. Rather, it is mainly driven by the MFI sector, whose relative size as a cross-border investor in this market significantly decreased between 2009 and mid-2012. It has not recovered its position since then. Looking at the whole period, around 17% of debt securities held by all financial sectors were in the hands of MFIs in other euro area countries in 2009, compared to only 10% in 2015.

On the other hand, Chart 4 shows that the upward trend in financial integration observed since mid-2012 can be mainly attributed to the OFI sector, which has gradually become the largest cross-border investor in the debt market. The role of the OFI sector as a cross-border investor in the equity market has also been growing since mid-2012.

Chart 4

Share of euro area cross-border holdings by financial holder sector: individual contributions



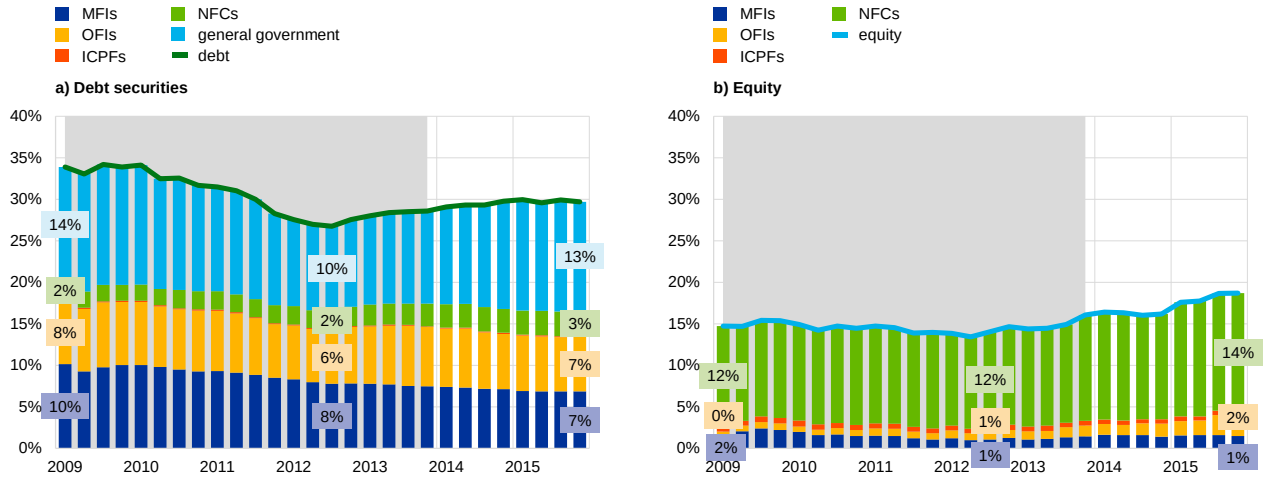
Sources: ECB (SHSS, SHES, and EAA) and authors' calculations.
Notes: The shaded area indicates the period based on SHES data before Q4 2013. See Section 2.2 for more details about the dataset used.

4.2.2 Main issuer sectors

From the issuer perspective, financial integration in the debt market differs greatly from that of the equity market (Chart 5). The lion's share of cross-border equity holdings are issued by NFCs. Equities issued by MFIs and OFIs are also held cross-border, but to a much lesser extent. Nevertheless, cross-border holdings of equity issued by OFIs have been increasing since 2009, albeit from a very low level.

Chart 5

Share of euro area cross-border holdings by issuer sector: individual contributions



Sources: ECB (SHSS, SHES, and EAA) and authors' calculations.
Notes: The shaded area indicates the period based on SHES data before Q4 2013. See Section 2.2 for more details about the dataset used. In panels A and B, ICPFs' contributions are respectively at around 0% and 1% over the whole period (the labels are omitted to make the charts more easy to read).

In the debt market, the contributions of each issuer sector are somewhat more equally distributed, but they have changed more over time. General government is the largest issuer of debt securities held cross-border, but its contribution significantly decreased between 2009 (14%) and mid-2012 (10%), when the sovereign debt crisis peaked. The second main change relates to the decreasing significance of the banking sector. It was the second largest issuer sector of securities held cross-border in 2009 (with a contribution of around 10%), but this contribution gradually decreased to around 7% in 2015. Hence, at the end of the period, its relevance as an issuer of debt securities held cross-border is comparable to that of the OFI sector, whose contribution remained stable (between 6-8%) over the whole period.

4.3 Robustness checks: a comparison with other data sources

Traditionally, aggregate data sources have been used to build quantity-based indicators of financial integration. However, the number of such indicators is limited by the level of detail (number of breakdowns) available in the aggregate data. In some cases several data sources have to be combined to derive the indicators. For instance, to derive a quantity-based indicator of financial integration for the euro area economy as a whole, it is necessary to combine EAA (which contains information on the sectoral links within the euro area) and b.o.p. data (the b.o.p. contains information on cross-border links). As for quantity-based indicators of financial integration for individual financial sectors, these can be obtained from balance-sheet data for the individual euro area sectors such as the ECB's monetary financial institutions' (MFIs') balance-sheet items (BSI), investment funds (IVF) statistics, and insurance corporations and pension funds (ICPF) statistics. However, due to the differences in how these datasets are compiled, the resulting indicators are not comparable across the different sectors.

Although they are limited in number, the indicators from aggregate data sources can be used as a benchmark for the indicators presented in this paper. To do this, we run comparisons between the main SHSS indicators and selected quantity-based financial integration indicators available in the traditional toolkit of the ECB's financial integration report.[19] Given the various conceptual and measurement differences between the SHSS and the aggregate data sources, we do not expect an exact match. Nonetheless, if the SHSS and other indicators reveal broadly similar trends over time, we are confident that the new SHSS indicators are a valid tool for the measurement of financial integration.

We start with a comparison between the SHSS indicators for debt and equity markets (presented in Chart 2 and Chart 3) and their counterparts obtained from information in the b.o.p. and EAA statistics for the whole euro area economy (b.o.p./EAA indicators). The b.o.p./EAA indicator for debt securities (equity) is calculated as the ratio of (i) resident portfolio holdings of debt securities (equity)

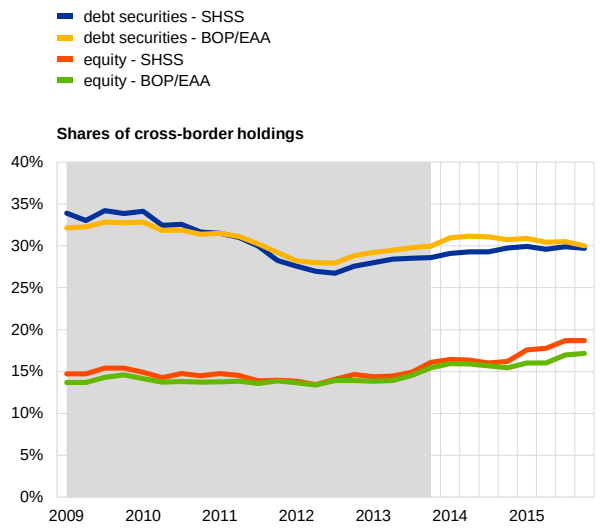
[19] See the Statistical Annex from ECB (2016b) for further details on their description.

issued by other euro area countries according to b.o.p. data in the nominator and (ii) total resident holdings of debt securities (equity) according to EAA data in the denominator. The combination of the two statistics in the design of this indicator is facilitated by the consistency of the underlying manuals used for the compilation of both statistics.[20]

Chart 6

Comparison of SHSS and b.o.p./EAA indicators of financial integration

(percentages of total euro area holdings)



Sources: ECB (SHSS, SHES, EAA and b.o.p.) and authors' calculations.
Notes: The shaded area indicates the period based on SHES data before Q4 2013. See Section 2.2 for more details about the dataset used to construct SHSS indicators.

From a conceptual point of view, the comparison of SHSS and b.o.p./EAA indicators is expected to provide relatively consistent results because b.o.p. portfolio investment collection systems mostly use security-by-security information. In other words, the security-by-security information in the SHS is also used as the primary data source for the aggregate information available in b.o.p.[21] In addition to this, the SHSS coverage of EAA for both debt and equity is close to 90% (see Table 1), which suggests that the difference in the denominator is relatively limited.

The results show that the SHSS and b.o.p./EAA indicators for both debt securities and equity follow a very similar pattern. Both the percentage levels and their development over time differ only marginally (Chart 6). The minor discrepancies in these indicators could be explained by differences in the coverage of the SHSS as compared to the b.o.p. and EAA data. First of all, the SHSS includes both portfolio and direct investment holdings, while the b.o.p. aggregates refer to portfolio holdings only.[22] In addition, unlisted shares and other equity are covered by the b.o.p. equity indicator but not by the SHSS equity indicator. Second, the lack of Eurosystem holdings in the SHSS affects the coverage of the denominator of the indicators as compared to EAA data, which include these holdings. This is mainly relevant for the debt indicator. In the case of the equity indicator, the gap observed in the denominator is mainly explained by the lower coverage of holdings by NFCs in SHSS as compared to in the EAA data. Other differences in coverage also stem from the fact that few euro area countries report securities without an ISIN to SHSS, while holdings of those securities are likely to be included in the b.o.p. and EAA aggregates. Finally, other discrepancies can arise due to several other factors such as differences in vintages, different coverage of selected sectors (e.g. ICPFs or some sub-sectors of the OFIs aggregate) or grossing-up procedures applied by some countries in the b.o.p. and EAA domains.

20 The latest update of European System of accounts (ESA 2010) is used for the compilation of the EAA, while the sixth edition of the IMF Balance of Payments and International Investment Position Manual (BPM6) is used for the b.o.p.

21 See Guideline ECB/2011/23 on external statistics. In particular, Annex VI of the Guideline defines that stocks of securities reported to the national compiler on an aggregate basis, i.e. not using standard (ISIN or similar) codes, should not exceed 15 % of the total portfolio investment stocks of assets or liabilities.

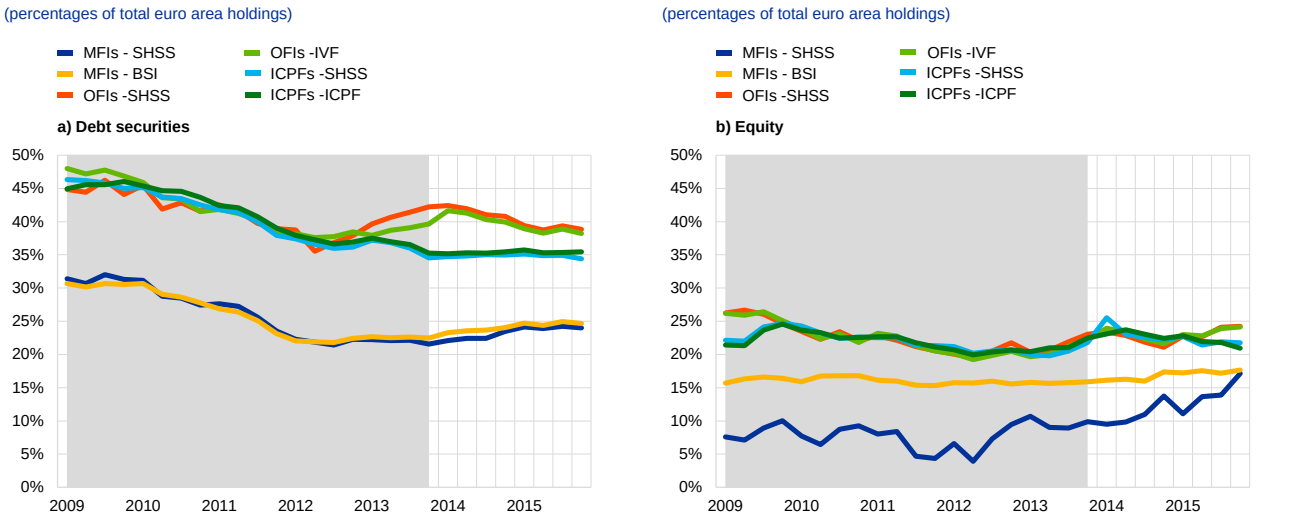
22 BOP statistics provides aggregate information on direct investment. However, this figure does not include only securities holdings but also other items, particularly loans.

SHSS sub-indicators for the holder sectors can be compared to those obtained from aggregate balance-sheet statistics for the individual financial sectors (i.e. MFIs' BSI, IVF and ICPF balance-sheet data; see also Section 2.2). However, the comparisons cannot be run for holdings by non-financial sectors, since no specific statistics are available for these sectors.[23]

In the case of debt securities, the results suggest that the indicators are highly consistent (Chart 7) despite the various differences between the SHSS and the individual balance-sheet statistics (e.g. differences on coverage and derogations, measurement, valuation or sector classifications). Equity indicators provide a very similar picture in the case of the OFI and ICPF holder sectors. However, the equity indicator results for MFIs reveal quite a significant gap, albeit one that is decreasing. The gap can be mainly explained by the conceptual difference in the type of equity covered: the BSI indicator includes listed and unlisted shares, other equity, and non-money market funds (non-MMFs) investment fund shares. The SHSS indicator only covers listed shares.[24] In addition, partial SHSS coverage of securities without an ISIN and valuation differences (book values in BSI statistics versus market values in SHSS) are other factors that may further contribute to the differences observed.

Chart 7

Comparison of SHSS sub-indicators for financial holder sectors with those from individual balance-sheet statistics



Sources: ECB (SHSS, SHES, BSI, IVF, ICPF and EAA) and authors' calculations.
Notes: The shaded area indicates the period based on SHES data before Q4 2013. See Section 2.2 for more details about the dataset used to construct SHSS indicators.

To summarise, the results presented in this section confirm from a time-series perspective our initial finding (see Fache Rousová, L. and Rodríguez Caloca, A., 2015) that SHSS data allow us to replicate the traditional toolkit of quantity-based financial integration indicators using only one single data collection. In particular, the results suggest that the SHSS indicators are broadly consistent with those available

23 These sectors are included in the EAA data but intra-euro area cross-border holdings information is not publicly available.

24 According to EAA data, the share of holdings of unlisted shares, other equity and non-MMF investment fund holdings in total euro area equity and non-MMF holdings is around 82 % (based on 2015 Q4 data).

from other data sources. This consistency holds both across time and for the different financial holder sectors considered. The only exception is one sub-indicator for equity holdings, but in this case the discrepancy can be explained by the conceptual differences in the underlying data sources. Moreover, not only do SHSS quantity-based financial integration indicators benefit from a fully comparable framework within one single data collection, they also allow us to extend the analysis to any sector (whether holder or issuer), thus covering for the very first time the different non-financial sectors.

In addition, this enhanced scope of the SHSS dataset also makes it possible to further 'drill down' to the individual security level. The box included in this document presents some evidence on the main characteristics of cross-border holdings obtained from such a granular micro-data perspective.

Box 1

Euro area securities traded cross-border: micro evidence

This box discusses the main characteristics of individual euro area securities that are traded cross-border within the euro area.[25] In line with the rest of our paper, we make a distinction between debt securities on the one hand and listed shares on the other.[26] However, this box covers only the data from the fourth quarter of 2013 to the fourth quarter of 2015, i.e. those collected under the SHS Regulation, because the adjustments of SHES data performed at the macro level cannot be replicated in the micro (security-by-security) dataset. The box is based on descriptive statistics only. A more in-depth analysis of what determines whether a security is traded cross-border or not is left for further research.

A first key finding is that most debt securities are held either entirely domestically (53%) or entirely cross-border (27%), while most listed shares (83%) are held by both domestic and non-resident investors (Chart A, Panel A). However, the picture changes when considering the amounts held rather than the number of securities (Chart A, Panel B)[27]. This is because securities held fully domestically or fully cross-border tend to be associated with relatively small holding amounts. They respectively represent 19% and 5% of total euro area holdings of debt securities and are negligible in total euro area holdings of listed shares. As a result, securities partially held by non-domestic investors record the highest share in terms of holding amounts.[28]

25 Some caution is warranted here as (i) Eurosystem holdings are not included in the SHSS database and (ii) non-euro area holdings are not considered. The exclusion of these holdings may lead to an underestimation of cross-border holdings, but such an underestimation is likely to be rather limited as most euro area securities that are held by non-euro area investors or the Eurosystem are also held by non-domestic euro area investors.

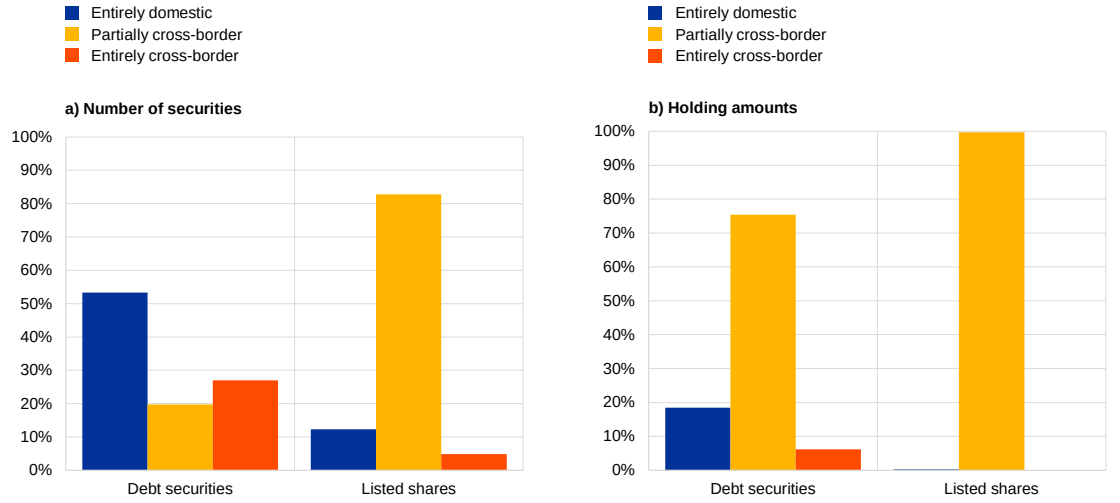
26 Moreover, securities classified in the CSDB as certificates are excluded because the classification of certificates is a borderline case between debt securities and equities.

27 The results are presented for holdings in market values. However, similar results are also obtained when using nominal amounts of debt securities.

28 When considering securities partially held by non-domestic investors, the value of domestic holdings is larger than that of cross-border holdings. This holds true for both debt securities and listed shares.

Chart A

Distribution of domestic v cross-border holdings



Sources: ECB (SHSS) and ECB calculations.
Note: Calculations based on average market value of holdings of debt securities and listed shares from Q4 2013 to Q4 2015.

One significant difference between debt securities and listed shares that are held cross-border concerns the number of companies/entities issuing securities. Specifically, the number of companies with debt that is held cross-border is almost 60% higher (around 6,000 companies) than the number of companies whose listed shares are held cross-border (around 3,700 companies). Another difference is the value of the holdings: for securities held cross-border, the average value held cross-border per security is eight times larger for listed shares (EUR 0.8 billion) than for debt securities (EUR 0.1 billion). This suggests that cross-border equity markets are dominated by just a few and potentially large companies that issue larger amounts, whereas the issuance of debt securities in the euro area cross-border market is less concentrated. In addition, an analysis by issuer sector points to the higher propensity of debt securities being held cross-border if those securities are issued by the non-financial sector, particularly by sovereigns. This finding is in line with Portes et al. (2001), which argues that long-term bonds, and in particular government bonds, are more likely to attract international investors as they are relatively homogeneous products and thus less information-intensive than listed shares.

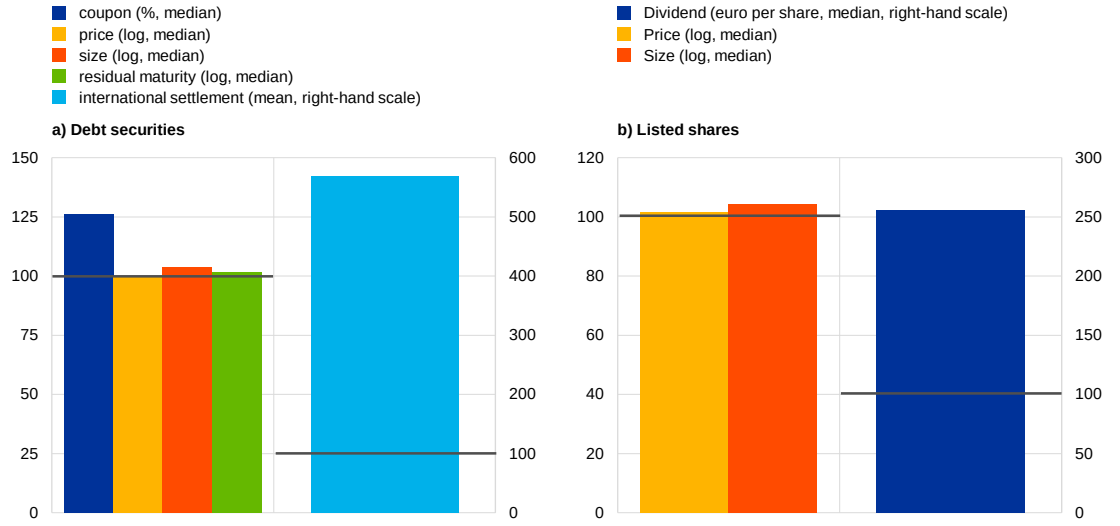
To shed more light on the intrinsic characteristic of the securities held cross-border, we consider the following variables: size, market price, yield (dividend for listed shares and coupon for debt securities), residual maturity, price, rating and whether a security is internationally settled or not (the latter three variables refer only to debt securities)[29]. These variables are proxies for the different types of financial risks such as liquidity risk (size), credit risk (ratings) and market risk (maturity, price, yield), as well as the effect of international financial infrastructure (international settlement indicator).

[29] Size is proxied by euro area holding amounts in market values. Coupon refers to the last coupon paid, dividend refers to the last dividend paid, and ratings are taken from the ECB ratings database. The dummy for an international settlement equals one if a debt security was issued in Euroclear (i.e. in an international central securities depository – ICSD) and 0 otherwise.

Chart B

Characteristics of partially/entirely cross-border traded securities compared with those of securities held entirely domestically

(100 base = mean/median of a given characteristic for securities held only domestically)



Sources: ECB (SHSS) and ECB calculations.
Notes: For instance, the coupon of partially/entirely cross-border long-term debt securities is around 25% higher than that of those securities that are held only domestically. The differences between the means/medians for the two groups of securities (entirely domestic and entirely/partly cross-border) of all characteristics with the exception of price of debt securities are statistically significant at the 1% level according to two-sample t-test. Calculations based on average holdings of debt securities and listed shares from Q4 2013 to Q4 2015 at market values.

The summary statistics in Chart B suggest that selected security-specific characteristics indeed play a role in whether or not a security is held cross-border. First of all, the dividend and coupon are significantly higher for securities held cross-border than for those held domestically, which suggests that higher-yielding securities are attractive to foreign investors. The difference is particularly pronounced for listed shares, for which the dividend, on average, is almost three times higher for securities held cross-border than for those held domestically. A second key factor that determines whether a security will be held cross-border is if – in the case of debt securities – it is settled through an ICSD. Third, the results also confirm the importance of the size of a security (i.e. the size is larger for securities traded cross-border). Fourth, residual maturity also plays a role as it is found to be significantly larger for securities held cross-border than for those held domestically. While significant, the relative differences in size and residual maturity are relatively small. Fifth, the price of listed shares plays a role in determining whether the shares will be traded cross-border. Listed shares that are traded cross-border tend to have significantly higher market prices than listed shares held domestically. However, just as was the case with size and relative maturity, the difference in market price between securities held domestically and those held cross-border is relatively small. Finally, we do not find a significant difference between the price of debt securities traded cross-border and those traded only domestically.

Focusing on debt securities, Chart C shows the distribution of domestic and cross-border holdings of securities by rating. The result suggests that international investors invest proportionally more in debt securities that have been rated in general and which have been highly rated in particular. Specifically, the share of non-rated securities is at around 44% for securities held by domestic investors only, while this share decreases to around 12% if the securities are held cross-border. The share of securities with the highest credit quality (credit quality step 1) reaches 41% for securities

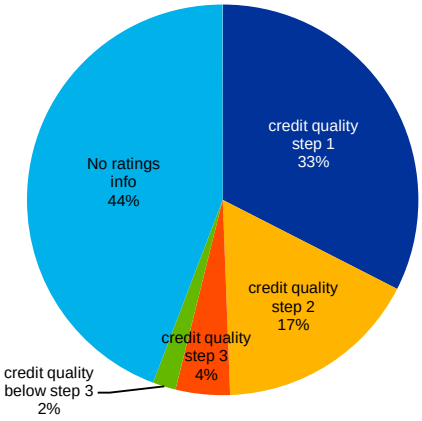
held cross-border, whereas the share is at around 33% for securities held by domestic investors only.

Chart C

Ratings distribution: domestic v cross-border securities

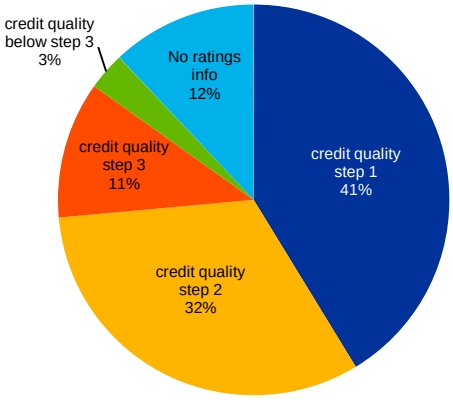
(holdings amounts in market values (percentage of total))

a) Debt securities held only by domestic investors



(holdings amounts in market values (percentage of total))

b) Debt securities held cross-border



Sources: ECB (SHSS and ECB's ratings database) and ECB calculations.
Notes: Based on holdings of debt securities from Q4 2013 to Q4 2015. Credit quality steps are defined in accordance with the Eurosystem credit assessment framework, which provides a harmonised rating scale classifying ratings into three credit quality steps. The first step includes securities rated from AAA to AA-, the second from A+ to A-, and the third from BBB+ to BBB-. In addition, the fourth and fifth categories include respectively all rated securities with a rating below credit quality step three and those securities, for which rating information is not available.

5 Main drivers of changes in financial integration since the financial crisis

The SHSS sector indicators in the previous section identified two key developments in euro area cross-border holdings since the financial crisis. First, there has been a gradual shift between the roles of two sectors: the contribution of the MFI sector to cross-border holdings has declined, whereas that of the OFI sector has grown. Second, there has been a decrease in cross-border holdings of government debt. These two trends drove much of the overall deterioration in financial integration observed in the debt market between 2009 and mid-2012. Therefore, we focus on these two developments in the following sub-sections.

5.1 The growing role of the OFI sector

Recent literature pointed out the growing size of the non-bank financial sector (the OFI sector) in terms of total assets. This has been accompanied by a decline in the activity of the regulated banking sector (e.g. Beck and Kotz, 2016; ECB, 2017). This trend has occurred against the backdrop of a low-yield environment and more stringent regulatory and supervisory rules imposed on the banking sector in the aftermath of the global financial crisis. In particular, tighter regulation of the traditional banking sector is said to have created a "boundary problem" (see Goodhart, 2008) whereby activities have shifted from the regulated to the less-regulated parts of the financial system (Doyle et al., 2016).

SHSS indicators in Chart 4 and Chart 5 confirm that the growing role of the OFI sector can also be observed in cross-border securities investment within the euro area. Moreover, the trend is relatively widespread as it applies to both debt and equity markets. At the same time, it is particularly pronounced from the investor (holder) perspective.

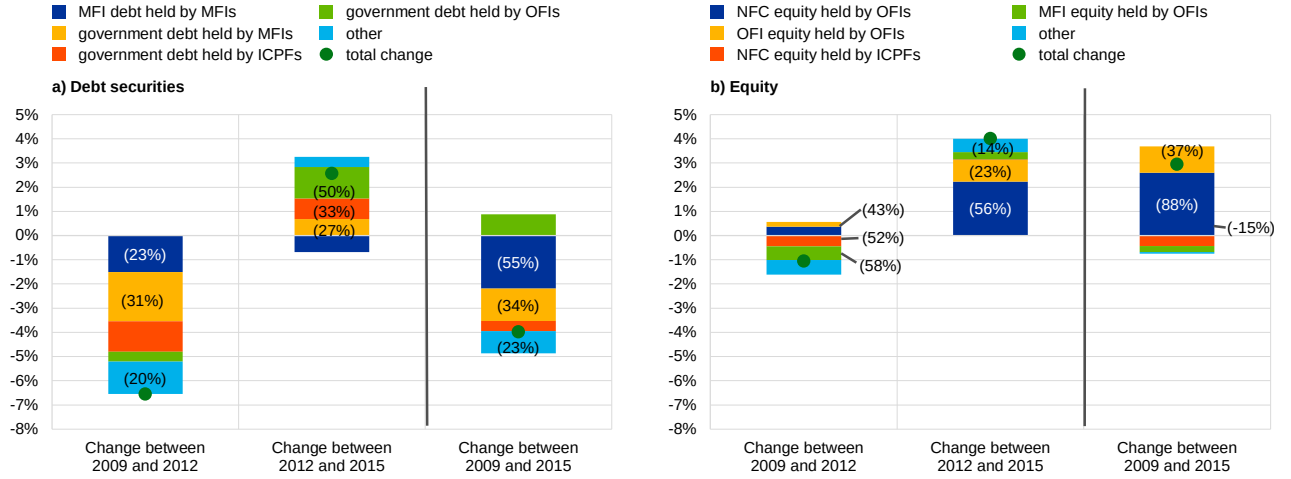
To get a better understanding of the trends since the financial crisis, we distinguish the different issuer-sector/holder-sector pairs and identify the complete structure of cross-border links between the different sectors. Chart 8 provides a breakdown of how the individual sector pairs contributed to the changes in financial integration.

Focusing on the period between 2009 and 2012, the changes in the government debt market can explain more than 55% of the overall deterioration in cross-border holdings observed in the debt securities market. The retrenchment of banks is the most significant contributor to this change (31%), followed by ICPFs (19%), whereas the contribution of the OFI sector is rather limited (6%). In addition to government debt flight, an important driver of the overall deterioration was the banking sector significantly decreasing its holdings of securities issued by banks in other euro area countries (contribution of 23%).

The changes in cross-border equity holdings between 2009 and 2012 were rather minor. Still, it is notable that cross-border investment by the OFI sector in equity issued by NFCs and other OFIs increased during this early period, when financial integration in all other segments deteriorated.

Chart 8

Change in euro area cross-border holdings between 2009 and 2015: individual contributions



Sources: ECB (SHSS, SHES and EAA) and authors' calculations.
Notes: The contributions are weighted using the share in the holding amounts of the composite indicator. The three largest weights by period and instrument type are shown in brackets. The 'Other' category includes all the remaining holder-issuer pairs (to make the chart easily readable, they are not shown individually). See Section 2.2 for more details about the dataset used.

In the period from 2012 to 2015, cross-border investment in government debt recovered to some extent, re-attracting all types of financial investors. Cross-border investment in debt securities by the OFI sector strengthened the most and contributed to this positive development by around 50% in the period. On the other hand, further deterioration in cross-border holdings of MFI debt securities by MFIs in other countries weighed on the recovery in cross-border investment.

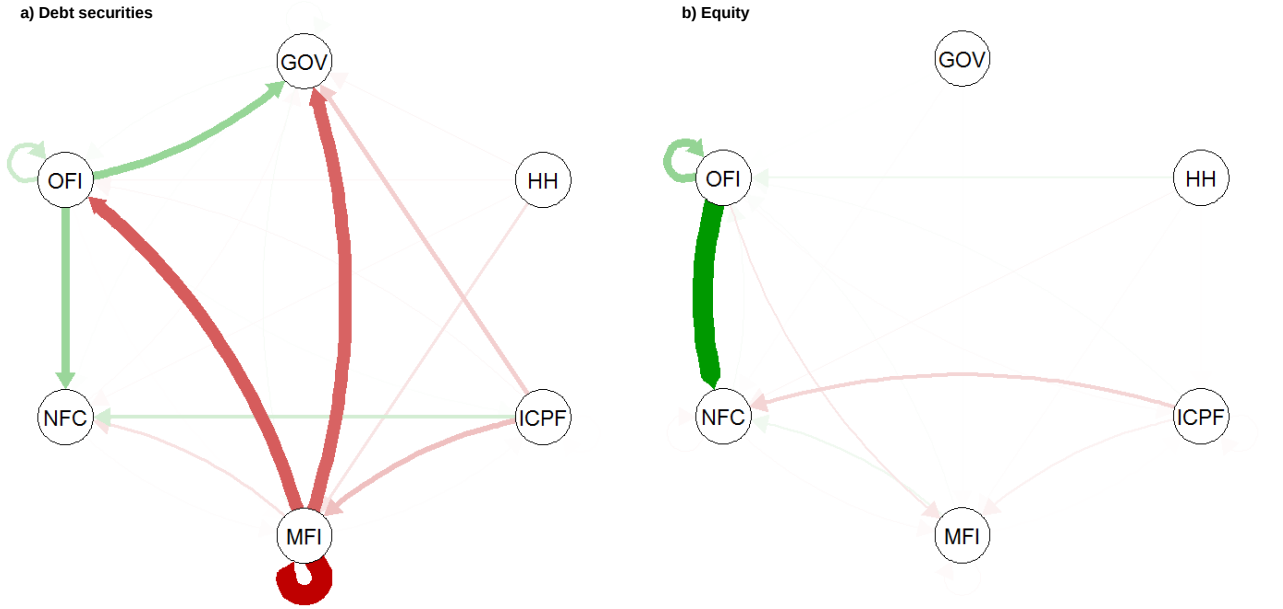
The increasing level of financial integration in the equity market observed between 2012 and 2015 was – again – to a large extent (by close to 80%) driven by the OFI sector, which invested in shares issued by NFCs (contribution of 56%) and by OFIs in other euro area countries (contribution of 23%).

Finally, looking at the full period from 2009 to 2015 (Chart 8 and Chart 9), we can conclude that the deterioration in the level of financial integration in the debt market was mainly due to less cross-border investment from banks in securities issued by both banks (55%) and governments (34%) in other euro area countries (see contribution in Panel A of Chart 8 and the dominant red arrows in Chart 9). On the other hand, the OFI sector was the main driver of the increase in financial integration in the equity market. To some extent, this increase offset the overall deterioration in the debt market. In particular, the main development in the equity market from 2009 to 2015 was that the OFI sector significantly increased its cross-border holdings of NFC equity (contribution of 88% in Panel B of Chart 8 and the dominant green arrow in Panel B of Chart 9).

These results suggest that between 2009 and 2015 the cross-border investment activity of banks in certain market segments, notably in government debt, was substituted to some extent by the cross-border investment activity of other non-bank financial entities. However, there is no evidence for a similar substitution effect in the case of debt securities issued by banks, as the significant decrease in cross-border MFI-to-MFI investment was not offset by an increase in cross-border investment from OFIs. Instead, cross-border investment by OFIs in debt securities of banks remained broadly unchanged over the observed period.

Chart 9

Change in euro area cross-border securities holdings between 2009 and 2015: network presentation



Sources: ECB (SHSS, SHES and EAA) and authors' calculations.
Note: Green (red) colours indicate increase (decrease) in cross-border holdings between 2009 and 2015. The thickness of the lines is proportionate to the relative contribution to the change in cross-border securities holdings between 2009 and 2015. The arrows indicate the direction of the investment. For instance, an increase in holdings by the OFI sector of equity issued by the NFC sector is displayed as a green arrow from the OFI sector to the NFC sector in Panel B. See Section 2.2 for more details about the dataset used.

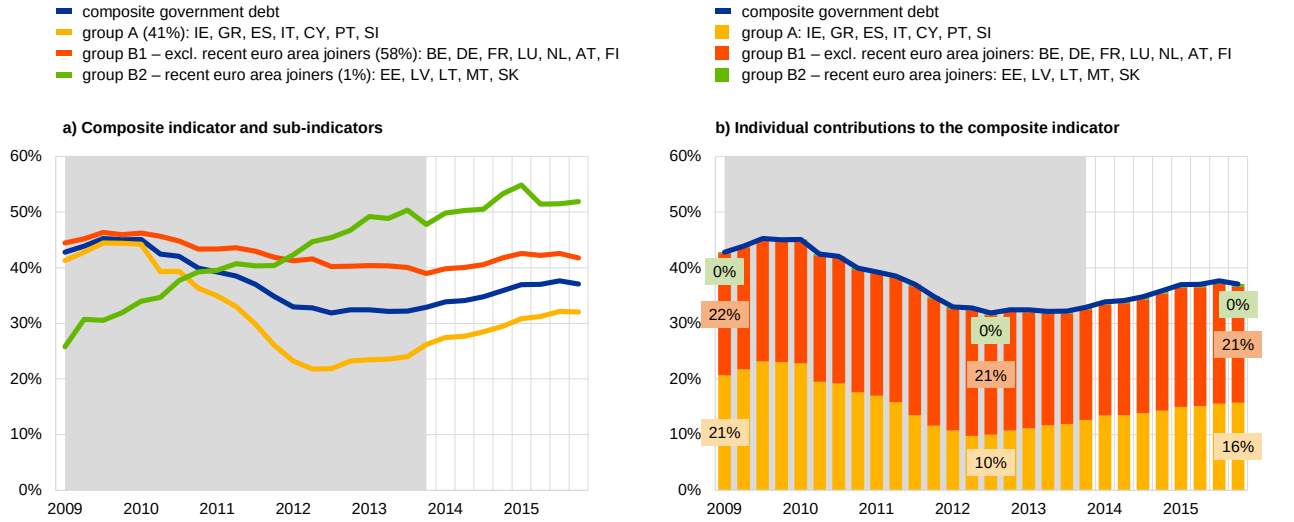
5.2 Developments in the government debt market

To better understand the developments in the government debt market, this section focuses on what drives investors to invest cross-border. These drivers include the creditworthiness of a country and whether a country recently joined the euro area or not. Our analysis starts by splitting the euro area countries into three different groups. The first group (group A) includes countries that experienced significant rating downgrades of their sovereign debt between the end of 2008 and 2015 (i.e. countries whose creditworthiness significantly deteriorated and which are thus

expected to have experienced capital flight).[30] The second group comprises countries that did not experience any significant rating downgrades, and which joined the euro area before 2008 (Group B1). The third group comprises countries that did not experience any significant rating downgrades, and which joined the euro area after 2008 (Group B2).

Chart 10

Share of cross-border holdings of government debt by issuer countries



Sources: ECB (SHSS, SHES, ratings database and EAA), and authors' calculations.
Notes: In Panel A, the average weight of the sub-indicators in the composite indicator is shown in brackets. The shaded area indicates the period based on SHES data before Q4 2013. See Section 2.2 for more details about the dataset used. The break in the third quarter of 2013 observed in Panel A for Group B2 mainly reflects the inclusion of data reported by Malta since that period.

The SHSS indicators for the three country groups show very different developments (Chart 10). The level of financial integration for 'downgraded' countries significantly deteriorated before mid-2012 (decreasing from around 42% in 2009 to around half this level in mid-2012). The level of financial integration has picked up somewhat since then (to more than 30%). On the other hand, the SHSS indicator shows much greater stability for the 'old' euro area countries that did not experience any significant rating downgrades. For these countries, the average percentage of their government debt held cross-border stayed at levels between 40% and 50% throughout the period. Hence, the partial recovery in the level of financial integration of euro area sovereign debt observed since mid-2012 has been driven by the improvement for the 'downgraded' countries, while the contribution of the 'old non-downgraded' countries slightly decreased during that period (Panel B).

In addition, the level of euro area financial integration of recent euro area joiners (Group B2) has been steadily increasing since 2009, following their accession to the monetary union. The countries in this group are small and thus contribute only marginally to the overall change (contribution of around 1%). Nevertheless, the result

[30] In line with ECB (2016), a significant deterioration in credit rating is defined as a downgrade by two or more credit quality steps on the Eurosystem's harmonised ratings scale (Eurosystem credit assessment framework, or ECAF) between the end of 2008 and the end of 2015 according to at least one of the three credit rating agencies that cover all euro area sovereigns. Any rating below the first three credit quality steps of the harmonised scale is allocated to a generic 'fourth' credit quality step.

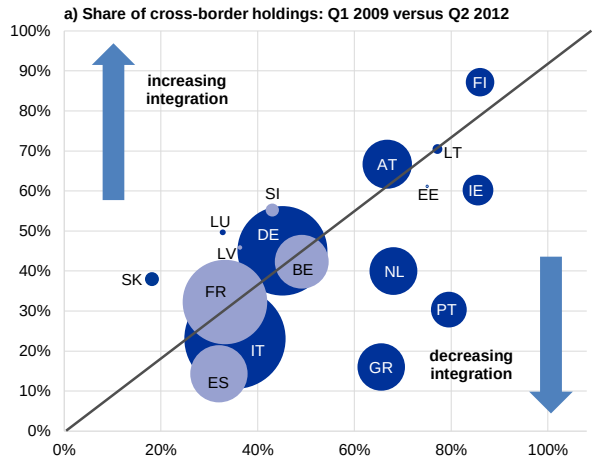
suggests that this group significantly benefited from euro area accession by attracting capital inflows from the rest of the euro area. Given the relatively large weight of Slovakian sovereign debt in this group (around 70%), changes in the indicator are – to a large extent – driven by holdings of this sovereign. However, the indicators for the other sovereigns in the group (with the exception of Lithuania) have also been increasing as cross-border investors have been buying the sovereign debt of these countries.

The richness of the SHSS data allows us to conduct a deeper analysis and distinguish the changes in the SHSS indicators for debt issued by the individual euro area countries. We present these indicators in Chart 11. The size of the circle is proportional to the average weight of each country in the composite indicator for government debt securities over the observed period.

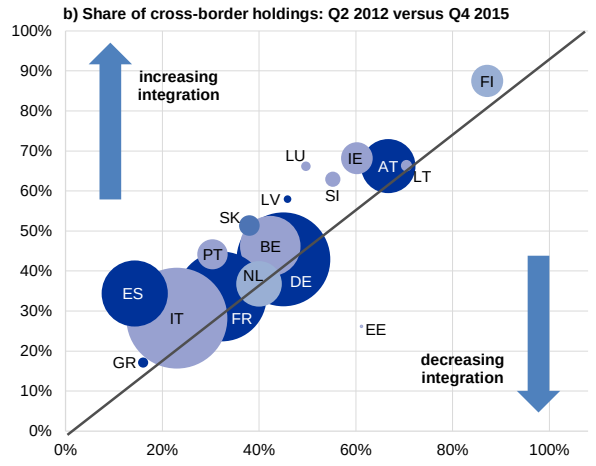
Chart 11

Changes in cross-border holdings of government debt by issuer country

(x-axis: first quarter of 2009, y-axis: second quarter of 2012)



(x-axis: second quarter of 2012, y-axis: fourth quarter of 2015)



Sources: ECB (SHSS, SHES and EAA) and authors' calculations.
Notes: For instance, the cross-border share of government debt issued by PT shifted from around 80% in Q1 2009 to 30% in Q2 2012. Data for IE in Q1 2009 is replaced by data referring to Q4 2009, owing to the low coverage of IE domestic holdings in Q1 2009. Data for EE in Q1 2009 is replaced by data referring to Q1 2010. CY and MT are excluded from the chart due to limited availability. See Section 2.2 for more details about the dataset used.

The direction and extent of the changes between the first quarter of 2009 and the first quarter of 2012 (Panel A) differ from country to country, highlighting the divergence within the euro area. Some countries such as Greece and Portugal experienced significant drops in cross-border holdings over this period, whereas the levels of some other countries such as Slovakia and Finland increased. On the other hand, the developments between 2012 and 2015 (Panel B) are much more homogeneous across countries, as the financial integration levels increased for nearly all countries over this period.

6 Conclusions

This paper introduces new quantity-based indicators built from securities holdings statistics by sector (SHSS) data and illustrates their usefulness in monitoring euro area financial integration. The high granularity of the data makes it possible to disentangle the level of integration in various securities market segments. It also makes it possible to detect the underlying drivers of changes in the level of integration. There are three main results that emerged from our study.

First, we provide evidence that the debt securities market is much more integrated overall than the equity market. However, we also find that the share of euro area cross-border holdings of equity has been the main driving force behind the (partial) recovery in financial integration since mid-2012. Since equity cross-border holdings tend to be less prone to sudden stops of capital flows, this evidence suggests that the euro area securities market may have shifted towards a more resilient type of financial integration after the crisis. It thus implies that the type of financial integration in existence at the end of 2015 may be of better 'quality' than that in 2009.

Despite this improvement in 'quality' of financial integration brought about by increased cross-border holdings of equity, the share of euro area cross-border equity holdings at the end of 2015 remains more than 10 percentage points lower than the share of euro area cross-border holdings of debt securities. Furthermore, the gap between the values of the indicator and the theoretical benchmark is also higher for the equity market than for the debt securities market. These findings underline the importance of the European Commission's initiative for a capital markets union, and the emphasis placed by the Commission on the equity market.

Second, we noted a gradual and widespread shift in cross-border investment activity away from the banking sector and towards the non-bank financial sector. This shift coincides with the low-yield environment and more stringent supervisory rules imposed on banks since the global financial crisis.

Euro area banks also significantly decreased their investment in debt securities issued by banks in other euro area countries. This explains around 55% of the overall deterioration in financial integration in the debt market observed since the financial crisis. However, there is no evidence that investment from other non-bank financial entities substituted for these foregone capital flows.

Finally, we find that the sharp decrease in financial integration between 2009 and 2012 was driven by more than 55% by investor flight from government debt securities. This investor flight was particularly pronounced for debt issued by those countries that were the most affected by the sovereign debt crisis and that experienced significant rating downgrades. This trend has since been reversed, and cross-border investment in government debt has recovered somewhat.

But the developments in financial integration vary greatly across euro area countries. For instance, the financial integration of sovereign debt issued by the recent euro

area joiners (i.e. Malta, Slovakia and the Baltic countries) with the rest of the euro area has been steadily increasing since 2009.

Despite the large number of the presented indicators, the overview we presented in this report is far from being comprehensive. However, the methodology we have used could be developed to conduct further analysis, in particular to build further, more granular indicators and sub-indicators. For instance, constructing indicators for securities belonging to a specific rating class would help obtain ‘cleaner’ indicators in terms of the riskiness of the assets, and would shed light on the role of credit risk for financial integration. It would also be interesting to analyse in more depth the gap between the actual values of the indicators and the corresponding theoretical benchmarks. Analysis that singles out market segments with the largest gaps (deficits) could help inform policy initiatives in the field of financial integration.

References

Adam, K., Jappelli, T., Menichini, A. M., Padula, M., and Pagano, M. (2002), 'Analyse, Compare, and Apply Alternative Indicators and Monitoring Methodologies to Measure the Evolution of Capital Market Integration in the European Union', report to the European Union.

Baele, L., Ferrando, A., Hördahl, P., Krylova, E., and Monnet, C. (2004), 'Measuring financial integration in the euro area', Occasional Paper Series, No 14, European Central Bank.

Bekaert, G., Harvey, C. R., and Lundblad, C. (2001), 'Emerging equity markets and economic development', Journal of Development Economics, Vol. 66(2), pp. 465-504.

Beck, G., and Kotz, H. (2016), 'Euro area shadow banking activities in a low-interest-rate environment: a flow-of-funds perspective', White Paper Series No 37, SAFE, February 2016.

Becker, T., Jeanne, O., Mauro, P., Ostry, J., and Ranciere, R., (2007), 'Country insurance: The role of domestic policies', IMF Occasional Paper No 243.

Bisschop, S. S., Boermans, M., and Frost, J. (2016), 'A shock to the system? Market illiquidity and concentrated holdings in European bond markets', DNB Occasional Studies 1401, Netherlands Central Bank.

Doyle, N., Hermans, L., Molitor, P., and Weistroffer, C. (2016), 'Shadow banking in the euro area: risks and vulnerabilities in the investment fund sector', Occasional Paper Series, No 174, ECB, June 2016.

Draghi, M. (2014), Financial Integration and Financial Union, speech at the conference for the 20th anniversary of the establishment of the European Monetary Institute, Brussels, 12 February 2014.

European Central Bank (2007), Financial integration in Europe 2007.

European Central Bank (2010), 'The Centralised Securities Database in brief'.

European Central Bank (2015), 'Who holds what? New information on securities holdings', *Economic Bulletin*, Issue 2.

European Central Bank (2016), Financial Integration in Europe 2016.

European Central Bank (2017), Report on financial structures 2017.

European Commission (2015), Action Plan on Building a Capital Markets Union.

Fache Rousová, L., and Rodríguez Caloca, A. (2015), 'The use of securities holdings statistics (SHS) for designing new euro area financial integration indicators', Bank for

International eds., Indicators to support monetary and financial stability analysis: data sources and statistical methodologies, vol. 39, Bank for International Settlements.

Felettigh, A., and Monti, P. (2008), 'How to interpret the CPIS data on the distribution of foreign portfolio assets in the presence of sizeable cross-border positions in mutual funds. Evidence for Italy and the main euro-area countries', *Occasional Paper Series*, No 16, Banca d'Italia.

Financial Stability Board (2016), 'Global Shadow Banking Report 2016'.

Goodhart, C. (2008), 'The boundary problem in financial regulation', National Institute Economic Review, Vol. 206, No 1, pp. 48-55.

Hüser, A.-C., Halaj, G., Kok, C., Perales, C., and von der Kraaij, A. (2017), 'The systemic implications of bail-in: a multi-layered network approach', Working papers, No 2010, European Central Bank.

International Monetary Fund (2008), 'Balance of Payments and International Investment Position Manual', Sixth Edition (BPM6).

Javorcik, B. S. (2004), 'Does Foreign Direct Investment Increase the Productivity of Domestic Firms? In Search of Spillovers through Backward Linkages', American Economic Review, Vol. 94, No 3 (June), pp. 605-27.

Koijen, R. S. J., Koulischer, F., Nguyen, B., and Yogo, M. (2016), 'Quantitative Easing in the Euro Area: The Dynamics of Risk Exposures and the Impact on Asset Prices', Working papers 601, Banque de France.

Kose, M. A., Prasad, E. S., Rogoff, K., and Wei, S.-J. (2009), 'Financial Globalization: A Reappraisal', IMF Staff Papers, Vol. 56(1), Palgrave Macmillan, pp. 8-62.

Portes, Richard, Hélène Rey and Yonghyup Oh (2001): 'Information and capital flows: The determinants of transactions in financial assets', European Economic Review, 45(4-6): 783-796.

Stiglitz, J., 2000, 'Capital Market Liberalization, Economic Growth, and Instability', World Development, Vol. 28, No 6, pp. 1075-86.

Wei, S.-J. (2006), 'Connecting two views on financial globalisation: Can we make further progress?', Journal of the Japanese and International Economies, Vol. 20 (4), pp. 459-481.

Abbreviations

Countries

BE	Belgium	**HR**	Croatia	**PL**	Poland
BG	Bulgaria	**IT**	Italy	**PT**	Portugal
CZ	Czech Republic	**CY**	Cyprus	**RO**	Romania
DK	Denmark	**LV**	Latvia	**SI**	Slovenia
DE	Germany	**LT**	Lithuania	**SK**	Slovakia
EE	Estonia	**LU**	Luxembourg	**FI**	Finland
IE	Ireland	**HU**	Hungary	**SE**	Sweden
GR	Greece	**MT**	Malta	**UK**	United Kingdom
ES	Spain	**NL**	Netherlands	**US**	United States
FR	France	**AT**	Austria		

In accordance with EU practice, the EU Member States are listed in this report using the alphabetical order of the country names in the national languages.

Others

b.o.p.	Balance of payments statistics
BSI	MFIs' balance-sheet items
CSDB	Centralised Securities Database
EAA	Euro area accounts
ECB	European Central Bank
ESCB	European System of Central Banks
FINTEC	Financial Integration Composites
FSB	Financial Stability Board
FVCs	Financial vehicle corporations
ICPF	Insurance corporations and pension funds statistics
ICPFs	Insurance corporations and pension funds
ISIN	International Securities Identification Number
IVF	Investment funds statistics
MFIs	Monetary financial institutions
MMFs	Money market funds
NFCs	Non-financial corporations
OFIs	Other financial intermediaries and auxiliaries
OMT	ECB's Outright Monetary Transactions
SEC	Securities issues statistics
SHES	Securities holdings experimental statistics
SHS	Securities holdings statistics
SHSS	SHS Sector data
OECD	Organisation for Economic Co-operation and Development
SSM	Single Supervisory Mechanism
TSCG	Treaty on Stability, Coordination and Governance in the Economic and Monetary Union

Acknowledgements

We would like to thank the following for comments received when writing this paper: Stefano Borgioli, Carmen Picón Aguilar, Carlos Sánchez Muñoz, Hansjakob Schlaich, Pierre Sola and the editorial board of the ECB Statistical Paper Series. In addition, we would like to thank the Statistics Department of Banco de España for providing us with detailed breakdowns on the Spanish national contribution to EAA.

Note

An earlier version of this paper was published as Special Feature D of Financial integration in Europe (ECB, April 2016).

Linda Fache Rousová

European Central Bank, Frankfurt am Main, Germany; email: linda.fache_rousova@ecb.europa.eu

Antonio Rodríguez Caloca

European Central Bank, Frankfurt am Main, Germany; email: antonio.rodriguez_caloca@ecb.europa.eu

© European Central Bank, 2018

Postal address	60640 Frankfurt am Main, Germany
Telephone	+49 69 1344 0
Website	www.ecb.europa.eu

All rights reserved. Any reproduction, publication and reprint in the form of a different publication, whether printed or produced electronically, in whole or in part, is permitted only with the explicit written authorisation of the ECB or the authors.

This paper can be downloaded without charge from www.ecb.europa.eu and from RePEc: Research Papers in Economics. Information on all of the papers published in the ECB Statistics Paper Series can be found on the ECB's website.

ISSN	2314-9248 (pdf)	DOI	10.2866/561114 (pdf)
ISBN	978-92-899-3357-5 (pdf)	EU catalogue No	QB-BF-18-002-EN-N (pdf)