Compilation of Detailed Flow of Funds: Korea's Experiences[1]

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Abstract

Since the financial crisis of 2008, the demand for data on financial interconnectedness among economic sectors has been increasing. However, data on financial inter-linkages between sectors are still inadequate. The Detailed Flow of Funds is one such statistical series that can show sectoral linkages and as a result its compilation is recommended by the 2008 System of National Accounts. This paper discusses the Bank of Korea's endeavors to provide information on interconnectedness between sectors by compiling Detailed Flow of Funds. Its contents include an outline of the Korean Detailed Flow of Funds statistics that the Bank of Korea has developed, the method of data collection, and challenges in their compilation.

Keywords: From-whom-to-whom accounts, Inter-sectoral linkages, Detailed Flow of Funds

[1] The views expressed in this paper are those of author and do not necessarily represent those of the Bank of Korea.

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1. Introduction

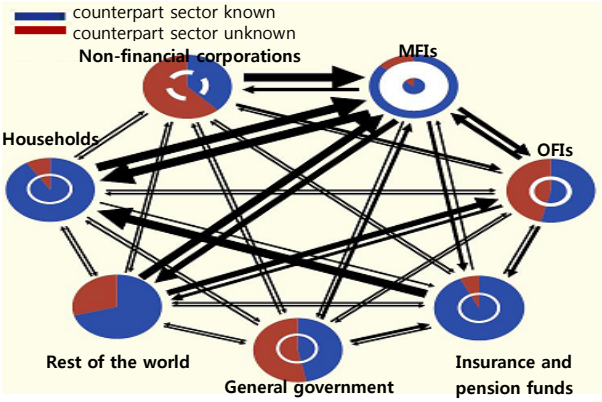
Detailed flow of funds statistics are on from-whom-to-whom basis, which can show creditors and debtors in a matrix form for every financial instrument. Their compilation has been recommended by the 2008 System of National Accounts (SNA). As the global financial crisis of 2008 clearly revealed the need to pay more attention to financial stability, the demand for these statistics, which enable data users to analyze financial interconnectedness, has also been increasing.

The G20 also recommends improving the Flow of Funds to fill in data gaps and thus international bodies such as the IMF and BIS have started to gather data for understanding financial transactions between sectors. Also, central banks are making efforts to identify linkages between institutional sectors, using economic statistics such as financial accounts or economic models such as the DSGE. Chart 1 shows euro-area and Japanese sectoral interconnectedness. Likewise, the Bank of Korea has endeavored to analyze inter-sectoral linkages. One such effort involves developing Korean Detailed Flow of Funds.

This paper is organized as follows: Section 2 presents an outline of the Korean Detailed Flow of Funds that the Bank of Korea has developed. Section 3 describes the main data sources and the compilation procedures of the Korean Detailed Flow of Funds. Section 4 provides several findings from analyses based on the Korean Detailed Flow of Funds. Section 5 concludes by setting out several challenges in compilation and future tasks.

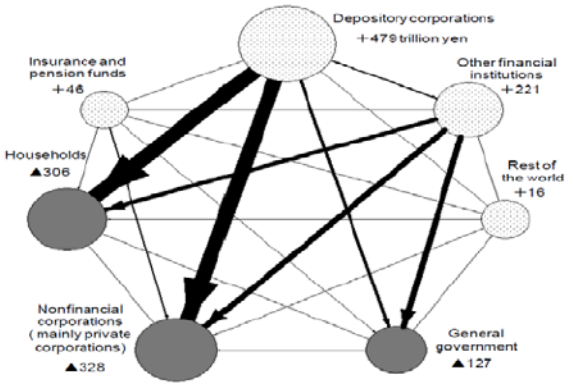
[Chart 1]

Inter-sectoral exposures in euro area (2010)



Source: ECB, Monthly Bulletin(Jan. 2012)

Inter-sectoral transactions in Japan (Loans)



Source: BOJ, Bank of Japan Review(Apr. 2012)

2. Outline of Korean Detailed Flow of Funds

Korean Detailed Flow of Funds statistics consist of two tables, a transaction table and a stock table. Each table describes who does what with whom. That is, sectors in the columns and rows of the table represent creditors and debtors respectively. The basic structure of the table is shown in Table 1.

Like the Flow of Funds statistics, there are five sectors: financial corporations, general government, non-financial corporations, households and non-profit institutions serving households, and rest of the world. Particularly, financial corporations sector is classified into eight subsectors: central bank; deposit taking corporations (having two sub-subsectors, bank and non-bank); investment funds (having two sub-subsectors, money market funds and non-money market funds); insurance companies; pension funds; other financial intermediaries (having three sub-subsectors, securities companies, financing companies, and public financial institutions); financial auxiliaries; and captive financial institutions and money lenders. The reason of this is for capturing linkages among financial subsectors in detail.

In view of data reliability and availability, the Korean Detailed Flow of Funds statistics only cover five financial instruments: currency and deposits; loans; debt securities; insurance and pension reserves; and investment fund shares. These five financial instruments cover more than 60% of total financial assets. With regard to valuation, all transactions and stocks of financial instruments are evaluated at market prices. The Korean Detailed Flow of Funds statistics are compiled in a non-consolidated basis.

[Table 1] **Basic structure of transaction and stock table**

		Creditor				
		Financial corporations	General government	Non-financial corporations	Households and NPISHs	Rest of the World
Debtor	Financial corporations					
	General government					
	Non-financial corporations					
	Households and NPISHs					
	Rest of the world					

[Table 2] **Summary of Korean Detailed Flow of Funds**

	Details
Framework	Transaction table Stock table
Classification of Sectors	Financial corporations ▪ Central bank ▪ Deposit taking corporations Banks Non-banks ▪ Investment funds MMF (Money Market Funds) Non-MMF ▪ Insurance companies ▪ Pension funds ▪ Other financial intermediaries Securities companies Financing companies Public financial institutions ▪ Financial auxiliaries ▪ Captive financial institutions and money lenders
	General government
	Non-financial corporations ▪ Public non-financial corporations ▪ Private non-financial corporations
	Households and non-profit institutions serving households
	Rest of the world
Classification of Financial instruments	Currency and deposits ▪ Currency ▪ Transferable deposits ▪ Non-transferable deposits
	Loans ▪ Short-term loans ▪ Long-term loans ▪ Government loans
	Debt securities ▪ Short-term debt securities ▪ Long-term debt securities ▪ Derivatives-linked securities ▪ Commercial paper
	Insurance and pension reserves
	Investment fund shares
Accounting rules	Valuation: Market price Consolidation: Non-consolidation basis

3. Data Sources and Compilation Procedures of Detailed Flow of Funds

3.1 Data sources

The main data sources are the raw data of the Flow of Funds statistics. To compile the Flow of Funds and Detailed Flow of Funds, Bank of Korea (BOK) integrates data frameworks by adding counterparty information to the original survey forms, which are collected from financial corporations, general governments, and public non-financial corporations. For instance, BOK collects data which can show who deposits where. Table 3 shows the survey form for deposits. Like this, BOK collects data on financial assets such as securities by issuers and loans by borrowers and data on financial liabilities such as debts by lenders.

Also, data collected by other institutions are used to compile Detailed Flow of Funds as supplementary data. There are financial market data such as investment fund statistics collected by Korea Financial Investment Association and debt securities statistics collected by Korea Securities Depository. Another type of supplementary data is the financial statements filed with financial supervisory authorities.

[Table 3] **Detailed statement on deposits held**

Institution:

Counterpart	**Breakdown of deposits**	**Amounts**
Central bank	Deposits	
	Repurchase agreements	
Commercial banks	Transferable deposits	
	Short-term savings deposits	
	Long-term savings deposits	
	Cover bills	
	Negotiable certificates of deposits	
	Repurchase agreements	
Specialized banks	Transferable deposits	
	Short-term savings deposits	
	Long-term savings deposits	
	Cover bills	
	Negotiable certificates of deposits	
	Repurchase agreements	
Foreign bank branches	⋮	
Mutual savings banks	⋮	
⋮	⋮	
Total		

3.2 Compilation procedures

Basically, the compilation procedures of Detailed Flow of Funds are very similar with those of Flow of Funds. First, for every sector other than the private non-financial corporations sector and the households and non-profit institutions serving households sector, a detailed balance sheet is made out using counterpart information. Table 4 shows a detailed balance sheet for each institutional unit. Almost every financial instrument is classified by counterpart sectors. Then detailed balance sheets of institutional units are aggregated by sector.

[Table 4] **Detailed Balance Sheet**

Financial Assets	Amounts	Counterpart sector
1. Monetary gold and SDRs		
2. Currency and Deposits		
2.1) Currency		Central bank
2.2) Transferable Deposits		
2.2.1) Bank transferable deposits		Banks
2.2.2) Non-bank transferable deposits		Non-banks
2.2.3) Deposits at the central bank		Central bank
2.2.4) Deposits by general governments		Central bank
2.3) Non-transferable Deposits		
2.3.1) Short-term savings deposits		
2.3.1.1) Banks		Banks
2.3.1.2) Non-banks		Non-banks
2.3.2) Long-term savings deposits		
2.3.2.1) Banks		Banks
2.3.2.2) Non-banks		Non-banks
2.4) Cover Bill		
2.5) Negotiable Certificates of Deposit		Banks
2.6) Repurchase Agreements		
2.6.1) Central bank		Central bank
2.6.2) Other financial corporations		
2.6.2.1) Banks		Banks
2.6.2.2) Non-Banks		Non-banks
2.6.2.3) Investment funds		Investment funds
2.6.2.4) Insurance companies		Insurance companies
2.6.2.5) Securities companies		Securities companies
2.6.2.6) Financial companies		Financial companies
2.6.2.7) Public financial companies		Public financial companies
2.7) Money in Trust		Non-banks
2.8) Other Deposits		
3. Insurance and Pension Reserves		Insurance companies Pension funds
. . .	. . .	
Total		

[Table 4] **Detailed Balance Sheet**

Financial Liabilities	Amounts	Counterpart sector
1. Monetary gold and SDRs		
2. Currency and Deposits		
2.1) Currency		
2.2) Transferable Deposits		
2.3) Non-transferable Deposits		
2.3.1) Short-term savings deposits		
2.3.2) Long-term savings deposits		
2.4) Cover Bill		
2.5) Negotiable Certificates of Deposit		
2.6) Repurchase Agreements		
2.7) Money in Trust		
2.8) Other Deposits		
3. Insurance and Pension Reserves		
4. Debt securities		
4.1) Short-term debt securities		
4.2) Long-term debt securities		
4.3) Derivatives-linked securities		
5. Loans		
5.1) Short-term loans		
5.1.1) BOK loans		Central bank
5.1.2) Deposit taking corporation loans		
5.1.2.1) Banks		Banks
5.1.2.2) Non-banks		Non-banks
5.1.3) Investment fund loans		Investment funds
5.1.4) Insurance co. & pension fund loans		Insurance and Pensions
5.1.5) Financial intermediary loans		
5.1.5.1) Securities companies		Securities companies
5.1.5.2) Financing companies		Financing companies
5.1.5.3) Public financial companies		Public financial companies
5.1.6) Financial auxiliary loans		Financial auxiliaries
5.1.7) Captive financial inst. and money lender loans		Captive and money lenders
5.1.8) Call money		
5.2) Long-term loans		
.	.	
.	.	
.	.	
Total		

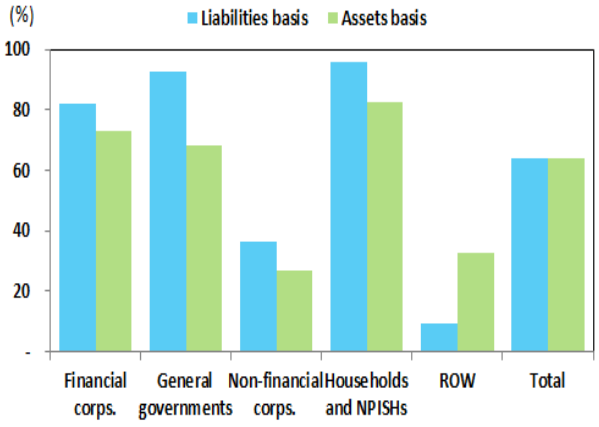
Second, after aggregating detailed balance sheets by sector excluding private non-financial corporations and households and NPISHs, total financial assets or liabilities are fixed and residuals are allocated to the private non-financial corporations sector and the households and NPISHs sector using counterpart information. After balancing vertical and horizontal accounts, every cell in balance sheets is rearranged in accordance with Detailed Flow of Funds frameworks.

4. Selected Results from the Pilot study

According to the pilot study, the proportion of counterparts identified in total financial assets (or total financial liabilities) is about 60%. Regarding economic sectors, the proportion of counterparts identified in total financial assets of financial corporations, general government, and households and non-profit institutions serving households is more than 70%. However, that of non-financial corporations and the rest of the world is around 30% or less. This is because the proportion of shares, direct investments, and trade credits in their total financial assets (or financial liabilities) is much larger than that of the financial instruments that Korean Detailed Flow of Funds covers. Chart 2 and Chart 3 shows respectively the proportions of counterparts identified in each sector's financial assets and liabilities and the proportion of financial instruments held by each economic sector.

[Chart 2]

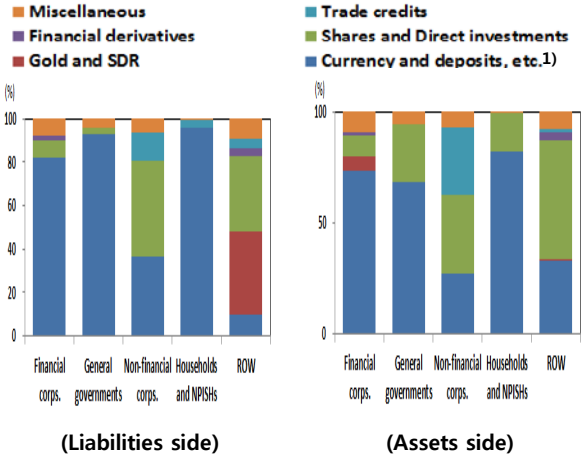
Proportions of counterparts identified by sectors



Source: Pilot study (as of end-2012)

[Chart 3]

Proportions of financial instruments held by sector



Note: 1) Currency and deposits, loans, debt securities, insurance and pension reserves, and investment fund shares

Source: Pilot study (as of end-2012)

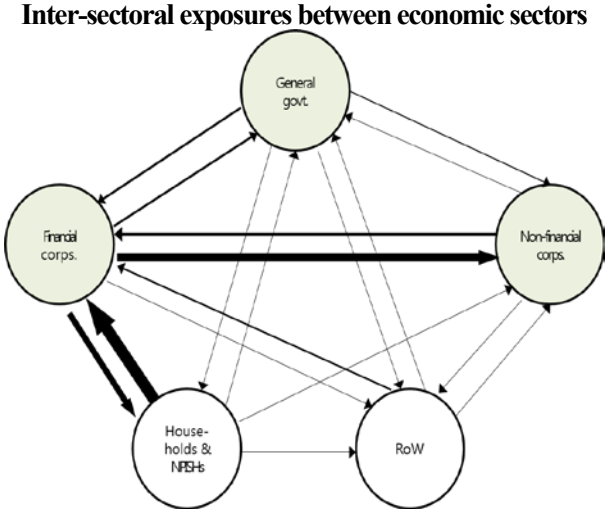
With regard to inter-sectoral exposures, exposures are mainly related to financial corporations, which function as financial intermediaries. For the general government sector, the proportion of exposures with financial corporations in its financial assets is about 44%, which is less than the corresponding proportions in other sectors' financial assets. This is due to the heavy weight of intra-sectoral exposures in the general government sector. For instance, there are lots of intra-sectoral transactions among

general government subsectors, such as central government loans borrowed by local governments and government debt securities held by social security funds.

As for intra-sectoral exposures, financial corporations and general government have a large portion of intra-sectoral exposures, making up more than 30% of their financial assets (or liabilities). However, the intra-sectoral exposures of non-financial corporations account for less than 5% of their financial assets (or liabilities). Chart 4 and Chart 5 show inter-sectoral exposures and intra-sectoral exposures respectively.

[Chart 4]

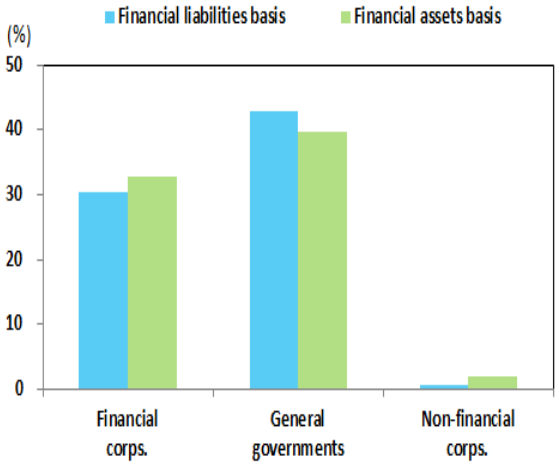
Inter-sectoral exposures between economic sectors



Note: Arrows indicate direction of funds and their width indicate the size of inter-sectoral exposure.
Source: Pilot study (as of end-2012)

[Chart 5]

Proportions of intra-sectoral exposures



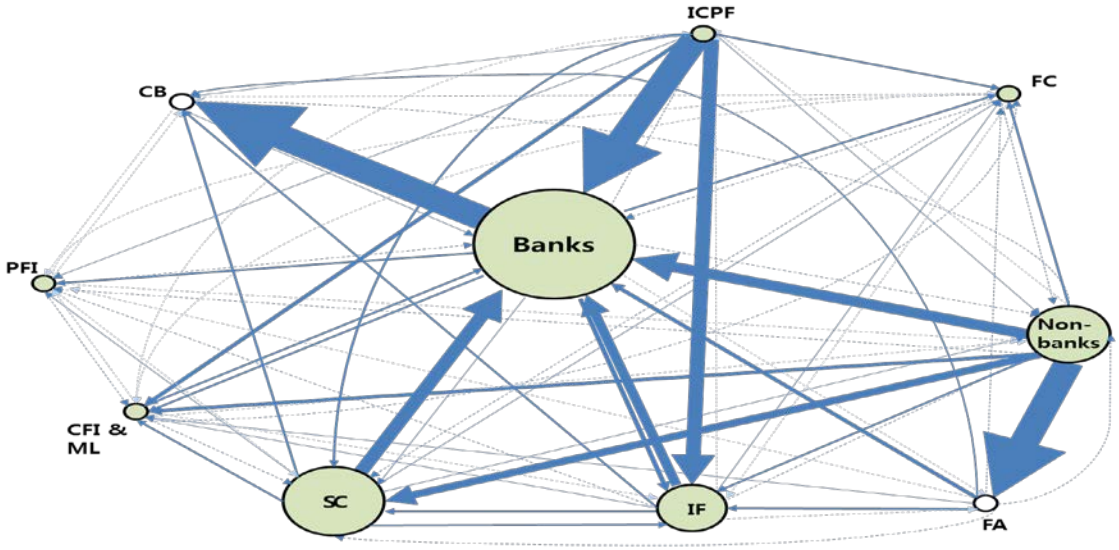
Source: Pilot study (as of end-2012)

Regarding mutual exposures in the financial corporations sector, banks play a central part in the financial system, as other financial subsectors such as central bank, non-bank deposit taking corporations, securities companies, insurance and pension funds, and investment funds have large amounts exposures to bank. Banks have a large weight of their financial assets with central bank owing to bank reserves and Monetary Stabilization Bonds holdings. However, banks raise funds from insurance and pension funds, non-bank deposit taking corporations, securities companies, and investment funds. In the case of non-bank deposit taking corporations, they operate large portion of their funds with financial auxiliaries but the scale of their financing from other financial corporations is not that large.

For intra-sectoral exposures in financial corporations sector, banks' intra-sectoral exposures are the heaviest and are followed by securities companies, non-bank deposit taking corporations, and investment funds in that order. Chart 6 displays the inter-subsectoral exposures in the financial corporations sector.

[Chart6]

Inter-subsectoral exposures in the financial corporations sector



Notes: 1. Size of ○ indicates size of intra-sectoral exposures. Arrows and their width indicate the direction of funds and the size of inter-subsectoral exposures respectively.

2. CB: central bank, ICPF: insurance companies and pension funds, FC: financing companies, FA: financial auxiliaries, IF: investment funds, SC: securities companies, CFI & MF: captive financial institutions and money lenders, PFI: public financial institutions.

5. Future plans

The Korean Detailed Flow of Funds statistics briefly introduced in Section 2 and 3 promise to be very useful from a financial stability perspective, enabling data users to measure interconnectedness between economic sectors and to analyze contagion risks. However, because these statistics are in their early stage of development, there are many compilation issues needing to be improved in the future. Among them, crucial issues of mismatch problems between creditors' and debtors' data and the expansion of their coverage are described in this section.

Mismatch problems between debtors' information and creditors' information are caused by several factors. First, these problems result from the heavy dependence on balance sheet data when compiling the Detailed Flow of Funds. According to accounting standards such as Korean International Financial Reporting Standards, financial instruments are classified into four categories: held-for-trading; available-for-sale; held-to-maturity; and loans and achievable securities. Held-for-trading and available-for-sale financial instruments are measured at fair value and the other remaining financial instruments at amortized cost. Therefore, financial instruments can be evaluated differently according to their classification. Assume that banks and insurance companies hold debt securities issued by credit card companies. If banks and insurance companies classify them as available-for-sale and held-to-maturity respectively, securities values from credit card companies' balance sheets (liabilities side) are very different from the sum of their values from banks and insurance companies' balance sheets (assets side). In other words, mismatch problems necessarily arise if balance sheet data are used as the main data sources for compiling Detailed Flow of Funds statistics. Second, these problems are caused by respondents who do not fully understand the classification of counterparts. In fact, the Bank of Korea provides respondents with a detailed classification table of counterpart to help them in preparing our survey templates. However, respondents are often confused by the classification. For instance, if respondents classify debentures issued by security companies under bank debentures, the securities' aggregates using creditors' data are not the same as those using issuers' data. Therefore, it is necessary to change compilation methods from using only balance sheet data to using financial market data together with balance sheet data. For instance, securities data may be obtained from the securities depository. Also, it is important for compliers to communicate with respondents in order to let them know how to fit data correctly in survey templates.

With regard to expansion of the coverage of the Detailed Flow of Funds, there are two things to bear in mind. First, it is necessary to cover more financial instruments. For now, Detailed Flow of Funds only covers five financial instruments: namely, currency and deposits; insurance; debt securities; loans; and investment fund

shares. However, shares and financial derivatives should also be included. The second issue concerns the classification of financial subsectors. In order to analyze risks incurred by financial corporations, more detailed granularity is needed.

We expect that complete statistics will be released once these issues are addressed. Consequently, the Detailed Flow of Funds statistics can then be used as background data for monetary and financial stability policy.