Further enhancing monetary analysis with more data at short notice

Striking the balance between the regular collection of detailed micro data and the need for supporting ad-hoc surveys to capture financial innovation

Björn Fischer and Frank Mayerlen[1]

1. Introduction

Recent financial markets developments have demonstrated the need for detailed, timely and high quality information on financial instruments to enhance monetary analysis in real time.[2] Prominent and recent examples of these information needs have been in the area of "structured products" or "sub-prime" debt. To the extent that such instruments are structured as marketable securities, such information requirements can be supported by modern security-by-security databases which are capable of storing information available from the market and other sources at a very high level of detail. Moreover, these databases are of help to identify "where to look further" in case they can't provide the necessary information immediately. For this step, it is important to have an additional facility at hand for the collection of well specified complementary information from selected market participants via ad-hoc surveys at short notice.[3]

With relevant real-time examples, this paper tries to verify that analysing and handling security-by-security information is worth the effort and that such analysis has contributed successfully on a number of occasions to reduce substantially the uncertainty inherent to real-time monetary analysis.

2. Problem statement

It is well known that the policy decision process within central banks is challenging due to the high uncertainty under which real-time[4] policy decisions have to be made. Indeed, there is considerable "economic" uncertainty about the nature of exogenous shocks and about the functioning of the interaction between policy, private sector expectations and economic

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1 European Central Bank, Directorate General Economics and Directorate General Statistics.

bjorn.fischer@ecb.europa.eu; frank.mayerlen@ecb.europa.eu.

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2 See for example Stark (2008).

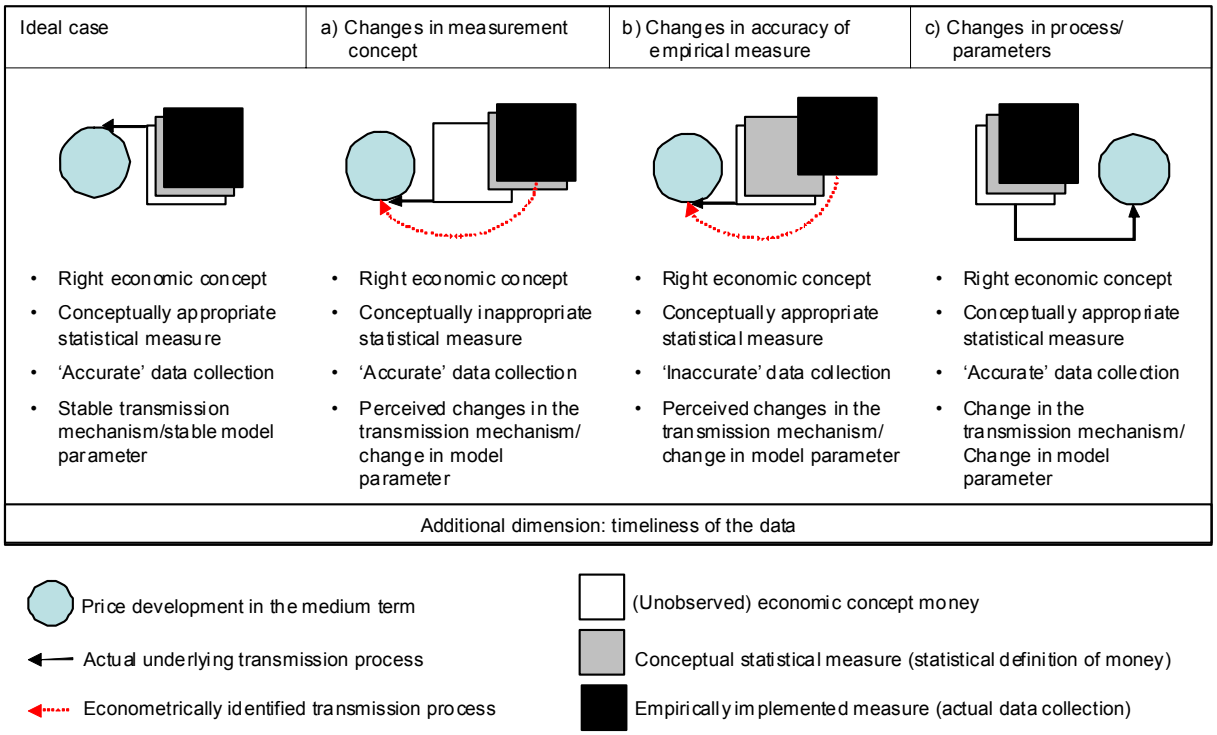
3 See also section 2.2 of the medium-term work programme for the ECB's statistical function at http://www.ecb.europa.eu/stats/html/workprogramme.en.html#.

4 Real-time analysis should be understood as reflecting the situation (point in time), when policy makers have to make their decisions, i.e. a state in which information on current developments is incomplete, or still subject to revisions and where new (innovative) developments might not have yet been fully identified and captured.

development. Statistics, which constitute the link between economic theory and reality, add some "statistical" uncertainty about the current state of the economy due to delays with which they are collected and due to the uncertainty about potential measurement problems. Financial innovations,[5] which may refer to financial products and their trading, financial processes or financial institutions, can add to these uncertainties by either leading to a conceptually inappropriate statistical measurement of unobserved economic concepts (see Figure 1 case a), or by impacting on the actual measurement quality of empirical measures (case b), or by changing the relationship between economic variables via a changed transmission processes or changed process parameters (case c). Those uncertainties may all occur simultaneously and are – for the real-time analyst – often equivalent and undistinguishable, although they have distinctly different consequences for policy interpretation.[6]

Figure 1

Uncertainties for monetary policy making in real time



Financial innovation is increasing the uncertainties for monetary analysis in real time, but at the same time often increases its relevance

In recent years, financial innovations have played a much more prominent role than in previous periods, potentially due to the creation of common euro area money- and financial markets, globalisation and global risk sharing, deregulation and technological progress

[5] For a detailed definition of financial innovation, see Tufano (2003).

[6] It may also be that the "economic concept" is inaccurate. An example would be a concept which relies on an "industry" breakdown of corporate loans, while manufacturing industries are (correctly) classified within the services sector in national statistics after having outsourced production to emerging economies.

allowing the efficient design of customer specific financial products in real time.[7] Recent financial innovation has been triggered in addition by the globally low level of interest rates in recent years, stimulating a rapid rotation of assets, also creating "search for yield" strategies by financial market participants. In the area of monetary analysis, the increased importance of financial innovation complicated considerably the channels through which monetary developments influence prices. At the same time, as has been experienced during the recent financial market turmoil, financial innovation has increased considerably the importance of monetary statistics and analysis for monetary policy.

This increased complexity in combination with the higher importance of monetary analysis for the overall policy process increases the need to put real-time monetary analysis on a broad basis. This requires the timely provision of a fully consistent break-down of aggregated data. In concrete terms, financial innovation might have a number of consequences:[8]

- First, financial innovation might significantly change the conceptual measure of the economic variable "money". A recent example, although the practical consequences are far from being straightforward, has been the move of the business model of MFIs[9] from originate-to-hold to an originate-to-distribute model, in which loans are originated, but sold subsequently. Under such circumstances, the statistical measurement concept of money and credit, defined as certain liabilities and assets from the MFI balance sheet, may start to shift away from the economic concept "money" and "credit".[10] (→ *uncertainty in the statistical measurement concept*)
- Second, financial innovation might modify the border between monetary and non-monetary assets, thereby driving a wedge between the conceptual measure of "money" and the empirical statistical measurement of monetary aggregates, endangering the indicator quality of the latter measure. One recent example, developed further below, has been the financial innovation concerning debt securities with embedded derivatives that distort the statistical category "holdings by the money holding sector of short-term debt securities issued by MFIs". This category is considered to be part of "money", but may now include assets that are not clearly capital certain and hence do not fulfil one of the defining criteria of money. (→ *uncertainty in the statistical measurement concept; uncertainty in the empirically implemented measure*)
- Third, innovation might influence money demand, especially via changes in the interest rate elasticity, possibly endangering money demand stability. (→ *uncertainty in the parameters of the actual underlying transmission process*)
- Fourth, the money supply might be influenced by portfolio changes on the asset and liability side of the MFI balance sheet, thereby influencing the link between the monetary base and broader monetary aggregates. This might lead temporarily and/or permanently to changes in the velocity of broader aggregates. (→ *uncertainty in the actual underlying transmission process*)

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7 Such instruments may be tax optimised and/or may have very customer specific risk/return profile.

8 See for example Issing (1997)

9 Monetary Financial Institutions (MFIs) are defined as financial institutions which together form the money-issuing sector of the euro area. This group mainly consists of the Eurosystem, resident credit institutions (as defined in Community law) and resident money market funds.

10 At the same time, it is crucial to understand that the application of the International Accounting Standards IAS 39 in a number of countries has resulted in a considerable lower impact of this change of business model on the analysis of MFI loan data than generally thought. This is due to the fact that IAS 39 makes even a partial de-recognition of loans from MFI balance sheets unlikely after a loan had been sold, as soon as part of the risks remain on the balance sheet of MFIs.

- Fifth, financial innovation might influence the transmission mechanism, possibly affecting the way monetary policy actions impact on the economy. This may work for example via an increased importance of the asset price channel and may thus modify at least the timing between the link of trend increases in money growth to trend increases in inflation. (→ *uncertainty in the actual underlying transmission process, but higher relevance*)

Statistical data are required in real-time to monitor the impact of financial innovation

An efficient and timely statistical coverage of financial innovation is thus a task that is crucial for the real-time assessment of monetary developments concerning risks to price stability, in particular as it helps to reduce uncertainties. A valid support for such coverage can be supplied by appropriate statistical tools allowing the real-time identification and monitoring of financial innovation. This needs to include the ability to answer statistical ad hoc questions at rather short notice and to identify financial innovation in certain products at an early stage. In particular, this is true for securities, which represent a very innovative segment of the financial market, but it does of course also relate to other market segments, e.g. (loans and) derivatives.

The European System of Central Banks (ESCB) is developing the "Centralised Securities Database" (CSDB), a micro database, holding detailed information at the level of the individual security. The CSDB will allow the ESCB to explore security related data at a much more granular level without further recourse to the reporting agents and, in turn, will reduce the burden for reporting agents by relieving them from detailed statistical classification and valuation requirements.

After presenting briefly the main features of the Centralised Securities Database, this note will address the question of how to make use of micro data to provide monetary analysis that works on a macro-level with the right data at short notice to assess the impact of financial innovation on the signalling quality of monetary developments on medium- to longer-term risks to price stability. The note aims to demonstrate (based on concrete real-time cases)[11] how available micro data has been used in real-time to support three broad approaches, depending on the issue:[12]

- To answer an economic question directly by providing the right statistics
- To narrow significantly the area where further investigations are required to answer a question (find out where to look further)
- To identify financial innovation or structural developments at an early stage, i.e. before potential distortions impact significantly on the signalling quality of money.

[11] Relying on concrete real-time cases is deemed as a good hedge against overly ambitious aims that fail to work in practical applications or are constructed only in retrospective

[12] Since the more powerful CSDB "Phase 2" is currently still being implemented, some of the ideas presented below are not yet implemented as permanent solutions but are currently rather being used ad-hoc and on a case-by-case basis. Most real-time examples provided in this paper thus had been based on ad-hoc security-by-security information collected from various sources including the CSDB. However, the CSDB database structure will have the potential to combine those sources.

3. The Centralised Securities Database as a flexible tool to support monetary policy in real time

A security-by-security database covering more than 4.5 million individual securities

The CSDB is a micro database, holding detailed information on more than 4.5 million securities.[13] The information, which is stored at the level of the individual instrument, covers so far reference information on issued securities. Holder information is collected and compiled via different channels by National Central Banks (NCBs), but is not included in the CSDB. More specifically, the database covers for example the international security identifier (ISIN code), issuing currency, statistical instrument classification, issue and redemption date, issuer name, sector and residency, as well as information on outstanding amounts, prices and income related variables. The CSDB is already being used in a simplified "Phase 1" version, while a more advanced "Phase 2" system is currently being implemented and is expected to go-live by end-2008. This Phase 2 system, which will enhance the information sharing between the ECB and EU NCBs, will be able to accommodate security-types beyond straight debt and equity and is therefore well prepared to cope with financial innovation also in the future.

The CSDB can be used for statistical production and for ad-hoc research

As a first use, the CSDB Phase 2 system will support the production of euro area external statistics and investment fund statistics in NCBs. In practice, this means that reporting agents can provide their statistical reports at the level of the individual security issued, held or transacted, without any further aggregation and in a format which does not require any statistical classifications and valuations. This reporting approach is much closer to the procedures used in the internal business systems of reporting agents. Relevant statistical information required will be sourced from the CSDB and will be matched during the statistical production process to the raw data provided by the reporting agent. Both datasets will be matched by using the international securities identifier (ISIN code) as a unique key. Overall, this will reduce the statistical burden for the reporting agent and will at the same time provide more flexibility on the statistical side, as it allows for different aggregations without changing the requirements addressed to the reporting agent. Furthermore, the CSDB can also be used to analyse developments in securities issues in real time and to identify any new patterns, e.g. caused by financial innovation, at a very early stage. This use is detailed further in the three case studies below.

Statistical coverage of the Centralised Securities Database

The CSDB supports and satisfies the statistical needs to conduct the single monetary policy for the euro area. In addition, the database will be used by individual euro area NCBs to produce statistics for domestic needs. In terms of instruments, the CSDB covers debt securities, including "hybrid" instruments with embedded derivatives, equity and investment fund shares. Financial derivatives are currently not covered. With regard to its geographical coverage, the database aims to include all instruments denominated in euro worldwide, regardless of where the issuer is located, all issues by issuers resident in the euro area,

[13] The CSDB allows to mark in a "focused list" those securities which are most relevant for the production of certain statistics, i.e. which are issued, held or transacted by the reporting agents. An exercise conducted for the production of external statistics led to the identification of around 350,000 most relevant securities. The quality of these instruments is checked with the highest priority.

regardless of the issuing currency, and all securities potentially being held by euro area residents (required, for example, for the compilation of external statistics).

A joint effort by the European System of Central Banks

The CSDB is a joint effort by the European System of Central Banks (ESCB). The database is fed with data sourced from 5 commercial data providers and with additional national contributions from many of the 27 ESCB National Central Banks (NCBs). As the different data sources of course overlap, the CSDB has a "compounding" algorithm which derives – in an automated way – "golden copy" information based on the available information. This compounding process is fully traceable to the database operator and the results can be cross-checked at the level of the individual security by the NCBs, as part of their contribution to the ESCB data quality management network.

4. Case study A: Using micro data to identify financial innovation directly and study its consequences

Looking into the aggregate data in more detail

At present, National Central Banks (NCBs) of the Eurosystem provide the ECB with statistical data which are pre-aggregated by sector and statistical category (i.e. instrument type) and which do not allow to identify at euro area level the contributions by individual reporting agents. As a consequence, it is not possible to analyse relative developments within the euro area reporting population. Growth in a certain statistical category may for example reflect a uniform development across all euro area reporting agents or it may reflect a much more uneven development. Any substitution effects within a largely unchanged euro area aggregate are impossible to detect.

The availability of security-by-security data also allows "replicating" the aggregates covering securities issued, as reported by NCBs, not only on an issuer-by-issuer level but even at the level of detail of the individual instrument. This allows identifying and analysing relative developments between reporting agents and permits the analysis of individual instruments issued, including, for example, their original and remaining maturity.

Practical example 1: refinancing schedule of asset-backed commercial paper (ABCP)

In general, the change of the banking model from "originate-to-hold" to "originate-and distribute", i.e. from a model where loans were created and kept on balance sheet to a situation in which loans are created by MFIs and on-sold, is a good example where the statistical measurement concept of monetary aggregates and loans might shift away from the unobserved economic concept of "money" and "credit", making the creation of a new measurement necessary.[14] So far, it cannot be claimed that security-by-security data have

[14] In practice, however, it turned out that the impact of this changing model on the definition of money and loans has been considerably lower than expected due to the fact that MFIs remained exposed to risks of sold loans, at the very least reputation risks. In addition, due to accounting frameworks and some financial prudential measures, loans remained fully on the MFI balance sheet in a number of euro area countries, even when they were sold to Special Purpose Entities.

helped to assess in real time the changes in the business model.[15] Still, security-by-security information has already provided crucial information for liquidity policy purposes in assessing in 2007 potential end-year frictions based on refinancing needs for maturing asset backed commercial paper (ABCP). Indeed, even without significant defaults in their asset structure, many ABCP issuing entities (structured investment vehicles (SIVs) or conduits) had difficulties in refinancing maturing liabilities since investors were increasingly uncertain about the inherent risk of these papers. Typically the SIVs and conduits are holding longer-term instruments on the asset side (mainly ABS) which are refinanced by the revolving issuance of short-term paper. A maturity mismatch arises where the amount of long-term debt to be refinanced remains broadly unchanged at least over several months, while the respective liabilities need to be renewed on a permanent basis through the issuance of short-term securities.

Practical relevance of example 1 for real time monetary analysis

Security-by-security information allows the identification of SIVs or conduits issuing ABCP and, by using information received from commercial data providers, allowed estimating the re-financing need for the next few months by an analysis of the maturity dates of the liabilities issued.[16] Given that most of these entities had explicit or implicit liquidity support from an MFI, such information helped to predict potential liquidity problems of euro area MFIs at the end of 2007, thereby helping to shape the preparation of appropriate liquidity operations during this problematic period. The use of crude proxies for real-time analysis, as done in this case, might considerably benefit from the availability of more detailed information on the issuance of asset-backed securities combined with information on holders of those securities and guarantees/support given to these vehicles by third parties. This will allow drawing some further and more elaborate conclusions (including forward looking scenarios) on the situation of the sponsoring MFIs. Indeed, in the current financial tensions, it has been crucial to understand potential risks stemming from MFIs' engagement in those securities, not only for financial stability reasons but in particular to advise the policy maker, in how far liquidity support by MFIs to related SIVs might impact on their ability to grant loans to the private sector, which in turn impacts on investment and output in general.

5. Case study B: Using micro data to significantly narrow the area in which further research is required to understand financial innovations

It is unlikely that security by security databases will by default hold information to always answer all statistical questions directly. This is in particular true for some financial innovations, where certain features of a security become very relevant and may be developed further at high speed and where very detailed data but also a good understanding of the economic context will be required for a complete assessment of the development. Indeed, some data may already be covered by the database in some form but some "background knowledge" is required to understand the business case and to query the database in the right way with the highest efficiency.

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[15] It should be noted that the collection of security-by-security information in this case may be hampered, as part of the securities can be private placements. For more details on the measurement of credit risk transfer in the EU see: Poloni and Reynaud (2008).

[16] In spite of potential gaps which may exist due to private placements, these data are deemed very helpful.

Identifying quickly whom to ask for further information

A security-by-security database can be of great help in narrowing down very quickly the number of issuers from whom more detailed information should be collected on an ad-hoc basis. In the example of ABS, security-by-security information would allow identifying those issuers with the highest outstanding amount and/or with the most significant increase in outstanding amounts. Those institutions could then be contacted or surveyed on an ad-hoc basis to collect further information. Such a combined approach, where the CSDB would be used in a first step to identify those institutions where ad-hoc interviews or data collections should be conducted in a second step, would be very beneficial to increase both the timeliness and the efficiency of the information collection process. Issuers of potential relevance can be identified quickly and further information needs to be collected only from those institutions. Other issuers will not be subject to any burden.

Not every ad-hoc question can be covered

Whether the "permanent" information in the CSDB should be further supported with data required and collected during an ad-hoc collection, needs to be decided on a case-by case basis. In principle, such information should only be included after a cost benefit analysis which takes into account (i) whether the phenomenon will be persistent; (ii) whether even more detailed CSDB information could be exhaustive or whether a significant additional amount of "soft" information would be required in any case. In the latter case, even more detailed CSDB data are unlikely to provide all information required, although it may shift the relative relevance of initial CSDB information and additional ad-hoc inquiries. Experience of the past years showed that enriching the CSDB based on very detailed one-off ad hoc data requirements would not have helped to capture future financial innovation up-front as this innovation may happen in a different area. Moreover, many innovations tend to be of a temporary nature, and thus do not warrant a permanent data collection.

Practical example 2: Euro Commercial Paper issued by state guaranteed banks

During the years 1999 and 2000, a strong expansion of short-term debt securities issued by MFIs could be observed in Germany. From the aggregate figures it was not evident whether this development had been caused by a certain type of institution, by a certain type of instrument or both or had been a broad-based phenomenon. However, security-by-security information allowed identifying that the development was mainly driven by a strong growth in the issue of Euro Commercial Paper (ECP) denominated in foreign currencies, by around 5 MFIs which had a state guarantee at that time. Subsequently, it was easy to meet all of them to collect the additional information that their securities had been considered as very close substitutes to government bonds, in particular by investors located outside the euro area, given their state guarantee at that time.

Practical relevance of example 2 for monetary analysis in real-time[17]

The identification of a specific sector increasing strongly its issuance of short-term ECP, in particular those denominated in foreign currencies, gave rise to the observation that this increase reflected a very dynamic non-resident demand for marketable instruments. Previously it had been assumed that these securities were in the hands of residents and had been assumed to be part of the monetary aggregate M3 to the extent that they were not held

[17] For a detailed technical description, see Fischer et al. (2008), or ECB (2001a) and ECB (2001b).

by MFIs.[18] Not excluding non-resident holdings of short-term marketable instruments upwardly distorted the annual growth of the monetary aggregate M3 by a maximum of 150 basis points in early 2001.

Based on security-by-security information, ad-hoc corrections were included in the monetary analysis using, as a first proxy, a grossing up approach based on the development of Euro Commercial Paper issued in foreign currencies by euro area MFIs. In order to solve the problem in the longer-term, information on the residency of holders of short-term debt securities was then derived mainly from aggregate information provided by international security settlement systems. With the implementation of this statistical enhancement, M3 data were corrected officially for the non-resident holdings of negotiable instruments in November 2001, while the general public had already been kept informed on the potential distortion during the months before. This official correction influenced the monetary policy assessment at that time, as evident from the Editorial of the May 2001 Monthly Bulletin that states:

> […] there have been indications that the monetary growth figures are distorted upwards by non-euro area residents' purchases of negotiable paper included in M3. […] Taking into account these factors, the slowdown in M3 over the last few months was more pronounced than previously thought […]. Overall, it can now be concluded that there is no longer a risk to price stability over the medium term signalled by the analysis of the first pillar.

Example 2 provides the value-added of information derived on a security-by-security level for real time monetary analysis. Figure 4 presents a potential measure of excess liquidity, namely an estimate of the real money gap as available in May 2001. Looking at the estimated real money gap using headline M3 growth as available at that time, the message is clear: Since early 1999, a liquidity overhang built up. For a real-time assessment of that date, the following questions would need to be answered: Does the increase in the money gap point to upward risk to price stability? Does the increase in the gap indicate changes in the transmission mechanism or signs of instability in money demand in general? Has the increase been caused by measurement problems (either in the statistical concept or in the empirical measure)?

The answers to these real-time questions cannot easily be provided by econometric models. A "yes" to any of the questions raised above would result in the same empirical outcome (for example changes in the process parameters of the empirical model), although with considerably different consequences for monetary policy. It is therefore essential to undertake a broad monetary analysis that includes an analysis of financial innovation based on statistics at a disaggregated level. The relevance of the questions changes considerably, when looking at the estimate of the real money gap based on the measure of M3 corrected for the non-resident holdings. First, the uncertainty on measurement problems is reduced. Second, between mid 2000 and early 2001, the measure now indicates a correction of a liquidity overhang that has built up in previous periods. This not only changes the policy message but reduces the relevance of the questions concerning the stability of the transmission process or the stability of the process parameters. The message based on corrected M3 was thus not only different from the mechanical message derived from official

[18] While the statistical concept of money does include those short-term debt securities which are held by the euro area money holding sector, the empirical measure could at the time not capture separately (and exclude) holdings by non-euro area residents due to measurement problems. Indeed, capturing the holding of negotiable securities has proven difficult as, given their negotiability, the issuing institution typically does not know (all) holders. However, until the appearance of the case described above, non-euro area resident holdings had been deemed rather low and stable over time.

M3 measures, but in addition the strength of the policy message had a considerably higher weight than the strength of the message based on the headline M3 figures.

Impact of non-resident holdings of short-term debt securities on the monetary analysis

Figure 2

Real time assessment of non-resident holdings of marketable instruments

(Different vintages of official annual M3 growth corrected for non-resident holdings in percentages)

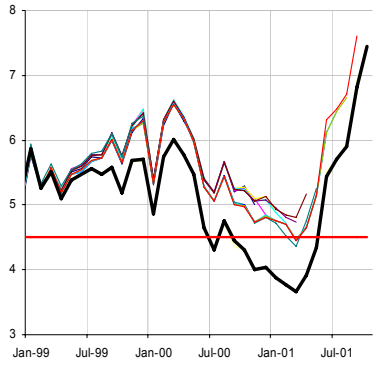

Figure 3

Real time assessment of non-resident holdings of marketable instruments

(Different vintages of internal estimates of annual M3 growth corrected for non-resident holdings in percentages)

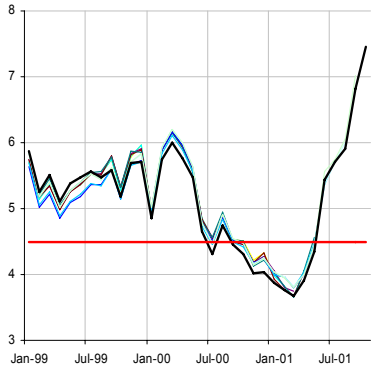

Figure 4

Real money gap[1] based on M3 and M3 corrected for non-resident holdings

(in percentages of the level of M3)

[1] The measure of the real money gap is defined as the difference between the actual level of M3 deflated by the HICP and the deflated level of M3 that would have resulted from constant nominal M3 growth at its reference value of 4½% and HICP inflation in line with the ECB's definition of price stability, taking December 1998 as the base period.

6. Case Study C: Using micro data at an early stage to identify measurement problems induced by financial innovation

Statistical categorisation may hamper the early identification of new financial products

For the purposes of macroeconomic analysis, financial instruments are classified into different statistical categories. This allows building time series as a basis to monitor developments over time. At the same time, the definition of such categorisation always needs to achieve the right balance between the number of categories and the size and uniformity of each individual category. Increasing the number of categories will in principle lead to "cleaner" categories with less intra category variation. At the same time, the analysis may become difficult with too many categories and there may be substantial substitution effects between different categories. Moreover, data collection and compilation costs increase substantially with more categories. Relying on fewer categories should reduce the substitution effects but bears the risk that too different instruments are categorised into the same category.

Independently from their definition, categories may to some degree be perceived as a "black box" which does not easily allow monitoring of the actual content. In other words, it would not necessarily be visible if specific instruments included in a certain category would develop new features or new instruments emerge, i.e. the case of financial innovation. An example would be short-term debt securities which start to have embedded derivatives, i.e. a substantially

changed risk/return profile, thereby driving a wedge between the aim of the statistical measurement concept and the empirical statistical measures.

The CSDB allows to "screen" statistical categories to identify financial innovation

The micro data provided by the CSDB can be used to build statistical aggregates in a very flexible way, following various aggregation procedures to meet different needs. Furthermore, the availability of micro data, covering different statistical attributes, allows to "screen" data within categories to identify any variation. This may comprise just a visual and labour-intensive screening of instrument names but may also include a more statistical and automated approach. As an example, the CSDB data would allow to compile the distribution of yields of the securities included in a certain category. With regard to short-term debt securities issued by euro area MFIs in euro, one would expect a rather narrow distribution of yields, around the Euribor rate plus a certain risk premium, assuming that any difference in the rating of the issuing MFI plays only a minor role for such short original maturities.[19] If the above mentioned category of short-term debt securities also included any instruments with embedded derivatives, those would have a different risk/return structure and would hence most likely pay a very different interest rate. As a consequence, such instruments could be identified by statistical analysis for further investigation.

Such statistical analysis may, for example, also be used for the screening of debt securities price data or of currency distributions within certain statistical categories. Moreover, it is possible to produce concentration measures, such as the Herfindahl index or just the relative share of the most relevant n issuers in terms of outstanding amounts, number of securities, or both. Such screening methods could be applied to the database as an ad hoc exercise and would be much more useful when applied over time, to generate time series. Moreover, the screening methods could be applied to all statistical categories in a fully automated way. After the calibration of the system at the beginning, filters can be used to monitor the developments over time and to identify significant developments which would require further manual investigation.

"Significant" developments need to be analysed manually

Identified "outliers" require further action. Assuming that they are not caused by erroneous input data, the securities concerned apparently have features which "deviate" from the statistical category where they are allocated. Further analysis needs to reveal whether these securities need to be allocated to a different category or whether they should represent a "new", separate category, i.e. whether they are a result of financial innovation.

A more detailed investigation should also cover, for example, an analysis of the risk/ return profile and of the targeted investor base. Any decision on the statistical classification of financial instruments needs also to take into account how instruments are "perceived" by the investors and whether any substitution effects may play a role. Given the granular structure of a security-by-security database, changes to the aggregation can be implemented without any need to address reporting agents.[20]

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[19] Depending on the shape of the yield curve, the maturity brackets investigated may need to be narrowed appropriately to reduce a possible bias.

[20] Provided that expired securities are kept in the database, such a change in aggregation can also be done retroactively, with limited effort.

Practical example 3: short-term debt securities with embedded derivatives

Short-term debt securities issued by euro area MFIs initially included only plain vanilla instruments which may pay an interest close to the respective Euribor rate. As of 2001, a new type of instrument appeared first in Germany, which could be identified with micro-data, as it paid an unexpectedly high interest of up to 20% p.a. After a first screening of the data and identification of "unexplainable outliers in the remuneration", a more detailed investigation revealed that the respective instruments, so called "reverse convertibles" deviated significantly from plain vanilla debt instruments as they had embedded option style elements. Over time, short-term debt securities with embedded derivatives developed further into a very diverse group of instruments called "certificates" or "hybrid instruments". Such instruments seem to have a persistent relevance for retail investors and they are by now heavily marketed in several euro area countries. [21]

Practical relevance of example 3 for real time monetary policy analysis

The occurrence of the above-described instruments posed a problem as they do not fulfil the defining criteria for money (in this case the criterion capital certainty) and should as a consequence not be included in M3. This poses two immediate statistical questions: 1) what would be the separation criteria; 2) where to classify these instruments instead. To further add to the complexity, the risk of the product may differ considerably from a holder (investor) perspective. Indeed, issuing institutions often classify retail derivatives into two groups: "investment products" and "leveraged products". Investment products have in some cases a (partial) nominal capital guarantee or a payoff structure comparable to a share, a share index or a commodity. Although some of these products may suffer substantial losses, depending on the market developments, a complete loss of the investment is unlikely. On the other hand, the leveraged products are more comparable to pure derivatives and a complete loss of the investment is possible, dependent on the market development. Leveraged products have usually an original maturity below two years while investment products can also have longer maturities. Both product types are very liquid, although for some investment products only limited secondary market trading occurs, the issuing institution publishes price information on a permanent basis and is willing to trade the instruments on a daily basis until redemption. At least in Germany, most of the products are also exchange tradable, for example on the Stuttgart exchange (EUWAX segment).

The timely statistical identification of the emergence of short-term debt securities with embedded derivatives, classified as part of the broad monetary aggregate M3, by analysing micro-data (via the identification of "unusual" yields), allowed to avoid the risk that this financial innovation could in real-time impact on the indicator quality of the monetary aggregate M3 concerning risks to price stability:

- For the immediate monitoring, ad-hoc data collection exercises had been undertaken allowing to monitor the (development of the) quantitative relevance of those instruments. As a result it has been agreed to separately identify in the MFI balance sheets certain types of short-term debt securities with embedded derivatives in the future.

[21] According to the Deutsche Derivate Verband (DDV), July 2008 has been the month with the highest new issue of such instruments so far (investment- and leveraged products), with a total new issue of close to 60,000 new instruments with a total number of outstanding instruments of 352,000. Some of these instruments have original maturities above 2 years and are therefore outside the maturity band which is covered by M3. (Frankfurter Allgemeine Zeitung, 13 August 2008, page 19). It should be mentioned that, given their retail character, these instruments have sometimes very small amounts outstanding which are not comparable to the respective amounts for other short-term debt securities, such as e.g. ECP.

- To support this identification and monitoring of these instruments in the future, an appropriate statistical category within the MFI balance sheet has been defined by the ECB, based on the following reasoning: A general separation of all instruments with (implicitly) embedded derivatives seems difficult, since this would also include convertible bonds where the holder has the right but not the obligation to convert and would also include certain "investment" certificates where the nominal capital is guaranteed to 100% at redemption. The latter products have the same capital certainty as cash, when abstracting from the default risk of the issuing MFI.[22] Furthermore, there may be a problem when separating euro denominated certificates with an embedded currency option while accepting at the same time straight non-EUR denominated short-term paper as a component of M3.

  Against the above, the ECB will in due time publish separate statistics on those short-term debt securities with an original maturity up to two years, where the contractual redemption amount in the issuing currency may at maturity fall below the amount initially invested, i.e. which are not capital certain in nominal terms.

The timely identification and assessment of financial innovation within an existing statistical classification has therefore ensured that monetary analyses can be conducted based on accurate and reliable data.

7. Conclusion:

Financial innovation which may refer to products, processes and institutions, is a normal and ongoing process within a dynamic and efficient economy. As a consequence, "real-time analysis" is required to monitor and assess its potential impact. This is crucial in order to support the policy assessment. At the heart of the problem, from a statistical view, is the question, whether the measurement concept or the empirical measure are affected by financial innovation. For this purpose, one needs to regularly monitor the quality and the economic meaning of certain statistical aggregations and definitions, also with the help of micro databases. As demonstrated with a number of examples, the CSDB and national databases have the potential to support real-time monetary policy assessment.

8. References:

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[22] According to recent press articles, investors seem not yet to properly take into account differences in the issuer ratings. There is evidence that those certificates which (have to) pay relatively higher returns due to the lower rating of their issuer are preferred by investors. See, for example, "Schwache zeigen Muskeln" in Handelsblatt 16/17/18 August 2008, page 34.

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