

New developments in the Euro Area Accounts¹

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Abstract

The euro area accounts, published since June 2007, provide a full sequence of transactions accounts and a complete rendering of the institutional sectors' financial balance sheets for the euro area. Over the past years, this rather complete framework has been further enhanced in a number of ways.

It was recently extended to include estimates of non-financial assets by institutional sector, including households housing wealth. This is an important step towards completing the institutional sector's balance sheets. Allowing *inter alia* for a broadly complete analysis of the developments of households net worth, covering the contributions of both non-financial and financial assets.

Furthermore, the understanding of the financing and the financial investment by institutional sector in the euro area is now greatly enhanced by the publication of who-to-whom data on loans and deposits, allowing a better inter-sectoral perspective for these instruments. We report on steps underway to extend the coverage of who-to-whom data on marketable instruments.

The importance of balance sheet developments since the start of the financial crisis also highlights the need for a more formal decomposition of the other flows into holding gains and volume changes other than transactions (as they may arise from reclassification of institutional units or instruments). The combined availability of who-to-whom data and the decomposition of other

¹ The views expressed in this paper are those of the authors and do not necessarily reflect the views of the European Central Bank.

flows will enable a detailed analysis of balance sheet vulnerabilities.

Introduction

The European Central Bank (ECB) and Eurostat started publishing integrated quarterly euro area accounts by institutional sector (EAA) in June 2007. The first release was followed by regular quarterly releases, published around 120 days after the end of the reference quarter. Quarterly euro area accounts provide a comprehensive overview of the euro area economy, including a breakdown by institutional sector. They show all transactions, other flows and balance sheet positions of non-financial corporations, financial corporations, general government and households within the euro area, as well as their interactions and positions vis-à-vis the (euro area) rest of the world. Quarterly euro area accounts are fully compliant with ESA 95 (and SNA 93).

The joint effort of the ECB and Eurostat to compile euro area accounts is just the visible part of a much broader exercise supported by all EU national central banks and national statistical institutes. The compilation process starts with the transmission of the national financial and non-financial accounts by all euro area member states. These data sets are combined with other source data available for the euro area as a whole, mainly balance of payments and international investment position statistics (b.o.p./i.i.p.) and MFI balance sheet statistics. The accounts are then not the simple aggregation of the national accounts of the euro area member states. In particular, compiling appropriate euro area rest of the world accounts entails the “consolidation” of the cross-border transactions and positions between euro area member states which are included in the national rest of the world accounts.

Furthermore, non-financial and financial accounts are compiled in parallel and integrated in three dimensions. First, for each transaction category (financial and non-financial) and each financial balance sheet category, total uses must equal total resources and total (changes in) financial assets must equal total (changes in) liabilities, when summed over all institutional sectors and the rest of the world (so-called horizontal consistency). Second, for each sector and the rest of the world, the sum of all resources and changes in liabilities should be equal to the sum of all uses and changes in assets (so-called vertical consistency). Third, the change in financial balance sheets (i.e. in stocks) for each asset category is equal to the changes arising from financial transactions and from other flows (stock-flow consistency).

This paper is organised as follows. First it provides a brief description of the way the euro area accounts are compiled and integrated from a variety of data sources, encompassing euro area wide primary data sources as well as national contributions of quarterly sector accounts. The discussion then moves to the three areas where the accounts have been recently improved and are being improved. First, the compilation of the non-financial assets by sector and household housing wealth is being discussed. Second, the developments are presented of from-who-to-whom tables for loans and deposits -which has already been achieved- and for securities -which is under development-. Finally, the efforts to provide a complete breakdown of the so-called other flows into valuation and

volume components are explained and first preliminary results are presented.

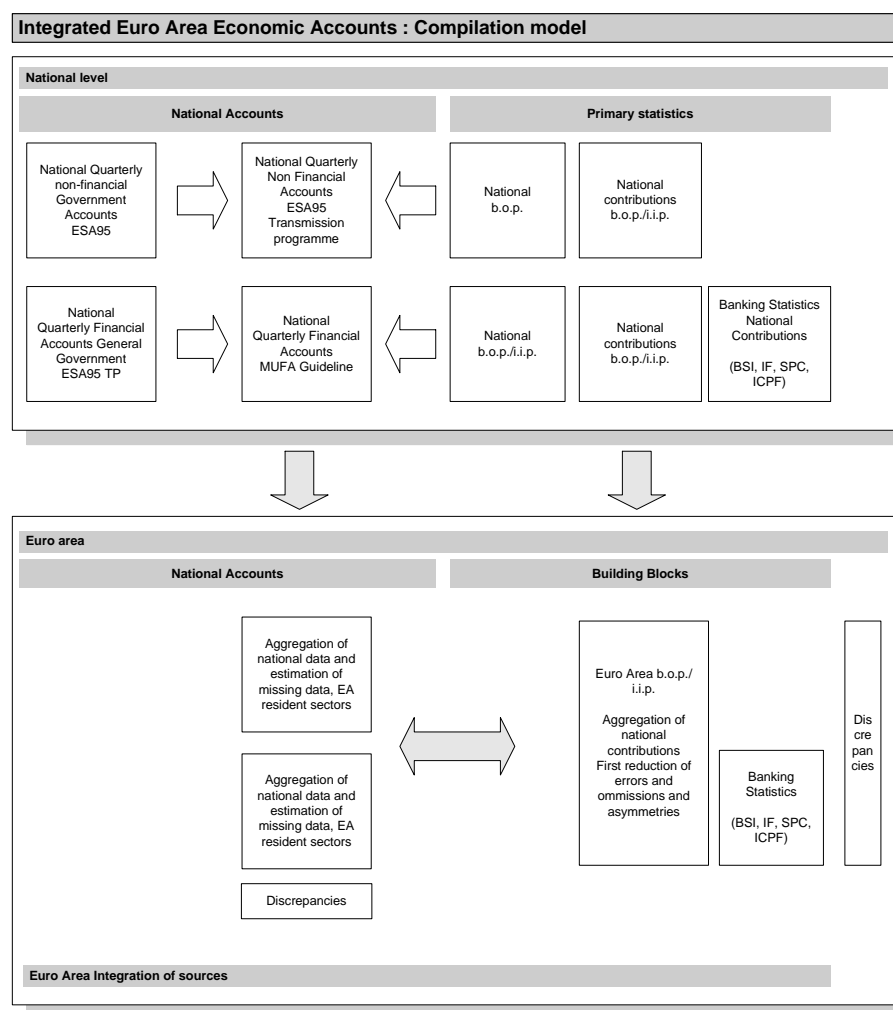
Integration of the accounts

The compilation of EAA follows three compilation principles which are common to integrated statistics (national accounts): completeness, conformity and consistency. The first principle espouses completeness, i.e. compilers have to ensure that they are using comprehensive source data. In the context of the sector accounts this means that each sector is described completely, and that where coverage of source data is insufficient, additional estimates are made to come to a meaningful total. The second principle, conformity, implies that all parts of the accounts conform (as much as technically possible) to the definition and recording rules prescribed by the relevant international manuals (SNA, ESA, BPM etc.). These recording rules and definitions may be at odds with concepts used in primary data sources; which impose on the compiler that adjustments should be made to the input data sets to allow for these differences. An example could be the use of nominal values rather than market valuation in securities issues statistics. The third principle, consistency, takes into account the identities present in the accounting framework and entrusts the compiler of the accounts the task to minimise these. As these identities are defined with respect to the accounting framework, these are referred to as *internal* consistency. Consistency can also be taken in respect to *primary data sources*, which can be named *external consistency*. There is also a case to be made for inter-temporal consistency, which applies to data that are published at different frequencies; and, in the context of statistics for economic areas, that the aggregate for the area would be consistent with the aggregation of country data.

Building blocks and national contributions

The compilation of euro area accounts follows a unique pattern (see Chart 1). As described above, comprehensive national (financial and non-financial accounts) data sets are being collected by Eurostat and the ECB.

Chart 1: Euro area accounts compilation model



In the euro area accounts, however, certain parts of the national data sets are not directly relevant for the euro area aggregate. In the first instance, as the euro area is being described as a single economic area, it requires a rest of the world account that describes the transactions of euro area resident institutions with institutions that are not resident in the euro area. Hence the euro area rest of the world account cannot be achieved by means of aggregation of the national data sets' rest of the world accounts. Therefore, the euro area accounts need to incorporate the euro area b.o.p./i.i.p. data as a euro area level building block. The euro area b.o.p./i.i.p. is itself the product of aggregation of euro area countries' b.o.p./i.i.p. data, but only after the geographical split in transactions and outstanding amounts vis-à-vis euro area residents and non-euro area residents is made (intra-extra euro area split). This geographical breakdown of the national contributions yields an immediate validation rule as regards b.o.p./i.i.p. data, since intra euro area assets by definition should be equal to intra euro area liabilities. Whenever this is not the case, transactions and outstanding amounts contain errors that are known as intra euro area asymmetries, which lead to statistical discrepancies at the level of individual transactions and instrument types.

The euro area Monetary Financial Institutions' (MFI) balance sheet statistics are the source of the monthly statistics on the monetary aggregates (M1-M3). In the compilation of the euro area accounts this data source supersedes some national data pertaining to the MFI sector, and the MFI

counterpart sectors as regards loans and deposits.

Achieving consistency

In bringing together national data sets, i.e. national contributions and euro area building blocks, a fundamental choice needs to be made as to the level of integration of the accounts. Because an exhaustive coverage of sectors, transactions and instruments is provided, consistency relationships can be validated, and in some cases used to estimate missing data.

As above mentioned, quarterly euro area accounts aim at being fully internally consistent. All transactions and stocks are horizontally reconciled, that is to say, the transaction balance, expressed for any transaction or asset type as the sum across institutional sectors of uses/changes in assets equals the sum across institutional sectors of resources/changes in liabilities. This relationship holds at the national level and therefore must also hold at the euro area level.

Euro area accounts also achieve vertical consistency for some sectors, namely financial corporations, general government and the rest of the world. This requirement is key to the compilation of the accounts, as the non-financial accounts provide a support for the compilation and reconciliation of the financial accounts. The two remaining sectors, households and non-financial corporations, which are of a higher analytical interest, are however not fully reconciled because of the lower level of direct data sources. However, in the process of reconciliation, vertical imbalances for these sectors are reduced to the maximum extent possible.

The consistency between flow accounts and balance sheets is completely kept. Whereas the reported data usually comprise transactions and balance sheets, implying other flows, the current euro area accounts compilation practice focus on transactions and other flows and derives balance sheets as residual. In other words, balance sheets are calculated from a reference period by accumulating transactions and other flows forward and backward.

The consistency of who-to-whom data with the main accounts is guaranteed by incorporating the counterpart sector dimension in the overall compilation process. To the extent possible, the compilation is “from the inside out”, i.e. the outside is derived by the aggregation of the inside detail. This ensures horizontal consistency for the relevant instruments (loans and deposits)

In making adjustments to achieve internal consistency, external consistency is lost. This means that euro area accounts necessarily deviate from most available building blocks, but also from the summation of national data. This is both a consequence of the needs to select between alternative data sources, as well as the need to make reconciliation adjustments. For instance, the euro area rest of the world account is not identical to the b.o.p./i.i.p., because of the need to fully reconcile the rest of the world with domestic sectors as well as to account for errors and omissions.

Non-financial assets

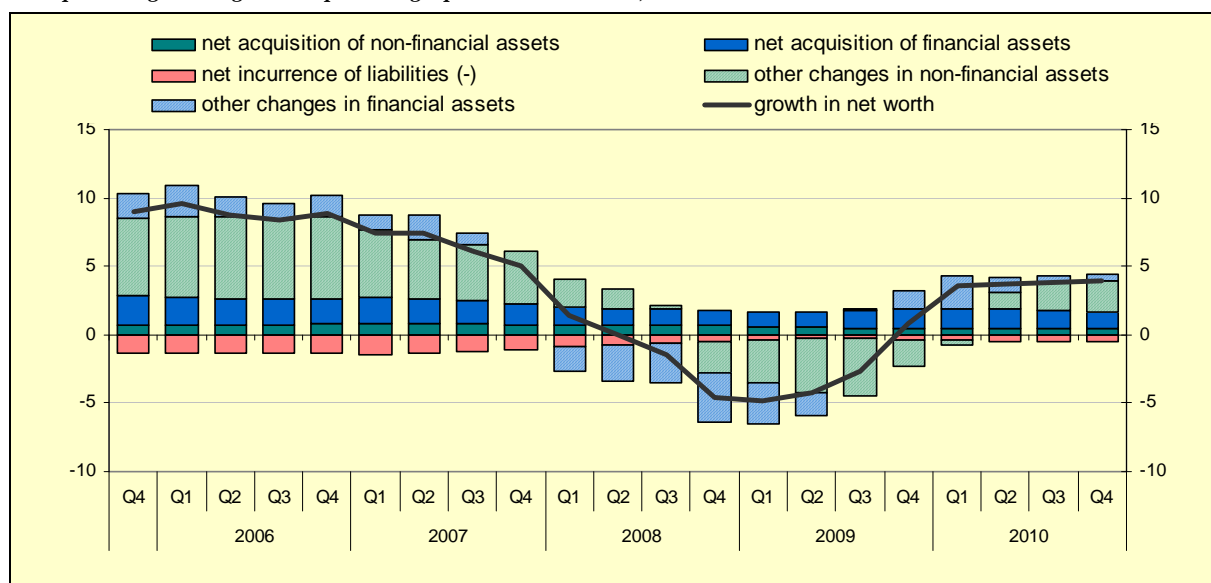
As part of the euro area accounts development framework, the ECB elaborated a methodology to estimate annual and quarterly euro area produced non-financial assets by institutional sector and by main asset type for the total euro area economy, thus complementing previous experimental

annual estimates for total economy capital stock and wealth.

In line with the ESA, capital stock reflects the value of all fixed assets in use, where fixed assets are described as produced assets, i.e. excluding land, that are used in the production process for more than one year. Households' housing wealth covers the value of all residential dwellings, including the value of the underlying land. Both indicators have an important economic meaning – the sum of non-financial assets and net financial assets (i.e. financial assets minus liabilities) constitutes the net worth of an economy or of a particular sector. Information on capital stock allows for a better understanding of the asset structure in a given production process, while housing wealth, which accounts for a large part of the total households' wealth, is important to assess households' consumption, investment, saving and portfolio decisions. Chart 2 below, which is regularly published in the quarterly euro area accounts Press release, depicts changes to households' net worth by type of asset.

Chart 2: Growth of households' net worth and contributions by type of asset change

(annual percentage changes and percentage point contributions)



Source : ECB

The compilation of the euro area annual and quarterly non-financial assets is based on information from different data sources, namely:

- Tables 20 and 26 of the ESA 95 transmission programme for country capital stock, annual data;
- Eurostat's national accounts, annual and quarterly (QNA), for gross fixed capital formation (GFCF) by activity and gross domestic product (GDP) data;
- Quarterly euro area (non-financial) accounts;
- Euro area residential property price index (RPP).

The estimation process is done in several steps making use of available national stock (balance sheet data) and flow (GFCF and GDP) series; however, not being a simple aggregation of country

data.² The estimation of the euro area capital stock is based on the following capital accumulation equations:

$$(1) \quad GCS_t = [1 - r_t + \beta_t]GCS_{t-1} + GFCF_t \text{ and}$$

$$(2) \quad NCS_t = [1 - \delta_t + \beta_t]NCS_{t-1} + GFCF_t$$

with retirement rate r_t , retirement + depreciation rate δ_t and revaluation rate β_t .

In a nutshell, formulae 1 and 2 indicate that gross capital stock in a given year (GCSt) equals that of the previous year (GCSt-1) minus that part of the stock that has reached the end of its service life (determined by the retirement rate r_t) plus the gross fixed capital formation in the current year GFCFt and the revaluation of the existing capital stock β_t . The same reasoning holds for net capital stock, but taking also into account the depreciation δ_t rate.

GFCF volume series are a crucial input to derive capital stock estimates for total economy – whether using the perpetual inventory method (PIM) or the equivalent capital accumulation equations. The so-called “shortcut method” is applied to derive euro area accounts consistent GDP and total economy GFCF volume series. In short, this involves dividing the euro area accounts nominal series by the corresponding deflator available from Eurostat’s euro area QNA.

In order to produce a breakdown of the euro area total economy capital stock by main asset type, the corresponding breakdown of GFCF series by main asset type is needed. Euro area accounts consistent GFCF by main asset type are constructed by applying the respective shares of the main asset types, as available in QNA nominal total economy GFCF, to the euro area accounts nominal total economy GFCF series. Deflators for GFCF by asset type are also taken from QNA.

Estimates for the euro area capital stock series by institutional sector are compiled broadly in the same way. However, data availability constraints require alternative methods to estimate euro area accounts GFCF deflators by sector, as well as the average retirement and depreciation rates. Deflators for the euro area accounts GFCF by sector are derived by combining information on the relative shares of the main asset types in the total capital stock of the different sectors with QNA deflators for GFCF by asset type. This results in weighted average GFCF deflators for the different sectors with annual changing weights. Retirement and depreciation rates were constructed as weighted averages, combining information on the relative shares of the main asset types in the total capital with the retirement and depreciation rates that were derived for the main asset types of the total economy capital stock.

Euro area households’ housing stock estimates are also estimated via the capital accumulation equations. The annual euro area net households’ housing wealth (HHW) is estimated by applying the average annual ratio of net HHW to households’ housing stock for the available countries to the euro area annual households’ housing stock series. The estimation of quarterly euro area net HHW, due to the lack of data, is done by applying temporal disaggregation techniques to the annual HHW

² National capital stock data are not available for all euro area countries; furthermore, euro area accounts introduce corrections for the misreporting at the national level of exports and imports due to asymmetries, which influences euro area expenditure components (notably GFCF).

estimates, using the euro area quarterly residential property price index (RPP) as indicator. Residential land, both at annual and quarterly frequency, is derived as the difference between the respective euro area HHW and net households' housing stock.

Who-to-whom on loans and deposits

Since October 2008 that national financial accounts data are available on a who-to-whom basis for loans and deposits. In the course of 2009 the compilation methodology and the data sources were fine tuned and, in the beginning of 2010, experimental euro area aggregates were made available to internal (ECB) users. These data were disseminated to the public at large (via the SDW) from October 2010 onwards.

This set of very detailed statistical information provides the perfect framework for a comprehensive sectoral inter-linkages and risk analysis. In the context of the recently created European Systemic Risk Board (ESRB), national accounts information on a who-to-whom basis provides the necessary detail to compile macro prudential indicators, particularly for the non-financial sectors.

The euro area accounts reconciliation process for deposits and loans is carried out on a who-to-whom basis; meaning that the balancing adjustments are introduced at the lowest level and that the totals ('exterior of the matrix') are derived from the aggregation of the detail in the interior. There are only two exceptions to this rule, transactions and stocks of MFIs and general government. For these two sectors, 'totals' coming from money and banking statistics and quarterly government financial accounts for general government, are not changed in order to maintain consistency with other ECB publications.

Who-to-whom on securities

In the past two years several statistical developments have materialized, contributing to an improvement in the availability of the necessary data for the compilation of who-to-whom accounts for securities. These are, in particular, experimental (internal) securities holdings statistics (SHS), investment funds statistics (IF) with comprehensive counterpart information and additional b.o.p./i.i.p. instrument detail.

The combination of these new or improved data sets with the national accounts data sets, MFI balance sheet statistics and other euro area statistics allowed the first compilation of experimental euro area who-to-whom balance sheets for debt securities (F33), quoted shares (F511) and mutual fund shares (F52) for 2009. These first experimental results are not yet in line ("consistent") with the published quarterly euro area accounts since a new compilation method needed to be developed to allow for the additional dimensionality of the source data.

The main use of euro area who-to-whom accounts and balance sheets is structural financial and

economic analysis as well as financial stability. In addition, such detailed data provide valuable references for the development of other statistical products, namely interest matrices and the breakdown of other flows into revaluations and other changes in the volume of assets and liabilities. Finally, they reveal data weaknesses (also in the quarterly euro area accounts) deserving further consideration and analysis to improve the overall data quality of euro area statistics.

The first attempt to compile euro area who-to-whom accounts and balance sheets for debt securities relied broadly on national accounts data provided by euro area countries, quarterly financial accounts for the general government, i.i.p. and securities holdings data. The first three data sources were broadly used to estimate the ‘exterior of the matrix’ (as in the current euro area accounts compilation process), while securities holdings data have been extensively used to estimate the who-to-whom detail (‘interior of the matrix’).

B.o.p./i.i.p. compilers have made an extra effort in the last two years to improve the availability of detailed information for shares and other equity. In particular, annual data are now available with the breakdown of ‘direct investment - equity’ between listed (quoted) and unlisted (unquoted) corporations, as well as ‘of which’ information on mutual fund shares on ‘portfolio investment - equity’. This allows, on the one hand, a clear breakdown of ‘direct investment – equity’ into its quoted/unquoted components and, on the other hand, the estimation of quoted shares on ‘portfolio investment – equity’ by residual; assuming that unquoted shares are only recorded under ‘direct investment – equity’.

However, the confrontation of these new b.o.p./i.i.p. data with the national accounts and securities holdings data sources does not yet yield satisfactory results. Assuming that data on total euro area issues are quite reliable, it means that either the estimates for the rest of the world or the portfolio (holdings) of the resident sectors, or both, are erroneous. Recalling that a major simplification has been introduced in the compilation of transactions and positions vis-à-vis the rest of the world, namely that unquoted shares are not recorded in ‘portfolio investment – equity’, it would be a logical conclusion to attribute the major part of the imbalance to the rest of the world.

Out of the three instruments for which experimental who-to-whom matrices were developed, mutual funds shares is by far the one with more comprehensive data sources, even overlapping in certain areas. The euro area who-to-whom balance sheets for mutual funds shares were compiled on the basis of a multitude of data sources. The overlapping data sources, in particular as regards total mutual funds shares issued by OFIs, still show relevant differences between national accounts and investment funds statistics, which need further work. The combination of the data sources shows a large imbalance between total holdings by sector (national accounts data) and counterpart who-to-whom information (investment funds statistics, MFI statistics and i.i.p.). This seems to be supported by empirical evidence collected in the context of an effort to improve b.o.p./i.i.p. net errors and omissions of a possible underestimation of intra-euro area cross border positions. In this context, the who-to-whom data are quite different from official euro area accounts data, e.g. holdings by households at the end of 2009 are estimated to be around 10% higher in the experimental data.

Deriving other flows

The financial crisis has changed the focus of the monetary policy analysis in many respects. Most notably, a growing interest in balance sheets and their components, in particular whether their changes are due to transactions or other flows, is behind recurrent themes like wealth effects, leverage behaviour, value of collateral and real-financial feedback loops.

The interest in understanding flows other than transactions has led euro area accounts compilers to start developing the statistical infrastructure for distinguishing different sub-categories, in particular to disentangle between flows due to revaluations and other volume changes.

A first experimental approach developed in 2009-2010 uses an outlier detection scheme based on the Kalman-Filter to infer on other volume changes (OVC) and residually derive revaluations. This detection scheme was primarily applied to debt securities and quoted shares, as for these instruments revaluations are particularly relevant. In parallel, the compilers of national financial accounts have started developing sources and methods to derive the revaluation/OVC split at the national level, generally again for debt securities and quoted shares. However, the data availability for revaluations and OVCs differs widely across countries. It was thus decided to further enhance the Kalman-Filter detection scheme with available country data on OVC to derive revaluations also for the euro area. The detection scheme uses now price and exchange rate indices, as well as the available national OVC to detect additional large non-transaction changes that are unlikely to be revaluations. This model is summarised in following box.

1) Detection of additional (non-transmitted) OVC (O_K) as large residual of the following model:

$$LE_t = LE_{t-1} \cdot (1 + \beta_p \cdot \dot{p}_{t-1,t}) \cdot (1 + \beta_x \cdot \dot{x}_{t-1,t}) + F_t \cdot \left(1 + \frac{\beta_p \cdot \dot{p}_{t-1,t}}{2}\right) \cdot \left(1 + \frac{\beta_x \cdot \dot{x}_{t-1,t}}{2}\right) + O_{c,t} + \underbrace{O_{K,t} + u_t}_{\text{Residuals}}$$

with R= Revaluations; LE = stocks; F= transactions, O_c = OVC as transmitted by countries

O_K = OVC as estimated by the model, p= Price index and x= exchange rate index.

2) Residual calculation of Revaluations:

$$R = LE - LE_{t-1} - F - O_c - O_K$$

For securities issued detailed country specific and issuing sector specific price and exchange rate indices are available from the ECB's financial market databases.³ The detection schemes thus works well for securities issued (liabilities) and produces plausible results for revaluations (see charts below). For securities holdings by institutional sector, price and exchange rate indices are not readily available. These could be derived if the composition of the institutional sectors' holdings by issuing sector were available. This is yet another reason to develop who-to-whom information for securities.

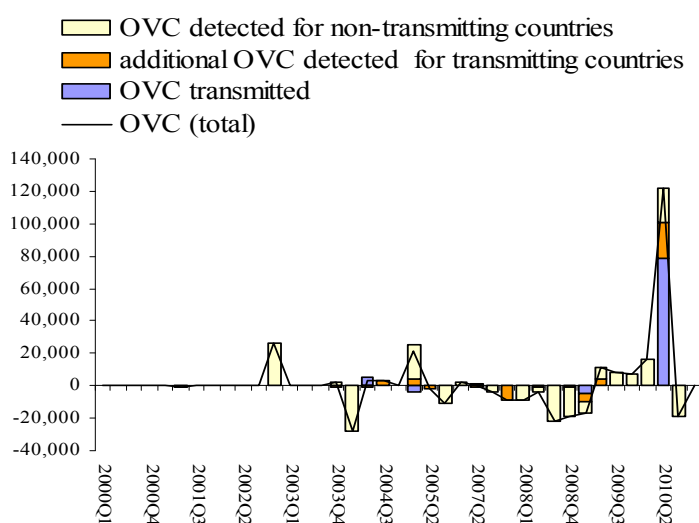
³ Exchange rate indices are relevant as for some sectors in several countries a non-negligible share of debt securities is issued in currencies other than the euro.

Preliminary results for revaluations: Example of long-term debt securities issued by OFIs

During the financial crisis users were particularly interested in the revaluation of debt securities issued by other financial intermediaries (OFIs). Other flows for these securities exhibited very large movements which could not be related to revaluation changes alone. Metadata from countries partly explained some of the largest movements as reclassification of institutional units. However, these metadata were not complete and difficult to integrate into the compilation system. Several countries have started transmitting OVC time series for securities to the ECB in 2010. This box provides some preliminary results on how these data are being used to derive revaluations for the euro area.

Other Volume Changes (OVC)

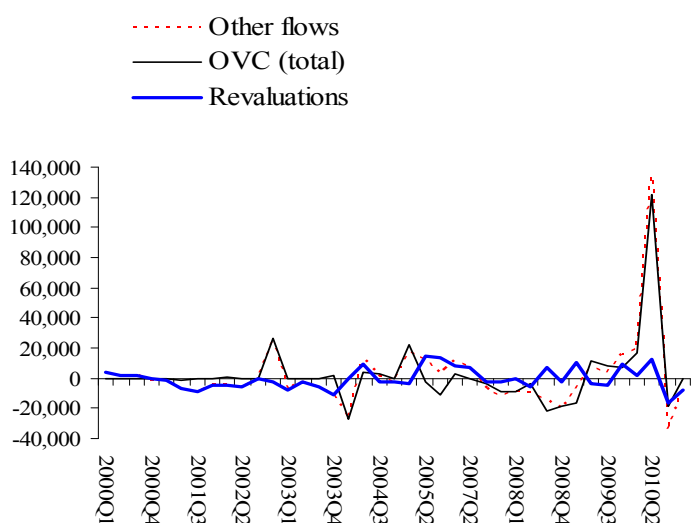
(EUR millions)



For countries already transmitting OVC the Kalman-Filter detection scheme still finds a few additional OVC as the data may not be complete. These additional OVC and the OVC detected for the countries that do not yet transmit any OVC will be investigated further. It is envisaged that all euro area countries provide OVC thus reducing the need for model based detection. However, the model allows for the combination of the currently available OVC with the detected OVC.

Split of other flows: OVC and Revaluations

(EUR millions)



Other flows (non-transaction changes in stock) in particular in more recent periods (e.g. the second quarter of 2010) were clearly dominated by OVCs due to the reclassification of institutional units. Other flows were thus a very poor proxy of revaluations. Subtracting the OVC (transmitted plus detected) from other flows, results in a far more plausible estimation of revaluations than previously possible.

In addition to the model based detection of OVC, high-frequency primary financial statistics are increasingly developing the split of other flows. In the first instance, money and banking statistics

introduced this split in the late 90s; transactions are derived residually from changes in stocks after the deduction of reclassifications and price adjustments. More recently (2007), a similar Kalman-Filter outlier detection scheme has also been introduced in the context of the b.o.p./i.i.p.

The new investment funds and securitisation vehicles statistics (2009-2010) present a novel approach, departing from money and banking statistics, in that transactions are compiled and directly reported by national central banks (NCB) to the ECB, while the NCB's may collect transactions or (price) revaluations directly from the reporting population.

Conclusions

The publication of the integrated quarterly euro area accounts by institutional sector in 2007 was a major European statistical achievement. It was a major step in a rather long development process, which started back in 1996 following the introduction of ESA95 and the creation of the European Central Bank. Lack of primary data and uncertainty over the merits of the unknown statistical product delayed the whole process, which only in 2001 with the publication of the first Table on Financing and Investment took off.

Quarterly euro area accounts are now a well established product in the monetary and economic analysis framework of the ECB. A quarterly Press Release on euro area accounts is made available to the public at large and feeds into the briefing material to the ECB Executive Board. A quarterly box is available in the February, May, August and November issues of the ECB Monthly Bulletin and comprehensive euro area data are disseminated in the statistical section of the Monthly Bulletin, the Statistical Pocket Book (SPB) and the Statistical Data Warehouse (SDW).

The euro area accounts are a rather unique product, which draws on a multitude of data sources from several countries and brings together two institutions in the compilation process. The difficulties inherent to the compilation of statistics for a monetary union are taken to the limit; the euro area accounts are not a simple aggregation of the national accounts of the euro area countries, a number of adjustments are needed to ensure a meaningful statistical product comparable across countries.

The initial (2007) product has already been considerably improved. Euro area produced non-financial assets by institutional sector, total euro area economy produced non-financial assets by main asset type, and households housing wealth, as well as who-to-whom data for loans and deposits, have been added in the course of 2010. Nevertheless, work is not yet complete and major challenges are still to come. This comprises, in particular: the publication of a comprehensive set of accounts at T+90 days fit for monetary policy purposes; who-to-whom detail for securities; the breakdown of other flows into revaluations and other volume changes not just for securities issued but also for security holdings by sector; and, complete seasonally adjusted euro area accounts.

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