A Flow-of-Funds Analysis of the Japanese Economy: Inequality among Households and among Firms

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A Brief History of Flow-of-Funds Analysis

Funds was one of the popular academic topics, both in law and economics, at the turn of the nineteenth and twentieth centuries after the excavation at Pompeii of the *tabulae ceratae* (wax-covered tablets) of Lucius Caecilius Iucundus, a first-century *argentarius*.

Argentarii, the ancient Roman equivalent of commercial bankers, were originally a kind of notaries who documented business transactions.

The proceeds from sales that were recorded in the *argentarii rationes* (bank ledger) were transferred between the clients of *argentarii* as a means of payment; it was then called *uacua pecunia*, literally meaning 'virtual currency', which is the origin of funds as we refer to it today.

It was Herbert Davenport (1908, 1913) and Frank Taussig (1911), the alumni of Harvard Law School, who invented the modern concept of funds in relation to the banking operations: 'creation of funds', 'transfer of funds', etc.

The first economist who made a systematic use of flow-of-funds account was Ragnar Frisch (1935).

The paper was published as the core of the report prepared by the Monetary Committee of the Norwegian parliament in 1935, which recommended the Norges Bank should start using open market operations in a systematic manner in order to invigorate the credit creation process in the commercial banks.

Frisch not only invented the concept of open market operation, the indispensable tool for modern central banking, but also demonstrated the effects of the operations with his 3-sector 5-instrument model.

Prototype of Ragnar Frisch's Flow-of Funds Table

	Central bank		Commercial banks		Nonbank sector	
	Payment	Receipt	Payment	Receipt	Payment	Receipt
Banknotes in circulation		×	×		×	
Reserve deposit		×	×			
Bank deposits				×	×	
Bank lendings			×			×
Open market operations	×			×		×
Net payment		×		×		×

Paolo Baffi, who had been hired by the Banca d'Italia in 1936, evaluated the consequences of central bank operations on the financial statements of various sectors of the economy before and during World War II.

His data set christened *Bilancio Monetario Nazionale* (National Monetary Balance) was a depiction of *circolazione monetaria* or monetary circulation.

Bilancio monetario nazionale

(*miliardi di lire*)

	ANNO 1946				ANNO 1947				ANNO 1948			
	IMPIEGHI		Raccolta tra il pubblico	Differenza tra impieghi e raccolta (effetto residuo sulla circolazione)	IMPIEGHI		Raccolta tra il pubblico	Differenza tra impieghi e raccolta (effetto residuo sulla circolazione)	IMPIEGHI		Raccolta tra il pubblico	Differenza tra impieghi e raccolta (effetto residuo sulla circolazione)
	per il Tesoro	per l'economia			per il Tesoro	per l'economia			per il Tesoro	per l'economia		
Banca d'Italia (operazioni dirette col pubblico ed istituti speciali)												
Anticipazioni a privati		0,9				9,9				— 1,9		
Prorogati pagamenti a privati		0,2				— 0,2				—		
Sconti diretti		0,1				0,3				—		
Risconto ammassi istituti e sezioni di credito agrario		13,4				36,0				3,4		
Risconto Consorzio sovvenzioni su valori industriali		1,6				13,3				— 1,2		
		16,2				*59,3*				*0,3*		
Depositi privati			—				— 4,4				29,9	
Vaglia, assegni ed altri impegni a vista			1,7				1,1				1,7	
			1,7	*14,5*			*— 3,3*	*62,6*			*31,6*	*— 31,3*
Aziende di credito												
Investimenti in B. T. O. ai fini del rapporto:												
diretti	—				36,2				73,3			
tramite B. I.	—				14,4				61,3			
Altri investimenti in B. T. O.	63,2				— 3,7				73,2			
Investimenti in altri titoli di stato	4,4				12,7				10,9			
Depositi presso il Tesoro	7,2				— 5,1				— 16,6			
	74,8				*54,5*				*202,1*			
Impieghi commerciali		256,2				365,2				349,1		
Eccedenza delle partite varie attive sulle partite varie passive		31,0				—				—		
		287,2				*365,2*				*349,1*		

The name ‘flow of funds’ is attributable to *Flow of Funds in the United States 1939-1953*, the first official statistics bore that name, which was published by the Board of Governors of the Federal Reserve System in 1955.

In the basic concepts of the Moneyflows Accounts, the direct ancestor of the U.S. Flow of Funds Accounts, Wesley Mitchell (1944) and Morris Copeland (1947, 1949, 1952) conceive of the economy as composed of institutional sectors.

Units in each of these sectors make and receive payments to other units in the same and the other sectors; this part of Moneyflows Accounts is referred to as ‘statement of payments’.

The other part of Moneyflows Accounts consists of the financial balance sheets of the institutional sectors; this part of Moneyflows Accounts is referred to as ‘statement of balances’.

The ‘statement of payments’ was omitted from the U.S. Flow of Funds Accounts in 1959 when the Fed started to publish the statistics on a quarterly basis.

While ‘statement of payments’ includes both the financial and non-financial transactions, today’s financial accounts do not cover the non-financial payments; it is problematic because the statistics no longer depict the entire circulation of funds throughout the economy.

As Stephen Taylor (1991), a prominent economist at the Fed, has remarked:

"It is these changes, more than that followed, that may have let Copeland feel that Moneyflows Analysis had been lost somewhere along the way."

"This had a major effect on the form of nonfinancial transactions in the system: gone were accounts for wages paid and received by sector, for interest paid and received by sector, and so forth."

"As a result, it meant that the flow-of-funds matrix — the defining form of flow-of-funds analysis — became very much truncated in its nonfinancial sections."

After the Bank of Japan (BOJ) introduced quantitative easing as a policy to the world in 2001, Tsujimura and Tsujimura (2003) applied Frisch and Baffi's ideas to analyze the effects of the policy using the formulae proposed by Richard Stone (1966) and Lawrence Klein (1983).

The study investigated the effects of each policy option on each sector of the economy while accounting for the lender-borrower relationship among institutional sectors.

Some central bankers commented that it was misleading because the analysis was based on the who-to-whom asset-liability matrix (lender-borrower matrix) derived from the financial balance sheets published by the BOJ.

Their argument was that the analysis only accounted for the financial market, so that the policy effects on the broader economy, such as on production and employment, were overlooked.

When Tsujimura and Tsujimura (2018) analyzed the U.S. quantitative easing, they used who-to-whom flow-of-funds matrix (payer-payee matrix) reviving the Mitchell and Copeland's original idea of 'statement of payments'.

A Flow-of-Funds Analysis of the Japanese Economy: Inequality among Households and among Firms

The present paper studies inequality among households and among firms using disaggregated National Accounts of Japan for 2020 by converting it into a ‘statement of payments’ using the indirect method of preparing cash-flow statement.

The formulae to convert ‘statement of payments’ into a who-to-whom matrix were proposed separately by Richard Stone (1966) and by Lawrence Klein (1983).

While the Klein formula uses the payment portfolio, the Stone formula applies the receipt portfolio to distribute the payments among institutional sectors on the pro rata basis.

The first step to draw up a who-to-whom matrix is to pick out the payment and receipt vectors separately from the 'statement of payments' in order construct two matrices **P** and **R**, whose columns represent institutional sectors and the rows denote each category of transactions.

Both the payment matrix **P** and receipt matrix **R** consist of 19 sectors, including the rest of the world, and 82 categories of non-financial and financial transactions.

Thus, who-to-whom flow-of-funds matrix, whose row-sectors are payers and the column-sectors are payees, is a 19-sector square matrix.

Institutional Sectors

1	Central bank
2	Commercial banks
3	Credit unions
4	Insurers, pension funds, etc.
5	General government
6	NPISHs
7	Households (Homeowners)
8	Households (Mortgaged homeowners)
9	Households (Tenants)
10	Unincorporated enterprises I
11	Unincorporated enterprises II
12	Unincorporated enterprises III
13	Small corporations I
14	Small corporations II
15	Small corporations III
16	Large corporations I
17	Large corporations II
18	Large corporations III
19	Rest of the world

I	Primary industry (Agriculture, forestry and fishery)
II	Secondary industry (Manufacturing, construction and mining)
III	Tertiary industry (Industries not elsewhere classified)

Transactions in summary

1	Intermediate consumption
2	Household final consumption expenditure
3	Government final consumption expenditure
4	Public capital formation
5	Private non-resicential capital formation
6	Private resicential capital formation
7	Goods for resale
8	Exports
9	Imports
10	Compensation of employees
11	Taxes on production and imports
12	Interest
13	Distributed income of corporations
14	Investment income disbursements
15	Rent on land, etc.
16	Residential rent
17	Current taxes on income, wealth, etc.
18	Social benefits
19	Employers□social contributions
20	Households' social contributions
21	Other current transfers
22	Net acquisitions of land, etc.
23	Capital transfers
24	Loans
25	Debt securities
26	Equities
27	Insurance and pension reserves
28	Other accounts receivable/payable

	Non-financial transactions
	Financial transactions

New funds are solely provided by the banking sector, which includes ‘central bank’, ‘commercial banks’ and ‘credit unions’.

The funds provided by the banking sector are distributed among each category of transactions according to its payment portfolio, which is then redistributed among the institutional sectors proportional to the rows of the receipt matrix **R**.

Since a recipient of the funds increases its payment unless the sector hoards the funds as deposit, the provision of funds creates a series of payments until the last cent is hoarded.

The sequence of the payments is written as the Leontief inverse, which is traditionally used to describe an inter-industry input-output structure of an economy.

The columns of the banking sectors of the Leontief inverse of the flow-of-funds matrix, show total amount of payment each sector ultimately receives when each type of banks provides a unit of funds to its customer.

Major Findings of the Study

When ‘central bank’ provides a unit of funds through an open market operation, the largest beneficiaries are ‘commercial banks’, ‘credit unions’, and ‘general government’ in that order.

The largest beneficiaries next to them are secondary- and tertiary-industry ‘large corporations’ followed by tertiary-industry ‘small corporations’.

Among the households, ‘homeowners’ and ‘mortgaged homeowners’ are better off than their ‘tenant’ counterparts whose share is less than a half.

Triangulation of a matrix is a technique to rearrange its rows and columns in the same order so that the maximum number of non-zero cells fall below the diagonal running from the upper left corner to the lower right corner.

Among the business enterprises, tertiary-industry ‘unincorporated enterprises’ stay mainly at the bottom of the triangle; mom-and-pop stores and restaurants, are indispensable in keeping funds flowing throughout the economy.

However, according to the Leontief inverse, ‘unincorporated enterprises’ as well as ‘tenants’ are completely left outside of the Japanese financial system.


See You in Japan!