**CONFERENCE ON STRENGTHENING SECTORAL POSITION AND FLOW DATA IN THE MACROECONOMIC ACCOUNTS**

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# The Compilation and the Analysis of Sectoral Financial Interlinkages in Austria

To be presented in Session 4 by Michael Andreasch



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# The compilation and the analysis of sectoral financial interlinkages in Austria[1]

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[1] The views expressed in this paper are those of the author and do not necessarily represent the position of the Oesterreichische Nationalbank. I am grateful to Michael Pfeiffer, Nicole Schnabl and Gerald Wimmer for their useful comments and suggestions.

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## 1. Introduction

The compilation of flow of funds (including balance sheets) thereafter called financial accounts in Austria is based on a "from-whom-to-whom" relationship between creditors and debtors for each individual financial instrument. The compilation in the form of a matrix has been designed in the wake of the introduction of the compilation of financial accounts affected by the implementation of the European System of National Accounts in 1996. The breakdown by sector and by financial instrument heavily depends on the available structure of the main primary sources such as banking statistics, security statistics, and balance of payments statistics. The compilation of financial accounts on a "from whom-to-whom" basis simultaneously allows the analysis of financial investment and financing of various sectors based on different financing channels and the indication of the importance of individual sectors acting both as creditor and debtor. Additionally the use of savings and the financing of borrowing requirements can be analysed against the background of the interlinkages of financial investors and debtors.

The rest of the paper is structured as follows: Section 2 elaborates the main sources and estimation procedures for the compilation of financial accounts on a "from-whom-to-whom" basis in Austria. Section 3 describes the structure of the matrix for the compilation of financial accounts including the benefits of this data model for the horizontal and vertical reconciliation. Section 4 is designated to show selected results based on the "from-whom-to-whom" relationship between the subsectors and sectors of the Austrian economy and their relationship with foreign creditors and debtors. Section 5 concludes by showing further steps for financial stability purposes such as the balance sheet approach designed by the IMF or balance sheet interlinkages analysed by the ECB. Finally the annex provides details on the publication of quarterly financial accounts on a "from-whom-to-whom basis" for Austria.

## 2. Data sources and estimation procedures for the compilation of financial accounts on a "from-whom-to-whom" basis

The European System of National Accounts (ESA 1995) is the main underlying concept both for the definitions and breakdowns of financial instruments and economic sectors. The following tables illustrate the main sources for the compilation of financial accounts.

| Households including NPISH (S.14+S.15) | Non-financial corporations (S.11) | General government (S.13) | Insurance corporations and pension funds (ICPFs) (S.125) | OFIs and financial auxiliaries (S.123+S.124) | Monetary financial institutions (MFIs) (S.121+S.122) | Rest of the world (S.2) | **Financial account (quarterly non-seasonal adjusted)** | |
|---|---|---|---|---|---|---|---|---|
| **Assets** | | | | | | | | |
| | | | | | BOP | | F.1 | Monetary Gold and SDR |
| O | O | O | ICPF | IF | BSI | R | F.21 | Currency |
| $BSI_{adj}$ / BOP | BSI / BOP | BSI = QFAGG | ICPF / BOP | IF / BSI / BOP | BSI / BOP | BOP | F.2M | Deposits |
| SHS | SHS | SHS = QFAGG | SHS | SHS | SHS / QFAGG | SHS = BOP / QFAGG | F.331 | Short-term debt securities |
| SHS | SHS | SHS = QFAGG | SHS | SHS | SHS / QFAGG | SHS = BOP / QFAGG | F.332 | Long-term debt securities |
| SHS | SHS | QFAGG | SHS | SHS | SHS | BOP / QFAGG | F.34 | Financial Derivatives |
| BOP | BOP | QFAGG | ICPF / BOP | IF / BOP | BSI / BOP | BOP | F.41 | Short-term Loans |
| BOP | BOP | QFAGG | ICPF / BOP | IF / O / BOP | BSI / BOP | BOP | F.42 | Long-term Loans |
| SHS | SHS | SHS | SHS | SHS | SHS | SHS = BOP | F.511 | Quoted shares |
| NFC / O / BOP | NFC / O / BOP | QFAGG | SHS / ICPF / BOP | SHS / IF /R / BOP | SHS / BSI / BOP | BOP | F.512 F.513 | Unquoted shares and other equity |
| SHS | SHS | SHS = QFAGG | SHS | SHS | SHS | SHS = BOP | F.52 | Mutual funds shares |
| ICPF / BOP | | | | | | BOP | F.61 | Net equity in life insurance and pension fund reserves |
| ICPF | ICPF | - | ICPF | - | - | ICPF = BOP | F.62 | Other ITR |
| BSI / BOP / GFAGG | BSI / BOP / QFAGG | QFAGG | BSI / BOP / ICPF | BSI / BOP | BSI / BOP | BOP | F.71 | Trade credits and advances |

| **Financial account (quarterly non-seasonal adjusted)** | | Rest of the world (S.2) | Monetary financial institutions (MFIs) (S.121+S.122) | OFIs and financial auxiliaries (S.123+S.124) | Insurance corporations and pension funds (ICPFs) (S.125) | General government (S.13) | Non-financial corporations (S.11) | Households including NPISH (S.14+S.15) |
|---|---|---|---|---|---|---|---|---|
| | | **Liabilities** | | | | | | |
| F.1 | Monetary gold and special drawing rights | | | | | | | |
| F.21 | Currency | R | BSI | | | - | | |
| F.2M | Deposits | Σ Assets | Σ Assets | Σ Assets | - | - | - | |
| F.331 | Short-term debt securities | SHS = BOP | SHS | SHS | SHS | QFAGG | SHS | |
| F.332 | Long-term deb securities | SHS = BOP | SHS | SHS | SHS | QFAGG | SHS | |
| F.34 | Financial Derivatives | BOP/QFAGG | Σ Assets | Σ Assets | Σ Assets | QFAGG | Σ Assets | - |
| F.41 | Short-term Loans | BOP | | Σ Assets | Σ Assets | QFAGG | Σ Assets | Σ Assets |
| F.42 | Long-term Loans | BOP | - | Σ Assets | Σ Assets | QFAGG | Σ Assets | Σ Assets |
| F.511 | Quoted shares | SHS = BOP | SHS | SHS | SHS | | SHS | |
| F.512 F.513 | Unquoted shares and other equity | BOP | SHS / BSI | SHS / Σ assets | SHS / ICPF | | Σ Assets | |
| F.52 | Mutual funds shares | SHS = BOP | SHS | SHS | - | | | |
| F.61 | Net equity in life insurance reserves and in pension funds reserves | BOP | - | - | ICPF | - | - | - |
| F.62 | Other ITR (Non-Life) | ICPF = BOP | | - | ICPF | | | |
| F.71 | Trade credits and advances | BOP | Σ Assets | Σ Assets | Σ Assets | QFAGG | Σ Assets | Σ Assets |

The main sources (as shown in the diagrams) are:

- BSI (Money and Banking statistics)
- SHS (Security holdings statistics including the total issuance of domestic securities)
- BOP (Balance of payments statistics including FDI)

Additionally we use:

- QFAGG (Government finance statistics)
- ICPF (Quarterly data and balance sheet data of insurance corporations and funded pension schemes)
- IF (Investment fund statistics)
- NFC (Balance sheets of nonfinancial corporations including data of the Company Register)
- O (Other sources like balance sheets data of non-financial corporations and selected other financial institutions)
- R is designated to the compilation of individual cells as residual item in the horizontal balancing process.

The **BSI statistics** (covering data of the central bank, S.121 and other monetary financial institutions S.122) are broken down on a fully aggregated level into the following counterpart sectors[3]:

- Central bank, other monetary institutes
- Other financial institutions excluding insurance corporations and pension funds
- Insurance corporations and pension funds
- Government (broken down in central government, local government and social security funds)
- Non-financial corporations
- Households including own account workers
- Non profit institutions serving households
- Rest of the world broken down by country and by economic sector with the Euro Area

More details are available in the **Balance of payments data** (BOP) because the reporting forms include individual reporting entities and individual counterparts (if both entities belong to the same group of companies – marked as FDI). They are marked by the identifier number created by the central bank. These information allow a partial split of counterpart sectors.

The **security holdings statistics** (SHS) are based on the so-called security by security system. Both custodian banks and end-investors for securities outside the custody with domestic banks are obliged to report the holdings of securities on an individual basis allowing the allocation of securities to different categories by the central bank. Therefore the issuing sectors are defined by accumulation of the individual issuers (allowing the fulfilment both of the existing SNA/ESA requirements as well as those of the SNA 2008 and ESA 2010 respectively). Regarding the holder sector the custodian banks differentiate the following categories at present:

Categories for own holdings of custodian banks:

- Securities including equity participation, held for own account
- Holdings related to (own) genuine securities sale and repurchase transactions and securities lending transactions

Categories on behalf of customers:

- Money market funds
- Investment funds other than money market funds
- Severance Funds
- Other financial corporations
- Financial Auxiliaries
- Insurance corporations
- Pension funds
- Government broken down in four subsectors

[3] No breakdown is available for debt securities and equity components on the liability side. The breakdown is available for domestic counterparts and counterparts located in the Monetary Union.

- Own account workers
- Other households
- NPISH
- Private foundations
- Non-residents broken down in credit institutions, households, and other non-residents

This combination of detailed aggregates of holders and individual issuer forms an important part for the "from-whom-to-whom" compilation of sectoral interlinkages.

BSI statistics, BOP data and SHS data cover roughly 75% of the total assets of the Austrian economy.

On the contrary the other sources are only partly designed with a full breakdown by economic sectors. Therefore assumptions have to be made for the integration of these data in the "whom-to-whom matrix" of financial accounts as follows:

- Government finance statistics are broken down for loans and equity (other than quoted shares derived from the SHS) according to the structure of administrative data.
- ICPF balance sheet data on the liability side do not contain any breakdown. The following assumptions are made: Gross insurance technical reserves for life insurance are allocated to domestic households subtracting holdings by non-residents based on balance of payments data. Gross insurance technical reserves for non-life insurance are allocated to domestic non-financial corporations and households according to the gross premiums for various types of contracts.
- Equity (other than shares) of non-financial corporations derived from balance sheet data are split by holder sector based on the structure of nominal capital available in the Company Register (an administrative data source) in Austria for nearly all limited liability companies.
- Finally the allocation of currency is estimated based on several assumptions.

## 3. Data matrix on a "from-whom-to-whom" basis

The data are available both for stocks and flows on a quarterly basis. The matrix is designed as follows:

In columns the creditor sectors are placed with the following breakdown[4]:

- Total economy (S.1)
- Non-financial corporations (S.11)
- Financial sector (S.12)
- Central bank (S.121)
- Other monetary financial institutes except money market funds (S.122)
- Money market funds (S.122, S.123)

[4] The classification of the sectors according to ESA 1995 and ESA 2010 (if different from ESA 1995)

- Other investment funds (S.123, S.124)
- Other financial institutions, except other investment funds and ICPF (S.123, S.125)
- Financial auxiliaries (S.124, S.126)
- Insurance corporations (S.125, S.128)
- Pension funds (S.125, S.129)
- Government (S.13)
- Central government (S.1311)
- State government (S.1312) and Local Government including Vienna (S.1313)
- Social security funds (S.1314)
- Households and NPISH (S.14 & S.15)
- Households (S.14), available since 2006 reference period
- Non profit institutions serving households (S.15)
- Rest of the World (S.2)
- Total liabilities of the individual debtor sectors

In rows the financial instruments are placed broken down into individual debtor sectors for each instrument. The financial instruments are compiled according to the requested breakdown of ESA 1995.

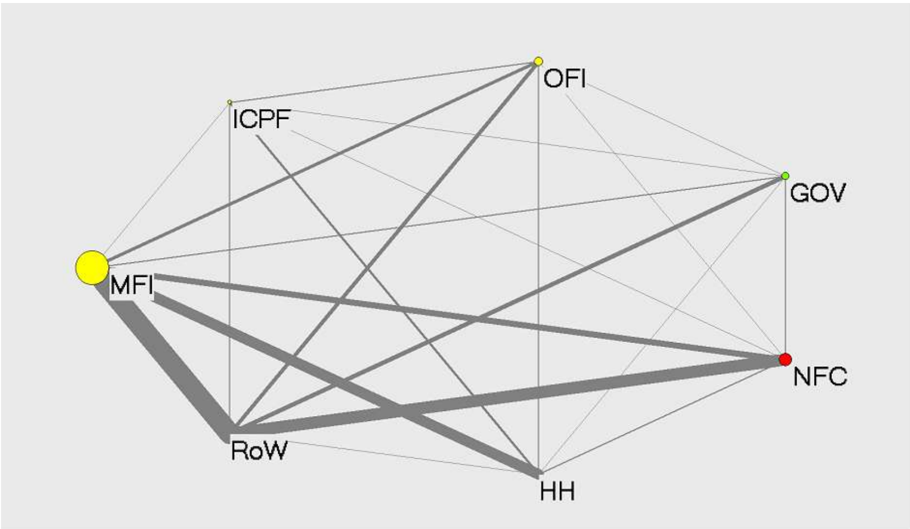
Therefore all cells defined in the matrix contains the following information: creditor sector, debtor sector, financial instrument, and classification of asset/liability side of the matrix allowing the compilation of financial accounts on a "from-whom-to-whom" basis with a very detailed structure. Apart from the fact that this structure can be used for various analyses it also allows checking procedures. Each cell where a source has been defined requires a value on a mandatory basis. Therefore missing entries can be identified. If there is more than one source available for a certain cell, the ranking of sources determines the value taken into account for this cell.

## 4. Selected results of the analysis of financial accounts

The financial assets that the individual institutional sectors or subsectors of the Austrian economy hold with other (domestic or foreign) sectors or subsectors are indicative of the degree of financial integration within the (national and global) economy. The sum of assets of all domestic sectors totalled approximately EUR 2,373 billion at the end of 2009, which is 8.7 times the size of Austria's nominal GDP; this means that assets have virtually doubled over the past decade. Of this amount, EUR 1,433 billion (60%) were attributable to the financial sector, of which EUR 540 billion (38%) reflected interlinkages within the financial sector. The biggest single share was attributable to monetary financial institutions (MFIs), including the OeNB (central bank), which had invested EUR 1,086 billion at the end of 2009 (of which they had invested EUR 258 billion with other units within the MFI subsector). Other financial intermediaries, except insurance corporations and pension funds, and financial auxiliaries, have gained increased significance above all through the activities of mutual funds and through the heavier use of financial holding companies (accounting for 37% of the total equity of the financial sector). Insurance corporations and pension funds play a prominent role in securing household's long-term provisions. In retail banking, households and nonfinancial corporations are key players given their high deposit and loan volumes. The degree of cross-border integration is high above all for MFIs (especially as a result of interbank transactions) accounting for EUR 703 billion of the gross exposures, nonfinancial corporations with a gross exposure of EUR 475 billion (mostly as a result of equity finance, including foreign direct investment by wholly foreign-owned nonfinancial SPEs) as well as the general government sector (given the high share of foreign investors in government debt securities). The cross-border liabilities amounted to EUR 156 billion.

The chart 1 highlights the degree of financial interlinkages of all sectors in the Austrian financial accounts.

Chart 1




MFI = Monetary financial institutions including Central Bank,
ICPF = Insurance corporations and pensions funds,
OFI = Other financial institutions including investment funds and financial auxiliaries,
GOV = Government sector,
NFC = Non-financial corporations,
HH = Households including NPISH.

Source: Financial accounts. The interlinkages were visualized using Pajek software. The size of the nodes reflects the level of intra-sectoral exposures, and the thickness of the connecting lines indicates the size of gross exposures between sectors (assets and liabilities).

The following selected issues are examples for the ongoing analysis of sectoral interlinkages in the Austrian economy taking into account financial accounts data on a "from-whom-to-whom" basis:

## 4.1 Intra-sectoral position of the economic sectors

The biggest interconnection of financial assets and liabilities within the same sector – both in terms of absolute values and percentage of gross-exposure - can be observed for the financial sector, accounting for 38% of the total assets of this sector. Main contributors to this kind of "internal" financing are the monetary financial institutes (including the central bank) accounting for 21% of total assets of the financial sector. The percentage of "intra-sectoral" financing increased by one third in the last ten years.

The main reasons for this development were

- the increasing interbank activities (also between central bank und other monetary financial institutes) in the form of deposits and debt securities which accelerated till 2008 and dropped in 2009 (for details see chapter 4.2)
- the "outsourcing" of equity holdings into financial holding companies both by domestic banks and by non-resident holders
- "shadow" banking activities in form of loans granted by banks to financial leasing corporations and their lending to non-financial corporations and households
- the ongoing securitisation of loans by establishing special vehicle corporations allocated in the financial sector and finally
- the diversification of funds by the acquisition of investment funds by banks, insurance corporations and pension funds as well as the purchase of so called funds in funds by investment funds. The increasing importance of the indirect investment led to an analysis using the "look-through" approach in Austria based on the security-by-security database.

The exception to this development was the stable investment of the insurance corporations in domestic insurance entities.

Apart from the financial sector the government sector increased the "intra-sectoral" asset position. The stocks amounted to 22% in 2009, ten percentage points higher than in 2000. Central government increased the granting of loans both to local government replacing partially the issue of bonds on the capital market and to social security funds substituting partially loans granted by banks.

The equity stakes held by nonfinancial corporations in domestic nonfinancial corporations explained roughly 17% of the total assets of this economic sector accounting for EUR 57 billion in 2009. This percentage declined due to the existence of the gross-border exposure of so called SPE[5] since 2005.

The complementary presentation on a consolidated basis subtracts the assets and liabilities within the same sector and their subsectors (e.g. the financial sector) from the total holdings and liabilities analysing the "external" position to other domestic sectors and the rest of the world. This kind of differentiation provides a detailed picture of financing of the Austrian economy and is very useful for understanding how funds are channelled from final lenders to final borrowers. This consolidated view as expressed by the connected lines in chart 1 illustrates the importance of the banking sector and the rest of the world sector for the "external" financing.

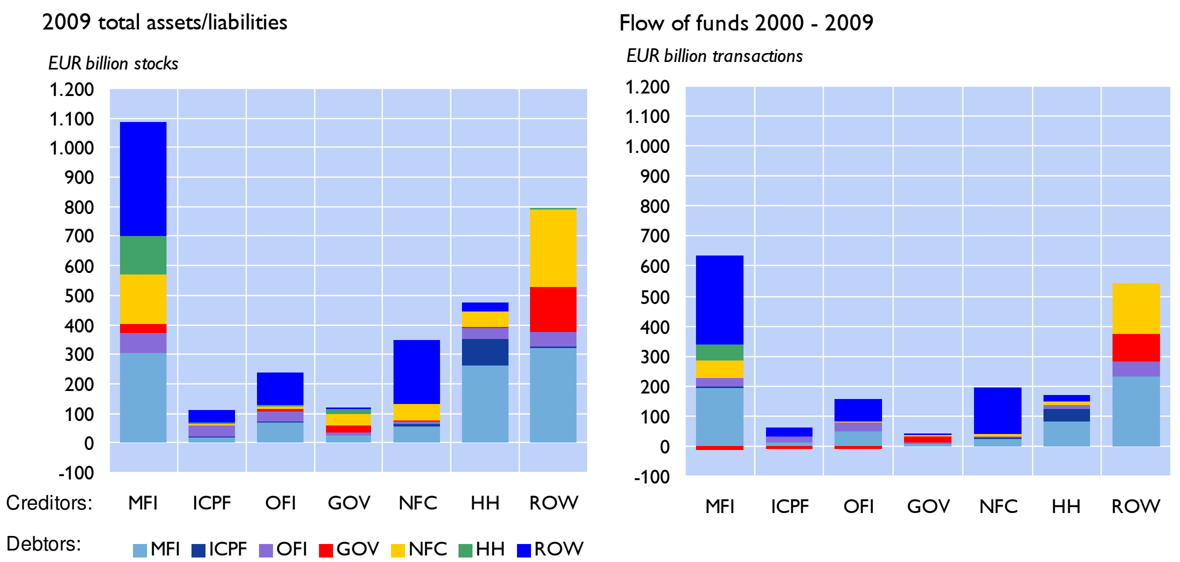
[5] Cross-border activities of SPEs refer to direct investment of domestic SPE which are virtually wholly-owned by nonresidents. They do not generate any sales, do not employ any staff.

## 4.2 Financial flows

The analysis of the long-term developments showed that the financial investment and the financing in the last ten years had a huge impact on the financial assets and liabilities in 2009. Financial investment of Austrian economy totalled EUR 1,225 billion accounting for 107% of the financial assets in 1999. Nearly the same ratio can be observed on the liability side (EUR 1,191 billion; 102%). On both sides the cross-border flows accounted for half of the total financial flows. The monetary financial institutes were the key player raising funds of EUR 604 billion (118% of the liabilities in 1999). Additionally the financial investment of other financial institutes (mainly financial holding companies and mutual funds) and nonfinancial corporations complemented the raise in cross-border financial positions against the background of the increasing importance of the "internationalisation" of the portfolio allocations of domestic institutional investors since the foundation of the Euro Area Monetary Union. This effect led also to net sales of government bonds by these institutional investors. Households invested EUR 168 billion in the last ten years, 47% with domestic banks (both in the form of deposits and debt securities). Their financial behaviour was an important pillar in the refinancing of banks apart from other domestic banks including the central bank und foreign investors. All in all the growth of the financial position was driven primarily by flows and not by price changes of outstanding stocks which were heavily effected by the decrease of the valuation of tradable securities during the last financial crisis.

Chart 2

Sectoral interlinkages of the Austrian economy




*Source: OeNB. MFI=Monetary financial institutes including Central Bank, ICPF = Insurance Corp, pension funds, OFI = other financial institutions, GOV = Government, NFC = Nonfinancial corporations, HH = Households including NPISH, ROW = Rest of the World (Nonresidents).*

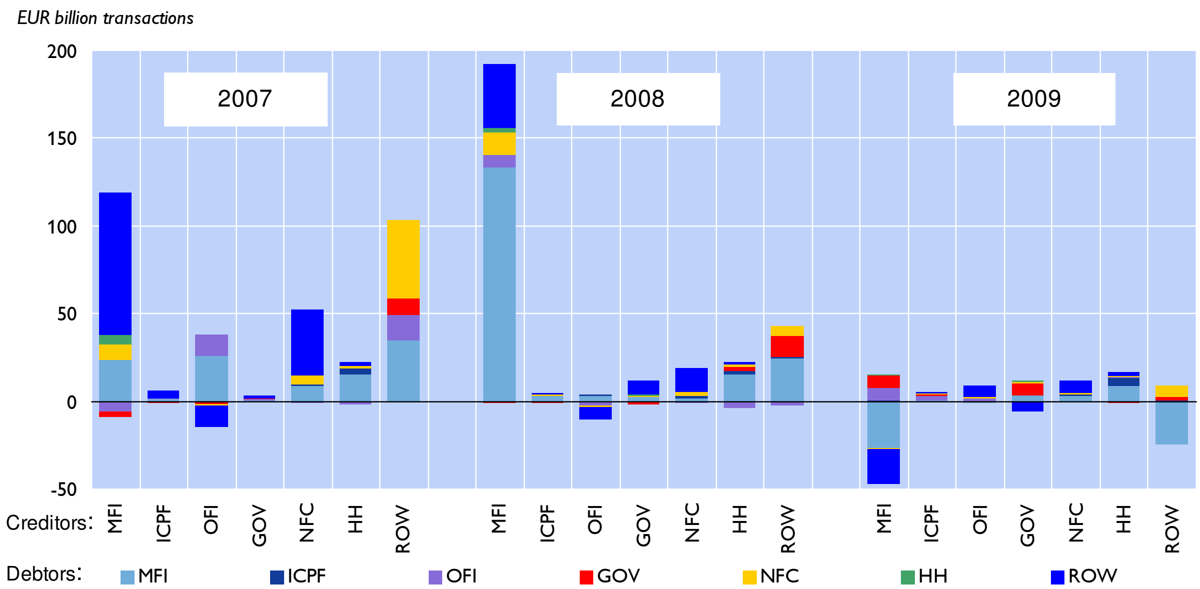
Regarding the turmoil during the last financial crisis the central bank used the flow of funds on a "from-whom-to-whom" data also as an important tool for the analysis. Following a sharp rise in financial investment and in external financing, with transaction volumes reaching more or less Austrian GDP levels in 2007 and 2008, both the net acquisition of financial assets and the net increase in external financing dropped to zero in 2009.

The financing behaviour of the financial sector (especially of domestic and non-resident banks) drove the increase in 2007 and 2008 as well as the turnaround in 2009. The main counterparties were the central bank, other domestic monetary financial institutions, and banks as part of the rest of the world. In 2008 the most prominent interaction was the increase of holdings of non-transferable deposits and long-term debt securities of domestic commercial banks issued by domestic banks. The financial investment totalled EUR 88 billion (accounting for close to 60% of the year-end position in 2007 and explaining roughly half of the total financial investment by this subsector in 2008). Additionally the increase of deposits held by the central bank with domestic commercial banks boosted both the financial investment and the financing of the MFI-sector. On the contrary, in 2009 the key players reversed their financial investment more or less completely.

The chart 3 plots the development for each individual sector between 2007 and 2009.

Chart 3

Who-to-whom financing in the last financial crisis




*Source: OeNB. MFI=Monetary financial institutes including Central Bank, ICPF = Insurance Corp, pension funds, OFI = other financial institutions, GOV = Government, NFC = Nonfinancial corporations, HH = Households including NPISH, ROW = Rest of the World (Nonresidents).*

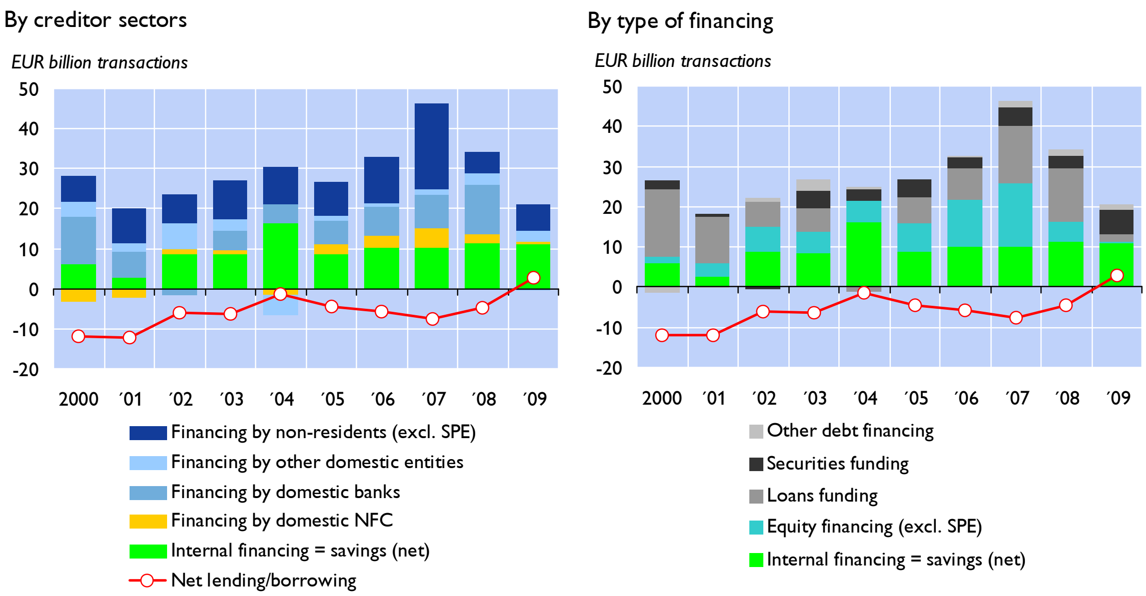
## 4.3 Creditors of the (real and financial) investment by non-financial corporations

In Austria the gross fixed capital formation is mainly driven by the non-financial corporations (68% of the total economy) and this sector is heavily engaged in financial investment especially in the case of direct investment abroad.

Traditionally the different financing channels for various types of investment are observed allowing the analysis of the importance of the credit channel (mainly driven by loans granted by domestic banks) and equity financing as important parts of the external financing. The external financing broken down by different creditor sectors is derived from the "from-whom-to whom" financial accounts supplementing the analysis of the financing channels. The internal financing accounted for 34% (on average in the last ten years) of the total financing of Austrian non-financial corporations. Regarding the external financing (excluding direct investment activities of domestic SPEs[6] abroad) Austrian companies have been financed mainly by domestic banks (33% of the external financing) in the form of loans and by non-residents (52% of the external financing) acquiring loans, debt securities and equity issued by non-financial corporations. The following chart (4) illustrates the changing degree of importance of the various creditors in the last ten years, especially during the last financial crises.

Chart 4

Financing of non-financial corporations (NFC)




Source: Statistik Austria, OeNB; Cross-border (equity) financing excluding cross-border activities of SPEs (FDI).

## 4.4 Sector classification of non-resident creditors and debtors

In 2009 the cross-border positions of domestic monetary financial institutes (MFI, including the central bank) amounted to 35% of the total assets and 30% of their liabilities, in the case of non-financial corporations the ratios were 62% and 44% respectively. Finally 70% of the total government debt was held by non-residents.

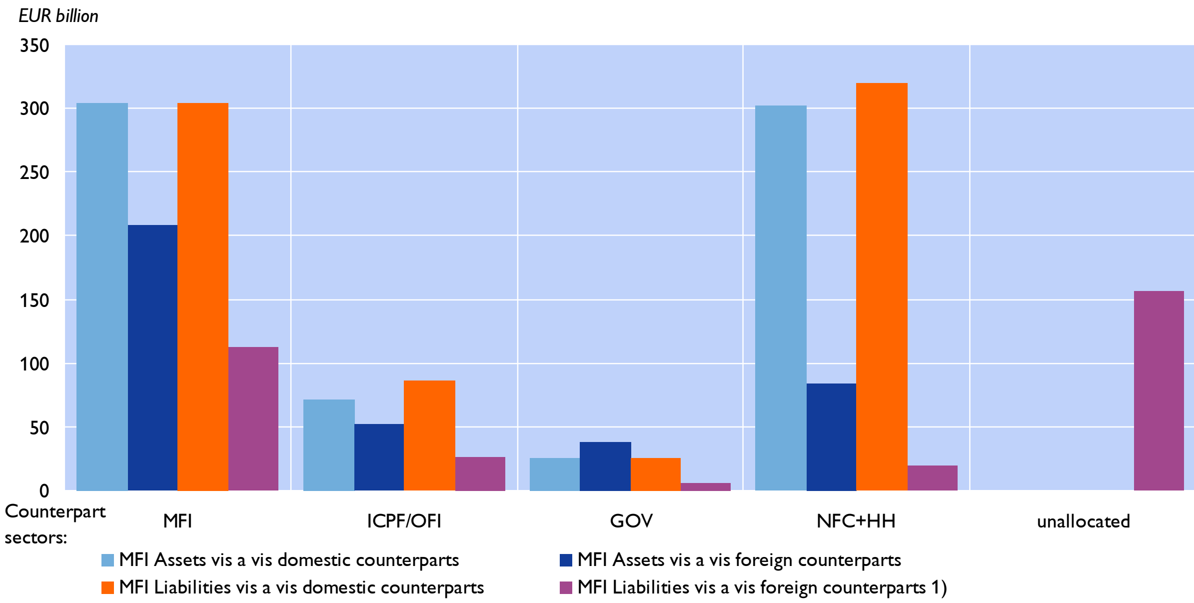
The traditional view on "from-whom-to-whom" tables of financial assets and liabilities differentiate only the domestic part of the sectoral interlinkages and treat the rest of the world sector in one lump-sum. Due to the importance of non-resident counterparties for

[6] These entities are virtually wholly-owned by non-residents. They do not generate any sales, do not employ any staff and their financial assets consist of foreign equity holdings.

the Austrian economy the Central Bank has started to investigate the sector classification of non-resident creditors and debtors. The following paragraphs will present first estimates for MFIs and for non-financial corporations. In a second step the Central Bank will concentrate its investigation on details of securities holdings statistics for government bonds held by non-residents as part of the cross-border debt (2009: 90%). In the case of MFIs the financial instruments non-transferable deposits (30%), long-term debt securities (25%) and long-term loans (22%) determined the total volume of cross-border assets, whereas deposits (48%) and the issuance of long-term debt securities[7] (44%) explained the biggest part of the cross-border liabilities in 2009 with stock volumes exceeding Austrian GDP levels. The allocation of the non-resident counterparties to economic sectors is based on the available data sets in various primary statistics[8]. The main results are the following: The importance of interbank activities increased after adding the non-resident MFI as counterpart sectors. Nearly half of the total assets and 39% of the total liabilities were intra-sectoral assets (compared to 28% of domestic intra-sectoral positions) in 2009. On the contrary in the retail banking the majority of assets and liabilities attributed to the private non-financial sector were financial stocks held and owed by domestic non-financial corporations and households. The proportion of non-residents was of minor importance, especially on the liability side.

Chart 5

MFI assets and liabilities vis a vis individual economic sectors in 2009




Source: OeNB; 1) Allocation of debt securities, quoted shares and mutual fund shares as unallocated.

[7] Long-term debt securities issued by other monetary financial institutes totalled 14% of the total liabilities of the MFI sector. Approximations based on the diversification of domestic holders were made for non-resident holders. This approach is under review together with the investigations on holdings of government bonds by non-residents.

[8] Additionally estimates have been made in the case of tradable securities on the liability side (EUR 157 billion), assuming that the structure of non-resident holders is closely related to the structure of resident holders. According to this assumption the securities were held by MFIs (accounting for 68%), other financial institutions including ICPF (16%), government (2%) and the private sector (14%).

The cross-border assets held by non-financial corporations were mainly equity stakes (due to foreign direct investment relationships including SPE cross-border activities) accounting for 74%, followed by loans[9] (16%). On the liability side these two instruments accounted for 65% and 18% respectively. The cross-border assets and liabilities of SPE totalled EUR 85 billion (40% of the total foreign assets and 32% of the foreign liabilities). The dominance of cross-border foreign direct investment activities pronounced the importance of "inter-sectoral" financial assets and liabilities between domestic non-financial corporations as well as domestic and non-resident non-financial corporations. The total "inter-sectoral" volume amounted roughly to EUR 217 billion (accounting for 62% of the total assets and 37% of the total liabilities).

## 5. Financial stability aspects of financial accounts on a "from-whom-to-whom" basis

The main goal of analysis of the financial stability is typically the identification of risks and vulnerabilities in various parts of the financial system. Moreover, the events of the recent global financial turmoil have demonstrated that financial stability analysis should also aim at identifying links between sectors and channels through which local shocks may spill over into further parts of the financial system. The financial accounts as a mirror of the financial system can be analysed as a network of interlinked exposures, although definitions on valuation and concepts (residency approach) are rather macro-economic- than risk-oriented. Nevertheless the sectoral interlinkages can help to detect such transmission mechanisms. Analysis of this network may then reveal that parts of the financial system that might not be considered particularly vulnerable to a given adverse scenario could still be affected due to their close interconnection with sectors that are directly confronted by the unforeseen events. Both the IMF and ECB, analysing financial stability, have started using this kind of network data. The IMF has elaborated the balance sheet approach[10] while the ECB has used the balance sheet interlinkages based on the so called Euro area accounts for their analysis[11].

In Austria the Central Bank has launched a project studying the network of sectoral financial interlinkages primarily to analyse the possible spill-over of leverage effects and changes in the valuation of equity holdings. Additionally Austria has started to compile the data according to the balance sheet approach of the IMF. The data for the reference year 2009 are shown below:

[9] At present the financial accounts data contain only cross-border loans, the majority of them are intercompany loans.

[10] The Financial Crisis and Information Gaps, Financial Stability Board (FSB and IMF) – Progress report May 2010

[11] Balance Sheet Interlinkages and Macro-Financial Risk Analysis in the Euro Area, ECB 2009 Working Paper No 1124.

| Balance sheet approach | Government including CB | Financial sector excluding CB | NFC + HH | RoW | Total |
|---|---|---|---|---|---|
| EUR billion, year-end 2009 | | | | | |
| | | | *Creditors* | | |
| *Debtors* | | | | | |
| Deposits | 0 | 18 | 17 | 22 | 57 |
| Short-term debt securities | 0 | 0 | 1 | 8 | 9 |
| Short-term loans | 4 | 1 | 0 | 0 | 5 |
| Trade credits | 0 | 0 | 0 | 0 | 0 |
| **Short-term liabilities** | 4 | 19 | 18 | 30 | 71 |
| Long-term debt securities | 13 | 25 | 1 | 133 | 173 |
| Financial derivatives | 0 | 0 | 0 | 3 | 3 |
| Long-term loans | 6 | 12 | 0 | 11 | 29 |
| Other accounts rec./pay. | 0 | 0 | 2 | 0 | 2 |
| Insurance technical reserves | 5 | 0 | 3 | 1 | 8 |
| **Long-term liabilities** | 24 | 37 | 6 | 148 | 214 |
| Total liabilities | 27 | 56 | 24 | 178 | 285 |
| Equity | 6 | 3 | 0 | 0 | 9 |
| Investment fund shares | 0 | 0 | 0 | 0 | 0 |
| **Total equity** | 6 | 3 | 0 | 0 | 9 |
| Government including CB | **33** | **59** | **24** | **178** | **295** |
| Deposits | 31 | 210 | 253 | 136 | 630 |
| Short-term debt securities | 0 | 2 | 0 | 7 | 9 |
| Short-term loans | 0 | 20 | 0 | 10 | 30 |
| Trade credits | 0 | 0 | 0 | 0 | 0 |
| **Short-term liabilities** | 31 | 232 | 254 | 153 | 669 |
| Long-term debt securities | 7 | 76 | 37 | 143 | 264 |
| Financial derivatives | 0 | 0 | 0 | 4 | 4 |
| Long-term loans | 0 | 14 | 0 | 8 | 22 |
| Other accounts rec./pay. | 0 | 0 | 94 | 1 | 96 |
| Insurance technical reserves | 5 | 1 | 8 | 2 | 16 |
| **Long-term liabilities** | 12 | 91 | 139 | 159 | 401 |
| Total liabilities | 43 | 323 | 393 | 312 | 1.071 |
| Equity | 7 | 96 | 8 | 24 | 136 |
| Investment fund shares | 5 | 72 | 44 | 17 | 139 |
| **Total equity** | 12 | 168 | 52 | 41 | 274 |
| Financial sector excluding CB | **55** | **491** | **445** | **353** | **1.345** |
| Deposits | 0 | 0 | 0 | 0 | 0 |
| Short-term debt securities | 0 | 0 | 0 | 0 | 0 |
| Short-term loans | 0 | 52 | 0 | 17 | 69 |
| Trade credits | 0 | 0 | 0 | 13 | 13 |
| **Short-term liabilities** | 0 | 52 | 0 | 30 | 82 |
| Long-term debt securities | 0 | 12 | 4 | 28 | 44 |
| Financial derivatives | 0 | 0 | 0 | 0 | 0 |
| Long-term loans | 24 | 234 | 0 | 33 | 292 |
| Other accounts rec./pay. | 0 | 0 | 0 | 0 | 0 |
| Insurance technical reserves | 6 | 3 | 0 | 2 | 10 |
| **Long-term liabilities** | 30 | 249 | 4 | 63 | 346 |
| Total liabilities | 30 | 301 | 4 | 93 | 428 |
| Equity | 26 | 18 | 103 | 170 | 316 |
| Investment fund shares | 0 | 0 | 0 | 0 | 0 |
| **Total equity** | 26 | 18 | 103 | 170 | 316 |
| NFC + HH | **56** | **318** | **107** | **262** | **744** |
| Deposits | 16 | 124 | 7 | 0 | 147 |
| Short-term debt securities | 0 | 2 | 0 | 0 | 3 |
| Short-term loans | 1 | 20 | 21 | 0 | 41 |
| Trade credits | 0 | 0 | 14 | 0 | 14 |
| **Short-term liabilities** | 18 | 146 | 41 | 0 | 204 |
| Long-term debt securities | 16 | 170 | 11 | 0 | 197 |
| Financial derivatives | 1 | 11 | 0 | 0 | 11 |
| Long-term loans | 0 | 91 | 15 | 0 | 106 |
| Other accounts rec./pay. | 0 | 8 | 2 | 0 | 10 |
| Insurance technical reserves | 1 | 1 | 1 | 0 | 2 |
| **Long-term liabilities** | 17 | 280 | 28 | 0 | 325 |
| Total liabilities | 35 | 426 | 69 | 0 | 530 |
| Equity | 0 | 46 | 170 | 0 | 217 |
| Investment fund shares | 2 | 20 | 6 | 0 | 28 |
| **Total equity** | 2 | 67 | 176 | 0 | 245 |
| RoW | **37** | **493** | **245** | **0** | **775** |

## Annex: Data availability

The data are published by the Oesterreichische Nationalbank on a "from-whom-to-whom" basis for the following economic sectors:

- Total economy (residents)
- Non-financial corporations
- Financial sector
- Monetary financial institutes
- Other financial institutions, except ICPF
- Insurance corporations and pension funds
- Government
- Central government
- Households and NPISH
- Households
- Rest of the word

The frequency of the data is quarterly and the results will be published 100 days after the end of the reference period.

The access to the data is the following link:
http://www.oenb.at/en/stat_melders/datenangebot/gesamtwirtschaftliche_finanzierungsrechnung/finanzierungsrechnung.jsp

Additionally the Central Bank in cooperation with the National Statistics Institute publishes the report on "Sector Accounts in Austria". The report contains a summary analysis for the last reference year, a detailed set of tables for the whole sequence of accounts for the main economic sectors for the last five years, key indicators for households, non-financial corporations and government for the last ten years and information on the methods and definitions based on the framework of the European System of National Accounts 1995 governing the compilation the national accounts in Austria. The publication will be produced on a yearly basis and is available 5 months after the end of the actual reference year.

The access to the report is the following link:
http://www.oenb.at/en/stat_melders/statistische_publikationen/gesamtwirtschaftliche_finanzierungsrechnung/publikationen_gfr_uebersichtsseite_-_englisch.jsp#tcm:16-169216

## Data sets:

### Who-to-whom relationship of financial assets of individual economic sectors

EUR billion

Stocks 2009

| | | MFI | ICPF | OFI | GOV | NFC | HH | Residents | ROW | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | *creditors* | | | | |
| MFI | | 304 | 19 | 67 | 26 | 57 | 263 | 736 | 320 | 1.056 |
| ICPF | | 3 | 5 | 5 | 0 | 9 | 89 | 110 | 7 | 117 |
| OFI | | 68 | 34 | 35 | 8 | 9 | 39 | 193 | 48 | 241 |
| GOV | *debtors* | 26 | 3 | 10 | 26 | 1 | 3 | 69 | 156 | 225 |
| NFC | | 169 | 5 | 7 | 40 | 57 | 50 | 328 | 260 | 588 |
| HH | | 133 | 1 | 5 | 14 | 0 | 0 | 154 | 3 | 156 |
| Residents | | 703 | 67 | 130 | 114 | 133 | 444 | 1.590 | 793 | 2.383 |
| ROW | | 383 | 43 | 108 | 5 | 215 | 31 | 784 | | 784 |
| Total | | 1.086 | 110 | 237 | 119 | 347 | 474 | 2.373 | 793 | 10 |

Stocks 1999

| | | MFI | ICPF | OFI | GOV | NFC | HH | Residents | ROW | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | *creditors* | | | | |
| MFI | | 121 | 10 | 25 | 15 | 33 | 168 | 372 | 139 | 510 |
| ICPF | | 1 | 6 | 0 | 0 | 4 | 48 | 59 | 3 | 62 |
| OFI | | 24 | 16 | 6 | 2 | 13 | 26 | 87 | 7 | 94 |
| GOV | *debtors* | 37 | 14 | 19 | 8 | 1 | 2 | 82 | 67 | 149 |
| NFC | | 116 | 5 | 3 | 29 | 32 | 31 | 216 | 50 | 266 |
| HH | | 68 | 0 | 0 | 22 | 0 | 0 | 91 | 0 | 91 |
| Residents | | 367 | 51 | 53 | 75 | 84 | 275 | 906 | 267 | 1.173 |
| ROW | | 134 | 9 | 42 | 3 | 36 | 14 | 237 | 0 | 237 |
| Total | | 501 | 60 | 95 | 78 | 119 | 288 | 1.143 | 267 | 30 |

Transactions 2000-2009 (cumulated)

| | | MFI | ICPF | OFI | GOV | NFC | HH | Residents | ROW | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | *creditors* | | | | |
| MFI | | 197 | 11 | 48 | 9 | 26 | 82 | 373 | 231 | 604 |
| ICPF | | 3 | 0 | 2 | 0 | 3 | 41 | 48 | 1 | 50 |
| OFI | | 27 | 20 | 31 | 5 | 2 | 13 | 98 | 49 | 147 |
| GOV | *debtors* | -13 | -11 | -9 | 17 | 0 | 1 | -14 | 94 | 79 |
| NFC | | 60 | 2 | 1 | 5 | 8 | 11 | 88 | 168 | 256 |
| HH | | 53 | 0 | 3 | -2 | 0 | 0 | 54 | 1 | 56 |
| Residents | | 327 | 23 | 76 | 34 | 40 | 147 | 647 | 544 | 1.191 |
| ROW | | 296 | 27 | 73 | 4 | 156 | 21 | 577 | 0 | 577 |
| Total | | 624 | 50 | 149 | 38 | 196 | 168 | 1.225 | 544 | -34 |

MFI: Central bank and other monetary financial institutes (S.121, S.122)
OFI: Other financial institutions including financial auxiliaries (S.123, S.124)
ICPF: Insurance corporations and funded pension schemes (S.125)
GOV: Government sector (S.13)
NFC: Non-financial corporations (S.11)
HH: Households including NPISHS (S.14, S.15)
ROW: Rest of the world (S.2)