

How micro data can contribute to an extended macro statistical framework for the assessment of stability?

Tardos Ágnes
Magyar Nemzeti Bank, the central bank of Hungary
Budapest, Hungary

Abstract

One of the statistical shortcomings identified during the financial crisis was that the current statistical data collection systems are residency based and focus on the production, use and financing process of a country or a region rather than its stability, vulnerability or financial risk profile. Out of the 20 recommendations developed by the Group Twenty (G-20) and published in their report titled '*The Financial Crisis and Information Gaps*' many were dealing directly with the increased need for more and better quality information on financial stability and also for new conceptual framework.

The paper makes an effort to highlight the shortcomings of the current reporting frameworks, the new directions defined by the G-20 initiatives and some of the possible ways forward by incorporating micro information to macro statistics. There are initiatives on new micro data collections, however so far no sufficient effort has been made to establish the proper link between micro based and macro statistics.

The paper will focus on the following three aspects of the possible improvements:

- Use of micro data in supplementing macro statistics with distributional information.
- How macro statistics could be improved by incorporating risk indicators being already in use for corporate business reporting to macro statistics.
- How the current residency based macro statistics could be supplemented with consolidated micro information in order to improve the assessment of individual countries' and regions' stability and vulnerability.

The author will make an effort to illustrate, as well as convince statisticians and users that instead of establishing a brand new macro prudential statistical framework, the existing statistical framework, namely the current Financial Accounts from the System of National Accounts should be extended with information supporting the assessment of stability.

Keywords: consolidation, financial stability, micro based statistics, risk indicators

Shortcomings of the current reporting frameworks and the loopholes in the new directions defined by the G-20 data initiative

All financial statistics (monetary statistics, financial accounts, balance of payments and international investment position statistics) include information about financial risk, however their primary focus are the flows and stocks of financing and they do not aim to provide full picture of the financial risks involved.

The current statistical data collection system derives its information from economic entities being resident in a region or country. The following two shortcomings are the consequence of the above. The first issue is that only direct cross border linkages are observed by the system i.e. financial link to the immediate counterparty of the financial instrument held or issued. The other problem is that main reporting agents are those who meet the economic entity definition of the statistical standards, however entities whose parent are not resident in the given country or region are to be considered

economic entities regardless of the nature of their operation. As a consequence entities who are satellites of companies operating in the rest of the world and whose activity is not interlinked with the economic activity of the country where they are resident (so called SPE-s) distorting the statistics of a country or region. Lack of appropriate data on micro interconnectedness is also an important aspect of the data gaps identified.

Most of the initiatives focus on the improvement of the assessment of the global economy rather than on the improvement of the vulnerability of individual countries and regions despite of the fact that one of the most important lessons of the financial crises was that the vulnerability of any individual member could put a full region at risk.

How macro statistics could be improved by incorporating risk indicators being already in use for corporate business reporting to macro statistics

What should be the main focus of financial risk, sensitivity and vulnerability analyses? As a starting point we could specify how we define financial risk and what are the most critical information that are necessary in order to evaluate each risk involved. International Financial Reporting Standard 7 the international standard for business reporting on disclosure of financial instrument in the financial statements for corporate entities defines the following financial risk categories: credit risk, liquidity risk, market risk.

For credit risk the standard requires information on maximum credit risk, collaterals, breakdown on the past due and impairment status of receivables. For liquidity risk information on maturity breakdown of undiscounted future cash flows (including interest rates) for all financial liabilities (excluding equity instrument) is required. For market risk sensitivity information should be disclosed separately for each type of market risk to which the entity is exposed at the end of the reporting period, showing how profit or loss and equity would have been affected by changes in the relevant risk variable that were reasonably possible at that time. Market risk includes currency risk, interest rate risk and other price risk.

Some information on these risks (maturity breakdown, currency breakdown) are already available in the financial statistics today. It would be worthwhile to analyze what would be the data need for the extension of financial accounts, and international investment position statistics if for the description of financial risk macro statisticians would use methodologies similar to the one described in business accounting. It should be also assessed how the definition and assessment should be modified in order to reflect the fact that the statistics describe macro aggregates.

For illustrative purposes financial market sensitivity measure has been compiled that could contribute to the already available risk measures in the Financial Soundness Indicators. The sensitivity measure is calculated similarly to the method described in IFRS 7 for individual corporate. One of the advantages of the new approach is that the same methodology could be applied for the total economy or for any of the economic sectors.

The questions below had to be answered in order to apply the IFRS methodology for macro statistics. What should be the risk positions and instruments to which the sensitivity measures are applied? How to decide what the reasonable possible risk is? For the illustrative example the following positions have been considered. The basis of the reasonable possible shift was the review of the revaluations and market movements during the past period in Hungary (see in brackets).

- ⇒ Currency risk: Net foreign currency position (10% movement of exchange rates)
- ⇒ Interest rate risk: Net interest bearing position (2 percentage point change of interest rates)

⇒ Other market risk: Investment funds and participation in listed stock exchanges (5% fluctuation in investment fund prices and 20 % in listed stock exchange prices)

Please find below the outcome of the first experimental calculation for the non financial sector and households.

Table 1
Market Risk Sensitivity of Hungarian Non-financial Corporate and Household Sector per GDP

<u>Non Financial Corporate</u>	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
FX sensitivity	1,2%	1,1%	1,2%	1,5%	1,1%	1,6%	2,2%	2,2%	1,9%	1,9%	2,1%
Interest rate sensitivity	0,4%	0,5%	0,6%	0,7%	0,7%	0,7%	0,8%	0,9%	0,9%	0,8%	0,9%
Other price sensitivity	0,3%	0,4%	0,5%	0,6%	0,3%	0,9%	0,9%	0,8%	1,0%	1,0%	1,1%
Total	1,9%	2,1%	2,2%	2,8%	2,1%	3,2%	4,0%	3,9%	3,8%	3,8%	4,2%
<u>Households</u>	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
FX sensitivity	0,2%	0,1%	0,2%	0,6%	0,8%	1,2%	1,9%	1,8%	1,9%	1,7%	1,0%
Interest rate sensitivity	0,0%	0,1%	0,2%	0,3%	0,3%	0,4%	0,5%	0,5%	0,5%	0,5%	0,3%
Other price sensitivity	0,4%	0,4%	0,4%	0,6%	0,5%	0,7%	0,6%	0,6%	0,7%	0,7%	0,7%
Total	0,6%	0,6%	0,8%	1,4%	1,6%	2,3%	2,9%	2,9%	3,1%	2,8%	2,0%

Source: Own estimate based on MNB Financial Accounts Data

The most significant source of sensitivity in both sectors is the foreign currency sensitivity. The increase of foreign currency exposure in the non-financial corporate sector and the households can be explained by the increase of gross indebtedness and within that/it the increased share of foreign currency borrowing. During and after the financial crises the slow down of lending to both sectors was counter-balanced by the depreciation of the Forint and thus the indebtedness decreased only very slowly. The decrease of the indebtedness of the Hungarian households in 2011 and 2012 was the outcome of a government regulation which required banks to allow repayment of loans by indebted households at historical exchanges rates. The resulting loss was shared between the banks and the government.

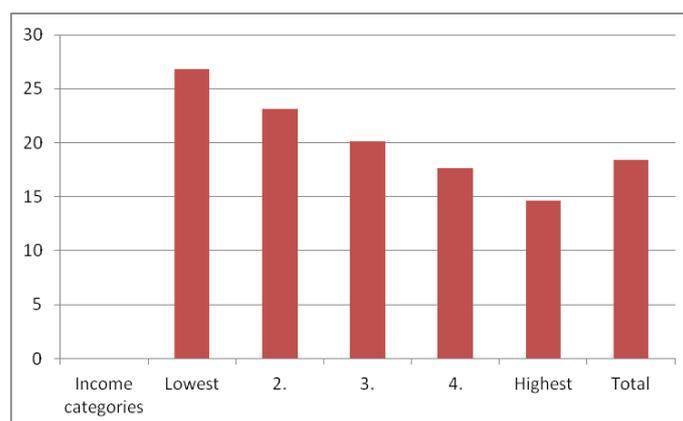
Use of micro data in supplementing macro statistics with distributional information

Due to prevailing methodological differences it is not easy to compare indebtedness of different countries and sectors despite of the fact that all Euro Area countries and most other European countries compile Financial Accounts according to the European System of Accounts. Despite of the methodological difficulties it could be concluded that on sector level the gross indebtedness of households is relatively low compared to other European countries while indebtedness of non-financial corporate sector seems to be relatively high, although for proper international comparison of non financial sector data inter-company loans must be excluded from the indebtedness calculation. In order to assess the macroprudential implication of indebtedness it is also important to take into account the level of interest rates and the income generation capability of the sector and the equity level of the non financial corporate. But above all, it is impossible to assess the vulnerability of the sectors due to the debt burden without appropriate distributional information of indebtedness within the sector. Please find below some examples illustrating the importance the distributional data.

According to the 2010 household survey of the Hungarian Central Statistical Office all the borrowings are held by 32% of the households. In other words 68% of the Hungarian households do not have any

loan outstanding to financial institutions. The average loan repayment burden of indebted households compared to disposable income is more than 25%. 36% of the poorest households had repayment burden above 30% and 14% of the poorest households had repayment burden over 50% in 2010. These latest households are the ones whose solvency is most vulnerable to any shocks.

Graph 1
Average Loan Repayment Burden of Households Compared to Disposable Income in %



Source: Households survey of the Hungarian Central Statistical Office (2010)

Likewise to the household sector in order to assess the vulnerability of non-financial sector due to indebtedness, we need information on the distribution of loans to different enterprise groups. 76% of the non financial corporate operated without bank borrowing in 2007¹. One third of companies with debt are indebted in foreign currency denominated loans. Majority of foreign currency indebted firms does not have any export activity and thus are exposed to currency mismatch as a result of the foreign currency borrowing. This mismatch group represents only 7% of all firms but they held 65% of all outstanding bank loans as of 2007. They employed 17% of the workforce and their value added was 23% within the Hungarian corporate sector. Companies with mismatch were hit harder by the crisis - their bankruptcy rates were higher, their investment contractions were more significant compared to their counterparts. The share of firms with mismatch decreased from 7% to 4% by 2010. Meanwhile, their share in the domestic loan portfolio decreased only by 2.5% due to the devaluation of Forint against foreign currencies. The overall impact of these firms on the Hungarian economy could be much larger than their direct impact on the real economy due to their significant share in the domestic bank's portfolio.

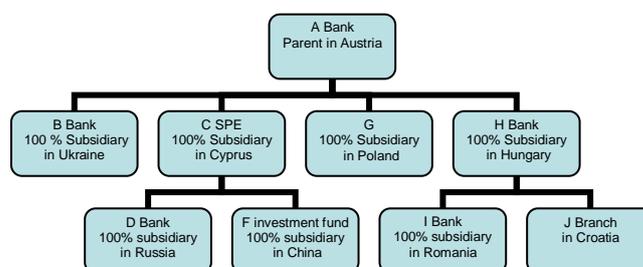
In order to enhance international comparability it would be crucial to agree internationally standardized methodology and data structure for distributional information.

¹ Source of info on the distributional non financial corporate sector information are from the following publication: Mariann Endrész, Győző Gyöngyösi, Péter Harasztosi: Currency mismatch and the sub-prime crisis: firm level stylized facts from Hungary – MNB Working Papers 8, 2012

Integration of consolidated micro information to macro statistics

The current statistical data collection system is residency based. Please find below the chart of an international banking group. The parent bank of the group Bank A is resident in Austria. The Austrian Bank has 4 direct subsidiaries (B, C, G and H) and other 3 subsidiaries (D, F and I) and 1 branch (J) controlled by the direct subsidiaries. The residency based statistics (Financial Accounts and International Investment Position) in Hungary includes information on H Bank being resident in Hungary and its direct link with any other member of the group. The traditional financial accounts provide information on the Austrian parent and the investment in the Romanian subsidiary and the Croatian branch. However in order to assess the financial stability of H bank it is not sufficient to evaluate national aggregates but the financial position of H should be also assessed separately and it is also important to understand the financial asset and liability portfolio of H bank in combination with its subsidiary (I Bank) and its branch (J Branch). The consolidated view of Bank H, Bank I and Branch J is provided by the Financial Soundness Indicators (See G 20 recommendation 2 and 3).

Graph 2
Corporate structure of an illustrative International Banking Group



What are the inter-linkages that we cannot see?

The investment chains in our global world are very often more complex than the direct link currently observed by our statistical system. The current residency based data collection system focuses on direct counterparts and thus the Austrian statistics do not provide sufficient information on the Russian, Chinese, Romanian and Croatian subsidiaries and branches. Simultaneously the Romanian, Chinese, Romanian and Croatian statistics do not show the linkages with Austria.

Further complication is caused by the Cyprus SPE whose data might be excluded from the national aggregates of Cyprus in order to provide meaningful information on the national economy.

Consolidated financial position of the Parent influences the financial position of the subsidiary. The financial position of Hungary and Bank H is also dependent on the financial position of the Consolidated Banking Group of A including all external financial position of subsidiaries and branches within the group. That consolidated view is currently collected by BIS for large banks, however the consolidated banking data collected and compiled by BIS are useful only to analyze world aggregates and are not designed to support national and country vulnerability.

Incorporation of consolidated micro information to the Financial Accounts

The following table illustrates the magnitude of the difference between data from stand alone consolidated financial statements of Hungarian Financial Institutions.

Table 2
Selected Indicators of Monetary Financial Institutions for 2012
in % of GDP unless otherwise stated

	Solo Monetary Financial Institutions	Consolidated Monetary Financial Institutions	(Consolidated data) / (Solo data)
1. Gross Loans	67%	78%	117%
2. Impairment	-7%	-10%	158%
3. Net Loans (3)=(2)+(1)	60%	68%	112%
4. Total Non Performing Loans Gross	9%	14%	154%
5. Impairment	-5%	-8%	167%
6. Non performing net of provision (6)=(4)+(5)	4%	6%	138%
7. Equity	11%	10%	88%
8. Non performing net loans per equity (8)=(6)/(7)	38%	60%	156%
9. Non performing loans per loans gross (9)=(4)/(7)	14%	18%	132%

Source: MNB Financial Stability Indicators and own estimate based on solo and consolidated Financial Statements of Hungarian Banks including foreign subsidiaries

In order to provide better and more comprehensive information on the credit risk being inherent in the economy, the current residency based macro statistics could be supplemented with consolidated micro information which could improve the assessment of individual countries' and regions' stability and vulnerability. One practical approach could be to 'adjust' traditional financial accounts with information from the consolidated financial statements. This would lead to a new consolidated national economy concept. The border of the economy would be extended to subsidiaries of economic entities operated in Hungary. On the other hand SPE-s whose economic activity is not related to the Hungarian economy should be excluded from this new concept.

The source of information could be the Financial Stability Indicators (FSI) currently compiled for monetary institutions that will be extended to other financial intermediaries and insurers and also the stand alone and consolidated financial statements of other major non financial companies. It could be also important to provide further breakdown of financial accounts data per ultimate owners (domestic or foreign). A further step could be the identification in the financial balance-sheets and the capital in transit. Capital in transit is defined as financial receivables and payables arising from capital movements without direct impact on the functioning of the resident economy.

Conclusion

The author's belief is that instead of establishing a brand new macro prudential statistical framework, the existing statistical framework, namely the current Financial Accounts from the System of National Accounts should be extended with information supporting the assessment of stability.

The aim of this paper was to stimulate the thinking process. We are just at the beginning of a new era. We do not know exactly where the new developments will take us. The later we start the process the later we get there.