KEO DISCUSSION PAPER

CALAMVS GLADIO FORTIOR

KEIO ECONOMIC OBSERVATORY

SANGYO KENKYUJO

KEIO UNIVERSITY

MITA MINATO-KU
TOKYO JAPAN

Flow of Funds Analysis: The Triangulation and The Dispersion Indices

Kazusuke Tsujimura Masako Mizoshita

January 8. 2002
Ver. 1.0

KEO DISCUSSION PAPER No.69

1. Introduction

Flow of funds (FOF) analysis has been stem from "Social Accounting for Money flows" authored by Morris Copeland in 1949. Since then it has developed as an accounting system describing the inter-sectoral financial transactions between the economic actors. FOF accounts were included in the System of National Accounts in 1968 along with National Income Accounts, National Balance Sheet, Balance of International Payments Accounts and Input-Output Tables. FOF Accounts consist of balance sheets of the economic actors, in their traditional tabulation practice. This format of FOF is widely employed because of the easiness of compilation based on the corporate accounting system. The analysis of FOF based on the balance sheet format has been concentrated on the investigation of the difference between financial assets and liabilities of each sector. However this kind of study only describes the final balance of object-economy and the portfolio selection activity of the economic actors. It is unavoidable to build an asset-liability-matrix (ALM) to examine the inter-sectoral financial transactions on the whole. The first purpose of this paper is to present the compilation procedure of ALM from the FOF accounts of the balance sheet format widely available. The second purpose of this article is to show the interdependency among economic actors participating in the financial market, in terms of the triangulation and the dispersion indices. In this paper, FOF tables for Japan (March, 2000) will be employed for the demonstration.

As Leontief mentioned[1], dependence and independence, hierarchy and circularity are the four basic concepts of structural analysis. The definition and practical significance of each of these ideas can be demonstrated visually by schematic model tables in which numbers signify the presence or absence of interindustry transactions. As in case of input-output tables, if the corresponding box formed by the reverse combination of column and row is empty. Such relations become clearer in the model in which all the positive numbers fall below the diagonal running from the upper left corner to the lower right corner of the matrix. Rearrangement of the rows and columns of the original ALM as well as the input-output matrix construct this "triangular" system.

In addition to triangulation, the introduction of ALM into the framework of FOF analysis enables us to utilize the affluent assets of Input-Output (I-O) analysis notably the concept of Leontief-Inverse. However there are not a few fundamental differences between the ALM analysis and the I-O analysis. In the Y-table of the ALM, which is the sector-by-sector matrix, the column denotes the portfolio of fund-raising, while the row

---

[1] Leontief(1966), pp.166-168.

indicates the portfolio of fund-employment of a particular sector. In this sense, the ALM is an I-O matrix that is descriptive of the flow of funds. However it is also possible to construct an ALM that gives an account of the flow of financial instruments instead of the flow of funds. The column of this type of ALM (Y*-table) denotes the portfolio of fund-employment, while the row indicates the portfolio of fund-raising. In this context, the Y* matrix is a transposition of Y matrix.

This two-sided nature of ALM gives a significant theoretical importance to the FOF analysis. The simultaneous equations symbolised by Y portray the relations between the surplus in liabilities and the controlled total, while those represented by Y* depict the correspondence between the surplus in financial assets and the controlled total. The coexistence of these two systems of equations gives two alternative Leontief-Inverses to the structure of ALM. In the last part of this exposition, we will examine the asymmetric nature of the system in terms of the column sum and the row sum of the Leontief-Inverse, namely the indices of the power and the sensitivity of dispersion.

2. The Asset Liability Matrix

2.1 E- and R-tables

In Japan, Flow of Funds Accounts are compiled on the basis of 1993 IMF Manual by BOJ every three month. The ALM used in this paper has been compiled from the Financial Assets and Liabilities tables of FOF of 1st quarter 2000. The first step to draw up ALM is to pick out the assets and liabilities vectors separately from the balance sheets of FOF to make out two matrices E and R. E is a matrix to show the portfolio of fund-employment of each sector, ε and T^E are vectors that represent excess liabilities, sum of each row. Likewise, R is a matrix to show the portfolio of fund-raising of each sector, ρ and T^R are vectors that represent excess assets, sum of each row respectively. T is the vector that consist of either the sum of assets or liabilities whichever are greater. n and m denote the number of financial instruments and the number of institutional sectors. The structure of E and R tables in terms of their components are depicted below.

$$\begin{array}{ccccc} e_{11} & e_{12} & \cdots & e_{1m} & t_1^E \\ e_{21} & e_{22} & \cdots & e_{2m} & t_2^E \\ \vdots & \vdots & \ddots & \vdots & \vdots \\ e_{n1} & e_{n2} & \cdots & e_{nm} & t_n^E \\ \varepsilon_1 & \varepsilon_2 & \cdots & \varepsilon_m & \\ t_1 & t_2 & \cdots & t_m & \end{array}$$

Figure 1: E-table

$$\begin{array}{ccccc} r_{11} & r_{12} & \cdots & r_{1m} & t_1^R \\ r_{21} & r_{22} & \cdots & r_{2m} & t_2^R \\ \vdots & \vdots & \ddots & \vdots & \vdots \\ r_{n1} & r_{n2} & \cdots & r_{nm} & t_n^R \\ \rho_1 & \rho_2 & \cdots & \rho_m & \\ t_1 & t_2 & \cdots & t_m & \end{array}$$

Figure 2: R-table

2.2 Y- and Y*-tables

The ALM based on the fund-raising portfolio is denoted as Y while the one based on fund-employment is symbolized as Y*. We use Superscript letter * in case fund-employment assumption is concerned. To compile Y table in accordance with fund-raising portfolio, first R matrix is substituted for U matrix (commodity by sector) and transposed E matrix for V matrix (sector by commodity).

$\mathbf{U} \equiv \mathbf{R}$

$\mathbf{V} \equiv \mathbf{E}'$

In case of Y* table that represent fund-employment portfolio, we take E matrix as U* matrix and transposed R matrix as V* matrix.

$\mathbf{U}^* \equiv \mathbf{E}$

$\mathbf{V}^* \equiv \mathbf{R}'$

The coefficient matrices, B and B*, are constructed from U, U* and T by dividing the cells in each column of U and U* by the column sums T.

$$b_{ij} = \frac{u_{ij}}{t_j}$$

$$b_{ij}^* = \frac{u_{ij}^*}{t_j}$$

In the same manner, coefficient matrices D and D* corresponding to V and V*are defined as follows:

$$d_{ij} = \frac{v_{ij}}{t_j^E}$$

$$d_{ij}^* = \frac{v_{ij}^*}{t_j^R}$$

where t^E_j is the sum of assets and t^R_j is the sum of liabilities for financial instrument j. That is, d_{ij} is regarded as i sector's share of assets for j financial instruments while d^*_{ij} is i sector's share of liabilities for j financial instruments. The m x m coefficient matrices C and C* corresponding to Y and Y* are estimated using actor portfolio assumption, which is an equivalent of the industry technology assumption in the scheme of I-O analysis.

$\mathbf{C} = \mathbf{DB}$

$\mathbf{C}^* = \mathbf{D}^*\mathbf{B}^*$

Using these matrices, C and C*, transaction quantity matrices Y and Y* are reduced in

the following manner:

$$y_{ij} = c_{ij} t_j$$

$$y^*_{ij} = c^*_{ij} t_j$$

where y_{ij} is the amount of funds provided from sector i to sector j, and y^*_{ij} is the amount of financial instruments supplied from sector i to sector j. These tables are shown in Fig. 3 and Fig.4.

When we compare Y* table with Y table, ε^Y vector and ρ^Y vector are situated symmetrically. Moreover matrix Y* is obtained by interchanging matrix Y's rows and columns, i.e. matrix Y* is a transpose matrix of Y. As demonstrated in the Appendix, whether we adapt fund-raising assumption or fund-employment assumption, only one transaction quantity matrix is derived from a pair of matching E- and R-matrices. In that sense, the matrices Y and Y* are just like two sides of the same coin.

$$\begin{array}{ccccccc} y_{11} & y_{12} & \cdots & y_{1m} & \varepsilon_1^Y & t_1^Y \\ y_{21} & y_{22} & \cdots & y_{2m} & \varepsilon_2^Y & t_2^Y \\ \vdots & \vdots & \ddots & \vdots & \vdots & \vdots \\ y_{m1} & y_{m2} & \cdots & y_{mm} & \varepsilon_m^Y & t_m^Y \\ \rho_1^Y & \rho_2^Y & \cdots & \rho_m^Y & & \\ t_1^Y & t_2^Y & \cdots & t_m^Y & & \end{array}$$

Figure 3: Y-table

$$\begin{array}{ccccccc} y^*_{11} & y^*_{12} & \cdots & y^*_{1m} & \rho_1^Y & t_1^Y \\ y^*_{21} & y^*_{22} & \cdots & y^*_{2m} & \rho_2^Y & t_2^Y \\ \vdots & \vdots & \ddots & \vdots & \vdots & \vdots \\ y^*_{m1} & y^*_{m2} & \cdots & y^*_{mm} & \rho_m^Y & t_m^Y \\ \varepsilon_1^Y & \varepsilon_2^Y & \cdots & \varepsilon_m^Y & & \\ t_1^Y & t_2^Y & \cdots & t_m^Y & & \end{array}$$

Figure 4: Y*-table

So far, it is expressed that two kinds of ALM are drawn up in compliance with the difference of behavioural pattern whether raising funds or employing them. One is Y-table which is based on the assumption that each sector have fixed fund-raising portfolio (Liability Approach), the other is Y*-table which is founded on the assumption that fund-employment portfolio of each sector is settled (Asset Approach). Fig. 5 and 6 show tables of funds transactions and coefficients of which Liability Approach consist. Asset Approach is composed of tables given in the same way in Fig. 7 and 8; a superscript figure * is put in distinction from Liability Approach. Following analysis in this paper is made using Y-table in March 2000, which is presented in Table 1.

	Instruments	Actors
Instruments	X	U
Actors	V	Y

Figure 5: Tables of funds transactions based on Liability Approach

	Instruments	Actors
Instruments	A	B
Actors	D	C

Figure 6: Tables of coefficient based on Liability Approach

	Instruments	Actors
Instruments	X*	U*
Actors	V*	Y*

Figure 7: Tables of funds transactions based on Asset Approach

	Instruments	Actors
Instruments	A*	B*
Actors	D*	C*

Figure 8: Tables of coefficient based on Asset Approach

3 The triangulation of ALM

Since sectors and activities included in I-O or FOF are randomly ordered in usual cases, one glance is not enough to grasp the mutual relation within the system. So that we rearrange the rows and columns of the original ALM to analyse a causal sequence and ranking within the financial economy.

In case of triangulation of ALM, first we net out the symmetrical elements in Y matrix and then omit transaction figures less than 10 billion yen. Then sorting actors of Y matrix to minimum the number of upper right elements of Y matrix, it would prove that there are one-way flow of funds and clear relation of cause and effect in ALM. Table 2 presents the result of triangulation of ALM in March 2000. 84 elements out of all 595 elements that are upper right of Y matrix are null. It accounts for 13.3 percent of the total number of upper right elements. The order of the actors set on the basis of minimizing the number of upper right elements is showed in Table 3. Actors that depend on many other actors for supply of funds are situated in the upper side of table. These actors themselves tend to employ funds in a limited number of other actors. Conversely, actors that raise funds from only small number of other actors, and themselves serve many actors with funds are in the lower side of the table. Public

non-financial corporations are in the first place and private non-financial corporate enterprises are in the second place, then central government and rest of the world follow them. These actors have common characteristics that they make an excess investment over saving. On the contrary, actors situated in the bottom are public pension funds, households, corporate pensions, mutual aid insurance and so on. Households have excess savings and then public pensions etc. receive funds directly from them. We could compare Japanese financial system to a current in the river that rise from households, go through financial institutions of various kinds, and then flow into non-financial corporations and government downstream. It should be noted that not only financial institutions but also local governments and private non-profit institutions serving households are situated in the middle place.

Table 3: A result table of triangulation

	Actors
1	Public non-financial institutions
2	Private non-financial corporate enterprises
3	Central government
4	Rest of the world
5	Money market dealers
6	Special accounts for foreign reserve funds
7	Foreign-owned banks in Japan
8	Finance companies
9	Postal savings
10	Local governments
11	Securities companies
12	Deposit insurance organization etc
13	Licensed commercial and investment banks
14	Private non-profit institutions serving households
15	Government financial institutions
16	Bank of Japan
17	Collectively managed trusts
18	Non-collectively managed trusts
19	Stock investment trusts
20	Other bond investment
21	Structured financing special purpose companies and trusts
22	Financial institutions for small business
23	MMF/MRF
24	Financial institutions for agriculture, forestry and fisheries
25	Other non-life insurance institutions
26	Private non-life insurance companies
27	Trust fund bureau
28	Private life insurance companies
29	Other social security funds
30	Postal life insurance
31	National pension funds etc.
32	Mutual aid insurance
33	Corporate pensions
34	Households
35	Public pension funds

4 Leontief Inverse of Y- and Y*-tables

4.1 methodologies

We will apply the Leontief-Inverse, namely the indices of the power and the sensitivity of dispersion to Flow of Funds analysis. First denoting two vectors ε^Y and ρ^Y as follows:

$$\varepsilon^Y = \begin{bmatrix} \varepsilon_1^{\ Y} \\ \varepsilon_2^{\ Y} \\ \vdots \\ \varepsilon_m^{\ Y} \end{bmatrix} \quad \rho^Y = \begin{bmatrix} \rho_1^{\ Y} \\ \rho_2^{\ Y} \\ \vdots \\ \rho_m^{\ Y} \end{bmatrix}$$

The fundamental equations respect to Y and Y*-tables are expressed as follows:

$$\mathbf{C} \cdot \mathbf{T}^Y + \boldsymbol{\varepsilon}^Y = \mathbf{T}^Y$$

$$\mathbf{C}^* \cdot \mathbf{T}^Y + \boldsymbol{\rho}^Y = \mathbf{T}^Y$$

Solving each equation for T^Y yields

$$\mathbf{T}^Y = (\mathbf{I} - \mathbf{C})^{-1} \boldsymbol{\varepsilon}^Y$$

$$\mathbf{T}^Y = (\mathbf{I} - \mathbf{C}^*)^{-1} \boldsymbol{\rho}^Y$$

where I denotes the m x m unit matrix, $(I\text{-}C)^{-1}$ is the m x m Leontief inverse matrix by which how much demand for funds would be induced to each sector can be calculated, and $(I\text{-}C^*)^{-1}$ is the m x m Leontief inverse matrix by which we can calculate the amount of ultimately induced supply of funds. These matrixes are denoted Γ and Γ^* as follows,

$$\boldsymbol{\Gamma} = (\mathbf{I} - \mathbf{C})^{-1} = \begin{bmatrix} \gamma_{11} & \gamma_{12} & \cdots & \gamma_{1m} \\ \gamma_{21} & \gamma_{22} & \cdots & \gamma_{2m} \\ \vdots & \vdots & \ddots & \vdots \\ \gamma_{m1} & \gamma_{m2} & \cdots & \gamma_{mm} \end{bmatrix}$$

$$\boldsymbol{\Gamma}^* = (\mathbf{I} - \mathbf{C}^*)^{-1} = \begin{bmatrix} \gamma^*_{11} & \gamma^*_{12} & \cdots & \gamma^*_{1m} \\ \gamma^*_{21} & \gamma^*_{22} & \cdots & \gamma^*_{2m} \\ \vdots & \vdots & \ddots & \vdots \\ \gamma^*_{m1} & \gamma^*_{m2} & \cdots & \gamma^*_{mm} \end{bmatrix}$$

where γ_{ij} describes the amount of increase in demand for i sector's funds when the demand for j sector's funds rise, and γ^*_{ij} is the amount of increase in funds for which i sector derives supply, when j sector is supplied with funds. We can calculate both indices

of the power of dispersion and of the sensitivity of dispersion using γ_{ij} or γ^*_{ij}. Since the meaning of γ_{ij} is different from that of γ^*_{ij}, four distinct index would be made as follows.

$$w^{Y}{}_{j} = \frac{\sum_{i=1}^{m} r_{ij}}{\frac{1}{m}\sum_{j=1}^{m}\sum_{i=1}^{m} r_{ij}}$$

$$w^{Y^*}{}_{j} = \frac{\sum_{i=1}^{m} r^{*}{}_{ij}}{\frac{1}{m}\sum_{j=1}^{m}\sum_{i=1}^{m} r^{*}{}_{ij}}$$

$$z^{Y}{}_{i} = \frac{\sum_{j=1}^{m} r_{ij}}{\frac{1}{m}\sum_{i=1}^{m}\sum_{j=1}^{m} r_{ij}}$$

$$z^{Y^*}{}_{i} = \frac{\sum_{j=1}^{m} r^{*}{}_{ij}}{\frac{1}{m}\sum_{i=1}^{m}\sum_{j=1}^{m} r^{*}{}_{ij}}$$

where $w^{Y}{}_{j}$ and $w^{Y^*}{}_{j}$ given by γ_{ij} and γ^*_{ij} respectively are indices of the power of dispersion and $z^{Y}{}_{i}$ and $z^{Y^*}{}_{i}$ are indices of the sensitivity of dispersion. We name $w^{Y}{}_{j}$ as the dispersion power index of fund-raising, $w^{Y^*}{}_{j}$ as the dispersion power index of fund-employment, $z^{Y}{}_{i}$ as the dispersion sensitivity index of fund-raising, and $z^{Y^*}{}_{I}$ as the dispersion sensitivity index of fund-employment.

4.2 Results

The relation of the dispersion power index of fund-raising, $w^{Y}{}_{j}$, and the dispersion power index of fund-employment, $w^{Y^*}{}_{j}$, is presented in Fig.9. Households, the primary saving subject (fund-employer), and public pensions and other social security funds that specialize employing funds provided from households are situated in the second quadrant. Non-financial corporations, the primary investing subject (fund-raiser), and central government that is deeply in financial debt are in the fourth quadrant. Judging from the difference of fund-raising from fund-employment, these results are just as expected. Licensed commercial and investment banks, structured-financing special purpose companies and government financial institutions, which intermediate between primary saving subject and primary investing subject are in the first quadrant. The biggest intermediating institution of funds, licensed commercial and investment banks,

whose values of both indices about 1.1, lie between the biggest saving subject, households, and major investigating subject, private non-financial corporate enterprises. The central bank, Bank of Japan is found in the fourth quadrant compared with money market dealers sited in the first quadrant. It shows that the latter have more effect on financial market than the former.

The relation of the dispersion sensitivity index of fund-raising, $z^{Y}{}_{i}$ with the dispersion sensitivity index of fund-employment $z^{Y*}{}_{i}$ is presented in Fig.10. Though the dispersion sensitivity index is expected as the transposition of dispersion power index, there are households as well as private non-financial corporate enterprises in the first quadrant and they lay facing each other with a line of 45 degrees between. This means that both subjects play important parts in the financial system. Households save but also invest in housing as well, and private non-financial corporate enterprises not only raise funds but also play as moneylender. On the contrary big investment subjects, central government and rest of the world, are not major in supply of funds in view of their little value of the dispersion sensitivity index of fund-raising. Most of all financial institutions belong to the third quadrant while public financial institutions including licensed commercial and investment banks, postal savings, trust fund bureau and government financial institutions are in the first; and financial institutions for agriculture, forestry, and fishers, financial institutions for small business and public pensions are in the fourth. It may be caused by that most of financial institutions deal with many and unspecified partners.

5 Conclusions

In a framework of FOF table, the only object to be traded in it is fund, an abstract object. Moreover, there is a reversed flow of financial instruments, either material or fictitious, wherever there is flow of funds. By focusing on these two things, we have compiled two kinds of ALM, one based on fund-raising-portfolio assumption (Liability Approach) and another based on fund-employment-portfolio assumption (Asset Approach). It has been confirmed that these two different approach produce no less than a pair of twin transposed matrices. This means that no matter which method we might employ, one consistent ALM is derived from a set of E and R tables transformed from balance-sheet-type FOF tables universally available in most of OECD and IMF member countries.

Not a few techniques have been proposed to examine the fundamental character of an I-O table. We have chosen two of them namely the triangulation and the dispersion indices to apply on FOF analysis. By rearranging rows and columns of the original ALM,

we could successfully form a quasi-triangle matrix. This means that those actors that raise funds from multifarious sources tend to employ them in limited number of ends while those actors that raise funds from limited sources tend to employ them in various objects. An instant survey of the financial system gives a picture in which the funds proceeds from the household, the primary saving subjects, goes through the intermediaries, like commercial banks and other financial institutions, and ends up in the non-financial corporate enterprises, the primary investing subjects. The primary investors, including non-financial corporate enterprises and the central government, raise funds from many sectors by issuing bonds and/or stocks and allot them directly to production facilities or public works. On the other hand, the households, the primary saving subjects, and the institutional investors including pension funds and life insurers, which collect funds directly from the households, allocate the assets to a variety of objects in view of risk diversification. In the middle stream of the flow of funds, intermediary financial institutions, including commercial banks as well as the central bank, are situated alongside of the local governments and nonprofit institutions like educational foundations and religious corporations. These middle-stream institutions collect funds not only from the household but also from some of their fellow intermediaries and employ them directly or indirectly in the final investments.

In the course of the dispersion indices analysis, we found that there is an asymmetry in the propagation process of fund-raising and fund-employment. For example, in case of households, the primary saving subjects, the dispersion power index of fund-raising is less than one while that of fund-employment is greater than one. On the contrary, in case of non-financial corporate enterprise, the primary investing subject, the dispersion power index of fund-raising is greater than unity while that of fund-employment is less than unity. In this sense, the primary saving subjects and the primary investing subjects are both extremes in a financial system. However, as for the dispersion sensitivity indices of fund-raising and fund-employment, those of both households and non-financial corporate enterprises are greater than one. This might be because the household, the primary saver, make housing investments in residential buildings, and the non-financial corporate enterprise, the primary investor, sell their products to customers on credit and make advance payments to their subcontractors. As a conclusion, it can be said that the dispersion power index reflects the primary nature of the actors while the dispersion sensitivity index exhibits the exact nature of them. By introducing four different definitions of dispersion indices, it is possible to reconstruct them in a multidimensional space, so that we can clarify the role and the position of the economic actors in the financial system more explicitly.

References

Alho, Kari (1991) *Financial markets and macroeconomic policy in the flow-of–funds framework*, Aldershot, Brookfield.

Bank of Japan (1999) *Guide to Japan's Flow od Funds Accounts.*

Bank of Japan (2000) *Compilation Method of Japan's Flow of Funds Accounts.*

Copeland, Morris A. (1949) "Social Accounting for Moneyflows," *The Accounting Review,* vol.24, pp.254-64.

Copeland, Morris A. (1952) *A study of Moneyflows in the United States*, National Bureau of Economic Research,Inc., New York.

Dawson, Johon C. (1958) "A Cyclical Model for Postwar U.S. Financial Markets," *American Economic Review,* vol.48, pp.145-57.

Hawkins, D. and H.A. Simon (1949) "Some Conditions of Macroeconomic Stability," *Econometrica,* vol.17.

Korte,B. and W. Oberhofer (1970) "Triangularizing Input-Output Matrices and the Structure of Production," *European Economic Review,* vol.1, no.4, pp.482-511.

Leontief, Wassily W. (1951) *The Structure of American Economy, 1919-1939, An Empirical Application of Equilibrium Analysis*, 2nd edition, Oxford University Press, New York

Leontief, Wassily W. (1966) *Input-Output Economics*, Oxford University Press, New York.

Rasmussen, P.N.(1957) *Studies in Inter-Sectoral Relations*, North-Holland Publishing Company, Amsterdam.

Solow, R.M. (1952) "On the Structure of Linear Models," *Econometrica* vol.20,No.1,pp.29-46.

Stone, Richard, J. Bates and M. Bacharac (1963) *Input-Output Relationships 1954-1963 No.3 of A Programme for Growth*, Chapman and Hall, London.

United Nations (1968) *A System of National Accounts.*

United Nations (1993) *A System of National Accounts.*

Table 1:Y-table(100million yen)

	Bank of Japan	Licensed commercial and investment	Foreign-owned banks in Japan	Financial institutions for agriculture, forestry and fisheries	Financial institutions for small business	Postal savings	Collectively managed trusts	Private life insurance companies	Postal life insurance	Private non-life insurance companies	Other non-life insurance institutions	Mutual aid insurance	Corporate pensions	National pension funds etc.	MMF/MRF	Other bond investment trusts	Stock investment trusts	Finance companies
Bank of Japan	34093	158221	22814	5710	29568	76	0	23352	0	612	100	21	0	3	2	13	9	1274
Licensed commercial and investment banks	169460	549443	32104	45222	54937	34130	25287	20008	0	10629	853	111	1518	26	8665	8262	7443	576318
Foreign-owned banks in Japan	13209	41066	6896	4343	5282	2641	30	3714	0	630	111	21	0	3	28	46	36	25780
Financial institutions for agriculture, forestry and fisheries	9451	420411	20321	124679	129123	205083	13759	3620	0	585	524	23	0	5	7526	6318	6055	67843
Financial institutions for small business	33683	207673	11625	44913	50611	62252	6863	3249	0	1175	143	14	0	3	9850	8278	7930	122156
Postal savings	94	11195	998	1785	1290	3499	5332	2371	0	2400	281	33	0	8	12	81	53	2934
Collectively managed trusts	159	12631	1075	830	467	0	169044	618	0	54	3	1	0	0	0	0	0	36227
Private life insurance companies	451	108756	8427	14840	13371	17542	20290	3759	0	4161	268	46	27	7	3494	3000	2850	61495
Postal life insurance	41	35760	1060	10057	11149	47753	7634	1191	0	1447	214	17	0	4	5	35	23	3035
Private non-life insurance companies	168	31616	1509	2978	3510	4754	4897	2266	0	3023	267	27	12	9	926	854	791	11215
Other non-life insurance institutions	62	3954	1430	1721	659	1051	0	1935	0	1248	207	30	0	6	8	53	35	679
Mutual aid insurance	2	26369	838	5604	6880	7736	6225	153	0	376	5	1	0	0	4627	3880	3720	6785
Corporate pensions	93	62470	1966	5066	5351	7876	8519	592	0	2705	41	5	11	1	746	641	608	20282
National pension funds etc.	8	19315	302	3466	5086	1082	2239	146	0	253	11	2	0	0	65	56	53	1835
MMF/MRF	535	77938	2422	4069	7597	0	2986	111	0	249	0	0	0	0	0	0	0	4542
Other bond investment trusts	218	44501	1133	4089	7865	0	1214	78	0	143	1	0	6	0	0	3	1	2089
Stock investment trusts	11	21986	2267	229	259	0	469	34	0	820	1	0	3	0	0	1	1	2798
Finance companies	2697	55834	2131	9685	8980	12656	479	5804	0	4851	1147	69	4	19	1579	1441	1342	82966
Structured financing special-purpose companies and trusts	9	3689	120	73	72	0	1046	725	0	507	0	0	0	1	0	0	0	4844
Trust fund bureau	1662	20241	3121	4069	5420	427121	0	2119	0	4	1153	16	0	0	0	0	0	16
Government financial institutions	1178	24700	1174	4981	4157	130035	2734	2255	0	1743	1199	41	0	9	4	24	16	3639
Securities companies	21885	138677	25580	23214	23195	5967	0	18613	0	1834	443	136	30	5	107	146	118	15120
Money market dealers	57451	110023	17265	2546	12196	1	20	8092	0	32	1	0	0	0	36	30	29	1201
Non-collectively managed trusts	42	45584	7085	551	496	0	34328	159	0	1089	3	1	0	0	0	0	0	6283
Deposit insurance organization etc.	7	29750	586	7517	7817	10961	2	411	0	155	57	3	0	1	379	323	308	17924
Private non-financial corporate enterprises	160775	1215542	47057	170272	194323	185485	66693	20865	0	24784	4555	311	105	90	22505	19433	18431	73490
Public non-financial institutions	44748	49248	4529	13493	14519	24228	22	5545	0	4034	523	52	0	16	22	145	96	3632
Central government	134304	77829	18918	13811	12664	3318	5	17436	0	11653	6780	351	0	91	74	496	329	23599
Special accounts for foreign reserve funds	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Local governments	23	139957	14760	36729	33077	36593	2637	2540	0	487	5053	189	0	40	2906	2453	2346	19349
Public pension funds	167	65813	13216	10953	10876	7967	13347	4922	0	4029	659	76	0	15	8027	6838	6520	10477
Other social security funds	24	15114	663	6718	5702	9752	60	908	0	453	571	27	0	6	607	524	497	1754
households	351272	3207750	30102	1108886	1117940	1900944	218107	1394990	1103936	184238	9375	328953	779032	130207	121022	102770	98093	59616
Private non-profit institutions serving households	1383	133219	8955	34794	37909	53115	0	1690	0	739	77	10	0	2	15020	12611	12085	4865
Rest of the world	1447	322906	89032	8643	8159	6056	0	2572	0	7650	674	40	589	6	2	318	143	64318
Financial surplus or deficit	23931	0	1632	25598	67183	743	6009	6838	72356	63966	61938	32096	44449	2321	0	0	0	0
Total	1064743	7489181	403113	1762134	1898690	3210417	620477	1563681	1176292	342758	97238	362723	825786	132904	208244	179073	169961	1342380

Note Bank of Japan "Flow of Funds" March 2000

Table 1(continued): Y-table (100million yen)

Structured financing special purpose companies and trusts	Trust fund bureau	Government financial institutions	Securities companies	Money market dealers	Non-collectively managed trusts	Deposit insurance organization etc.	Private non-financial corporate enterprises	Public non-financial institutions	Central government	Special accounts for foreign reserve funds	Local governments	Public pension funds	Other social security funds	households	Private non-profit institutions serving households	Rest of the world	Financial surplus or deficit	Total
0	0	1929	116463	56313	0	3005	37100	1642	454751	48184	13	55	44	2338	23586	43451	0	1064742
10032	0	30408	102688	52245	15908	128650	2716718	126780	577524	90083	174173	503	655	1270590	65597	409471	172741	7489182
839	0	2891	25308	8157	28	5869	105583	8123	59600	17875	5209	53	70	24022	5745	29906	0	403114
5704	0	8572	16404	13676	8566	14791	299512	25294	74690	2612	25897	21	27	121036	9144	120862	0	1762134
63	0	11232	14701	11780	4305	27232	536826	36161	116717	59460	48424	49	64	321009	13535	126717	0	1898693
0	2588680	13903	8949	645	3311	388	75504	31061	285942	0	89659	579	220	2411	535	76260	0	3210413
0	0	522	3589	453	104973	8722	150833	5384	5656	2147	5264	0	0	58139	4169	47515	0	620475
15193	0	15848	41734	12571	12616	12214	534104	37424	261715	17375	61839	135	177	124349	7333	146270	0	1563681
0	29488	181065	8624	872	4740	2417	118177	202642	292303	0	103887	11014	95	9497	2864	89183	0	1176293
2566	0	3249	5246	3385	3042	1682	164450	8007	12967	176	13590	172	223	13173	714	41294	0	342758
0	41278	2550	14365	200	0	120	8538	2625	5473	0	804	356	146	2782	921	3802	0	97238
290	0	14336	942	1892	3867	1437	71278	28387	97233	0	42710	3	4	4237	521	22388	0	362726
4829	0	4340	10317	4114	5294	2905	343411	10400	122846	3069	19167	24	32	10892	1383	165790	0	825786
235	8155	4356	2089	400	1391	372	29138	7380	25697	227	3122	5	7	1203	205	14003	0	132904
0	0	1041	693	6803	1853	24	25443	2230	38532	0	4631	0	0	0	58	26486	0	208243
0	0	1374	931	3044	753	31	17151	2923	50107	0	6002	0	0	70	59	34592	695	179073
0	0	64	3922	5871	290	1	93984	99	6681	0	20	0	0	56	37	29758	301	169963
8697	0	5090	7220	176	326	18072	461577	25658	15052	0	10611	278	360	312678	8185	39484	237030	1342378
0	0	628	1245	3	651	1101	74288	769	110	0	561	16	4	26260	437	3342	0	120501
0	0	1117448	25110	3110	0	2270	349485	575750	1114939	0	423122	140248	0	106954	34073	140957	0	4498408
0	3443	318561	7677	354	1697	681	201809	159074	131568	0	125392	41459	68	801386	9713	54446	0	2035217
0	0	6699	194109	27821	3	1739	161965	10255	83039	4325	981	105	128	23620	20859	53552	65950	930220
0	0	5	37820	68641	8	0	394	8	3214	802	0	0	0	15	8372	557	0	328759
0	0	3773	6963	19984	21312	538	140190	6603	63345	10258	3671	0	0	1926	350	63640	0	438174
0	0	384	956	11	8	4075	70855	3209	24815	0	3064	12	15	15450	1888	8809	44540	254292
58574	0	34706	79370	948	41410	4019	3269135	72781	36257	0	4944	1400	1873	552610	19755	716426	5743248	12872173
0	564	1463	8705	2323	13	302	54393	5331	5570	0	562	303	418	7763	2956	6709	1557234	1819461
0	183858	32556	22224	5879	3	2746	162584	101044	47213	7179	1392	1031	1427	16046	8749	45718	3685159	4646466
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	277233	0	277233
0	0	31759	8282	118	1762	1795	140707	89629	30337	0	1159	39	144	8008	7579	20560	607404	1248621
346	1490230	30701	38279	2071	8287	1034	188605	53697	110297	396	26293	272	413	11163	7544	80075	0	2215605
0	84969	3465	4924	63	37	277	19551	9649	12942	0	1627	42	49	864	338	1533	0	183710
0	0	33094	49751	123	135422	5392	1047069	109946	125458	0	11652	3206	4117	24093	721	100608	0	13897885
0	0	5634	8580	2093	0	120	55687	10622	118414	0	15214	44	109	4559	5173	11799	0	554522
3133	0	48196	52039	2557	0	272	1146129	48672	235459	13065	11963	21	651	50527	50425	198750	877531	3251945
0	67744	63371	0	10064	56302	0	0	0	0	0	0	2014162	172169	9967960	231001	0		
120501	4498409	2035213	930219	328760	438178	254293	12872174	1819459	4646463	277233	1248619	2215607	183709	13897886	554524	3251946		

Table 2: Triangulation of Y table (10billion yen)

	Public non-financial institutions	Private non-financial corporations	Central governments	Rest of the world	Money market dealers	Special accounts for foreign reserve funds	Foreign-owned banks in Japan	Finance companies	Postal savings	Local governments	Securities companies	Deposit insurance organizations etc.	Unclassified commercial and investment banks	Private non-profit institutions serving households	Government financial institutions	Bank of Japan	Collectively managed trusts	Non-collectively managed trusts	Stock investment trusts	Other bond investment trusts	Structured financing special purpose companies and others	Financial institutions for small business	MMF/MRF	Financial institutions for agriculture, forestry and fisheries	Other non-life insurance institutions	Private non-life insurance companies	Trust fund bureau	Private life insurance companies	Other social security funds	Postal life insurance	National pension funds etc.	Mutual aid insurance	Corporate pensions	Households	Public pension funds
Public non-financial institutions	53	0	0	0	23	0	0	0	0	0	0	0	0	0	0	431	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Private non-financial corporations	184	32691	0	0	0	0	0	0	1100	0	0	0	0	0	0	1237	0	0	0	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Central government	955	1263	472	0	27	72	0	85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	0	0	0	0	0	0	0	0	0	0
Rest of the world	420	4297	1897	1988	20	0	591	248	0	0	0	0	0	0	386	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Money market dealers	0	0	0	0	686	8	91	10	0	0	100	0	578	63	0	61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Special accounts for foreign reserve funds	0	0	0	2642	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Foreign-owned banks in Japan	36	595	407	0	0	179	69	236	16	0	0	0	53	90	0	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2533	0
Finance companies	220	3881	0	0	0	0	0	0	890	97	0	0	1	0	33	15	14	0	0	0	0	0	38	0	0	0	0	0	0	0	0	0	0	0	0
Postal savings	68	0	2826	702	5	0	0	0	0	35	531	30	0	0	0	0	0	53	39	0	0	0	0	0	0	0	0	21814	0	0	0	0	0	0	0
Local governments	891	1368	289	86	1	0	96	87	0	12	73	0	0	0	0	0	0	0	0	0	23	0	0	0	0	806	42	0	0	0	0	0	0	0	0
Securities companies	18	826	608	15	0	43	3	79	0	0	1941	8	340	123	0	0	0	0	0	0	0	0	0	85	0	68	0	0	0	0	0	0	0	101	0
Deposit insurance organizations etc	29	598	221	85	0	0	0	0	106	13	0	41	0	18	0	0	0	0	0	3	3	0	0	4	0	0	0	0	0	0	0	0	0	0	0
Unclassified commercial and investment banks	775	15012	4867	866	0	901	0	5205	229	342	0	988	5494	0	57	112	127	0	0	0	63	0	0	0	0	0	0	0	0	0	0	0	0	38	0
Private non-profit institutions serving households	77	358	1087	0	0	0	32	0	526	76	0	0	476	52	0	0	0	0	120	126	0	244	150	257	0	0	0	0	0	0	0	0	0	7693	108
Government financial institutions	1576	1671	990	63	3	0	0	0	1161	936	10	3	0	41	3196	0	22	0	0	0	0	0	0	0	0	0	4	0	229	0	0	0	0	0	0
Bank of Japan	0	0	3204	429	0	482	96	0	0	0	946	90	0	222	8	341	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Collectively managed trusts	54	941	57	475	4	21	10	377	0	24	36	87	0	42	0	2	1690	706	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-collectively managed trusts	66	968	635	636	200	103	71	80	0	19	70	5	297	4	21	9	0	213	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stock investment trusts	0	756	64	256	58	0	22	16	0	0	38	0	145	0	0	0	5	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other bond investment trusts	28	0	496	343	30	0	11	6	0	35	8	0	362	0	14	2	12	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	263	0
Structured financing special purpose companies and others	8	57	1	2	0	0	0	0	0	6	12	11	0	4	6	0	10	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Financial institutions for small business	216	3425	1041	1196	0	585	63	1132	810	153	0	184	1527	0	71	41	64	38	17	4	0	506	23	0	0	0	0	0	0	0	0	0	0	0	0
MMF/MRF	22	29	385	265	68	0	24	30	0	17	4	0	669	0	10	5	30	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Financial institutions for agriculture, forestry and fisheries	118	1292	608	1122	111	26	100	982	2093	0	0	73	3752	0	36	37	129	80	58	22	56	842	35	1247	0	0	0	0	0	0	0	0	0	0
Other non-life insurance institutions	23	40	0	31	2	0	13	0	9	0	139	0	31	8	14	0	0	0	0	0	0	5	0	12	2	10	401	17	0	0	0	0	0	0	0
Private non-life insurance companies	40	1397	13	336	34	2	9	64	24	131	34	16	210	0	15	0	48	20	0	7	21	23	7	24	0	30	0	0	0	0	0	0	0	1030	0
Trust fund bureau	5752	3495	9311	1410	31	0	31	0	0	4231	251	23	202	341	11140	17	0	0	0	0	0	0	0	41	0	0	0	21	0	0	0	0	0	0	0
Private life insurance companies	319	5132	2443	1437	45	174	47	557	152	583	231	116	987	56	136	0	197	125	28	29	145	101	34	112	0	19	0	38	0	0	0	0	0	0	0
Other social security funds	92	177	115	9	0	0	6	14	95	15	49	3	145	2	34	0	0	0	5	5	0	54	6	67	4	2	850	7	0	0	0	0	0	0	110
Postal life insurance	2025	1182	2929	862	9	0	11	30	478	1099	66	24	358	29	1811	0	78	47	0	0	0	111	0	101	2	14	295	12	0	0	0	0	0	0	0
National pension funds etc.	74	280	256	140	4	2	3	19	11	31	21	4	193	2	43	0	22	14	0	0	2	61	0	35	0	2	82	1	0	0	0	0	0	0	0
Mutual aid insurance	283	710	969	223	19	0	8	67	77	425	8	14	263	5	143	0	62	39	37	36	3	69	46	56	0	3	0	1	0	0	0	0	0	0	0
Corporate pensions	104	3433	1228	1652	41	31	20	209	79	192	103	28	610	14	43	0	85	53	6	6	48	54	7	51	0	27	0	6	0	0	0	0	0	0	0
Households	1022	4845	1084	501	1	0	61	0	18985	36	261	0	18372	0	0	3489	1800	1335	980	1027	0	7968	1210	9879	46	1711	0	12706	33	10944	1290	3247	7681	241	0
Public pension funds	534	1872	1582	891	21	4	132	102	74	283	362	10	853	75	0	1	133	63	65	58	3	108	80	109	3	38	13500	48	4	0	0	0	0	90	2

Note Bank of Japan "Flow of Funds" March 2000

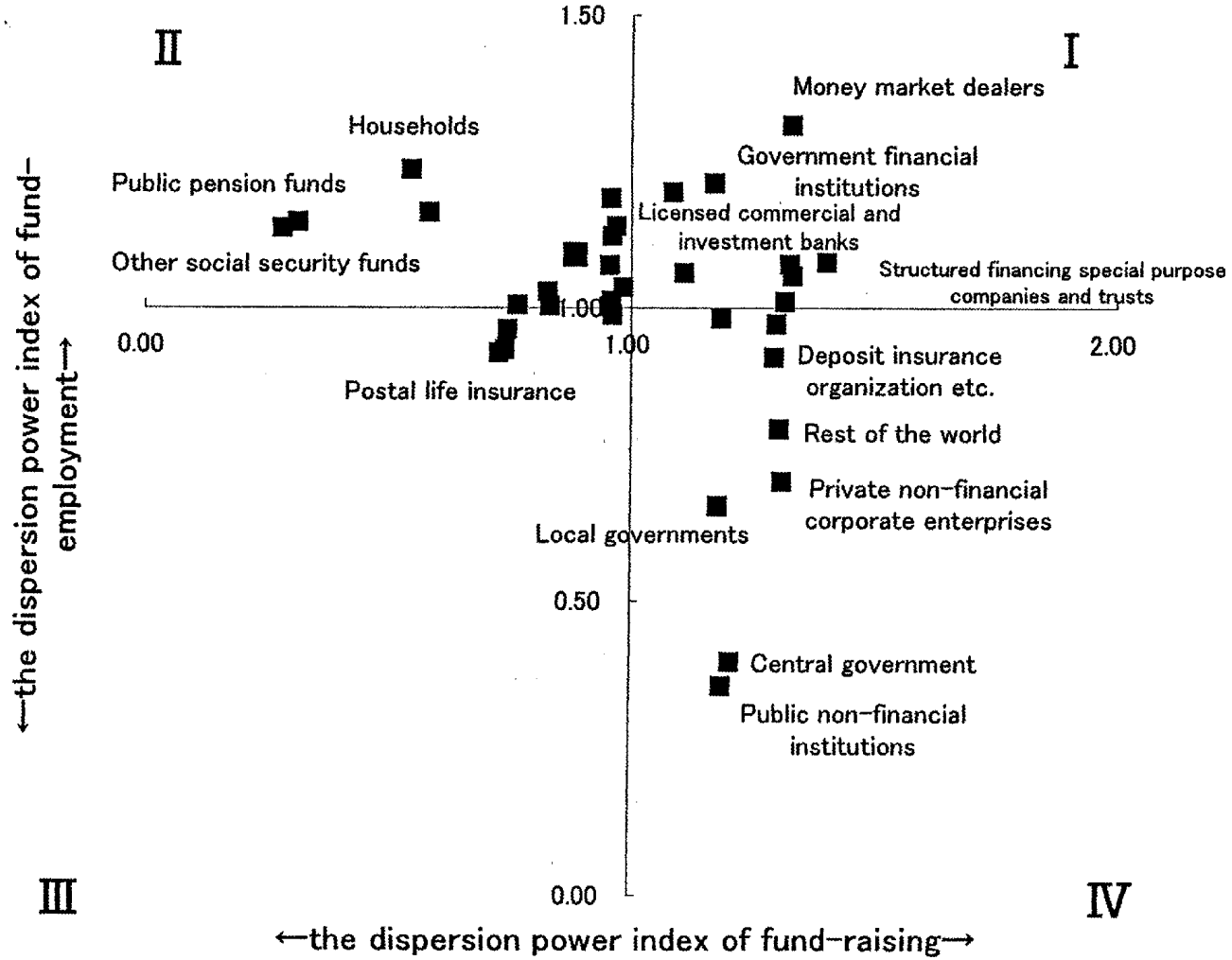

Figure 9 :The relation between the dispersion power index of fund-raising and the dispersion power index of fund-employment

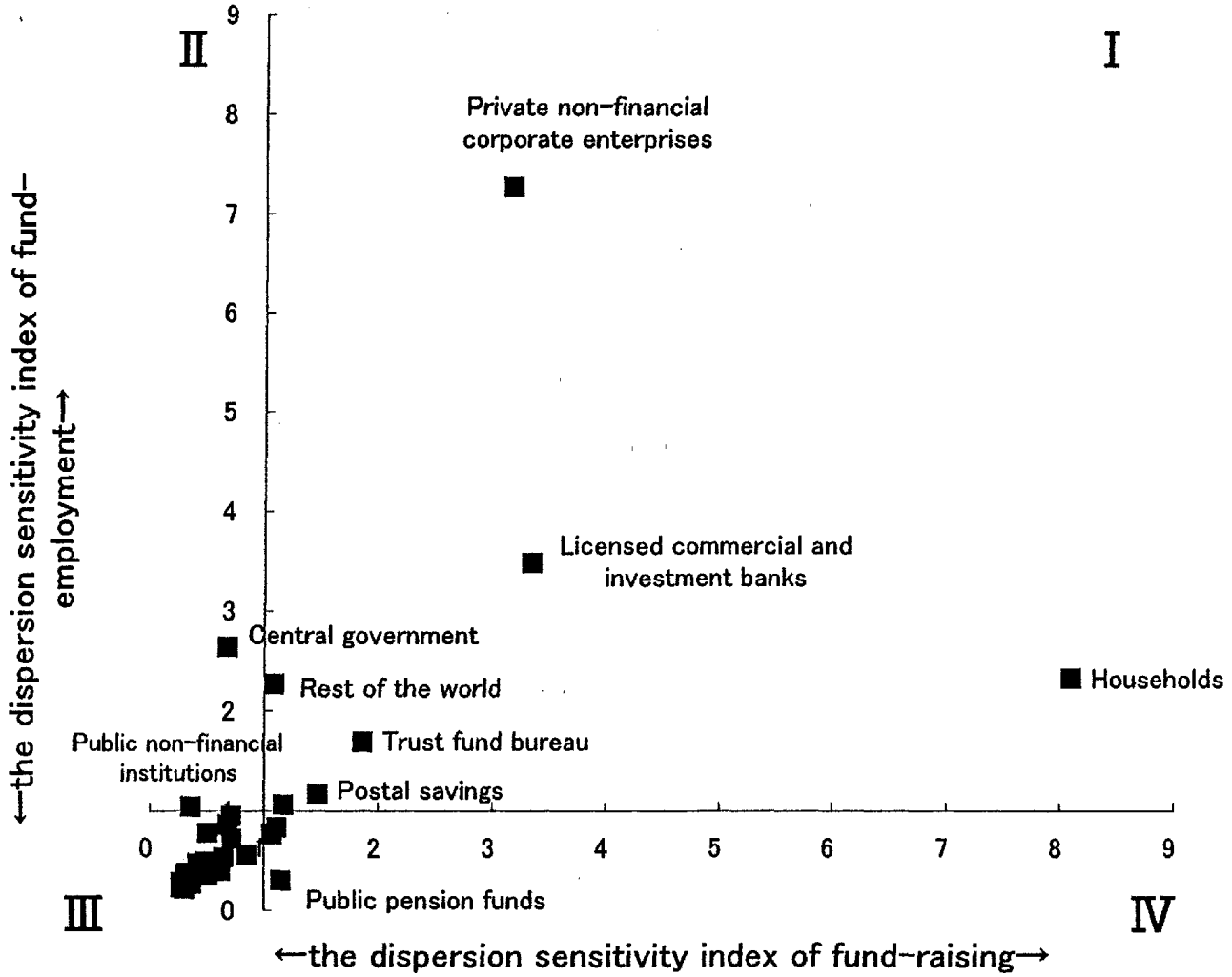

Figure 10 :The relation between the dispersion sensitivity index of fund-raising and the dispersion sensitivity index of fund-employment