IRVING FISHER COMMITTEE
ON CENTRAL-BANK STATISTICS

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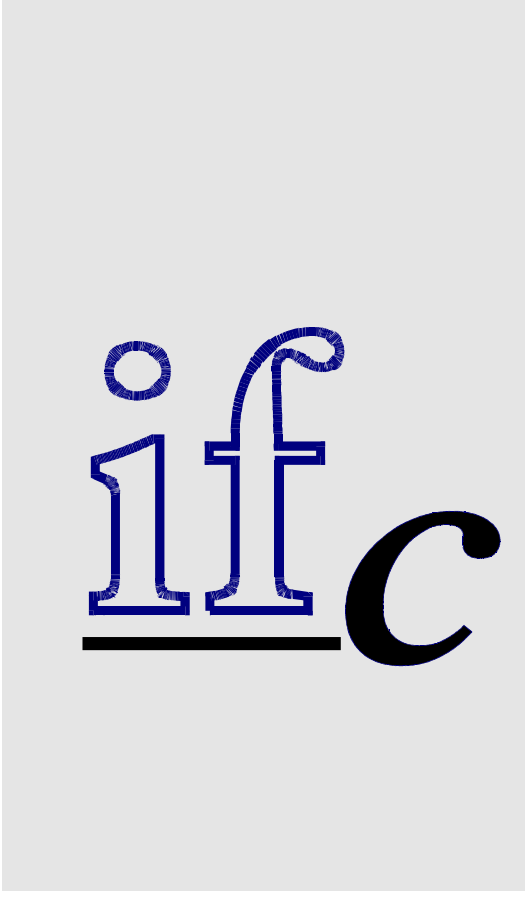

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EDITORIAL

Looking back – and ahead

The various meetings on behalf of the IFC which were organized in the framework of the 52nd ISI Session in Helsinki were a great success. Nearly 100 persons, representing more than 30 central banks and more than 20 other institutions, attended one or more meetings. Attendance at the Invited papers meeting and the two Contributed papers meetings averaged 60-70 persons. In one case the conference room was full to capacity. The meeting held in co-operation with the IAOS had to compete with one of the Contributed papers meetings, which was one of the reasons why the attendance was somewhat lower. The Administrative Meeting, during which important decisions were taken about the IFC's future strategy (see next page), was attended by 50 central bankers.

The IFC has started the preparation of its 2001 conference, which will take place in the framework of the ISI Session in Seoul, and it is studying the feasibility of a special conference, independent from the ISI, in 2002. The newly elected programme committee has been charged with the organization of both conferences. On the basis of the many suggestions received at the Helsinki Administrative Meeting, the Executive Body has drawn up a list of topics for each of these conferences, out of which the programme committee will make a definitive choice.

2001 Conference

1. Statistics for Financial Stability;
2. Collection of financial data from companies: Statistics and International accounting standards;
3. Relationship between Central Banks and Statist**i**cal Institutes;
4. The measurement of External Debt and External Reserves.

2002 Conference

1. Liberalization of Financial Markets and BOP-compiling;
2. Statistical methods in safeguarding the quality of statistics;
3. Central bank statistics in a multi-national set-up;
4. Statistics and Transparency;
5. Statistics and Virtual Information Technology.

This issue

The IFC Bulletin started publishing (abstracts of) papers for the Helsinki conference as far back as June 1998, and is continuing to do so in the present issue, which also contains comments from the discussants on the invited papers.

In addition to the proceedings of the Helsinki meeting, this issue contains two articles, one on a decision support method (originally presented as a paper in Helsinki) and one on the measurement of derivatives in the United Kingdom. The choice of these to articles reflects the editor's policy to achieve a balance between scientific and practical subjects.

The publication of Fisher's "Short Stories on Wealth" is continued with numbers 22-32, devoted to the phenomenon of Interest.

ADMINISTRATIVE MEETING

Minutes

of the Administrative Meeting, Helsinki, 12 August 1999

According to the attendance list the following persons attended the meeting: Acx, Agostinho, Álverez, Bajtay, Boamah, Caliço, Calvo, Carson, Caruana Galizia, Caune, Chaudron, Doguwa, Glaab, Hagino, Isnard, Kanaris, Kone, Lehtonen, Meganck, Melis, Monajemi, Munyandamutsa, Muwanga-Zake, Nesvadba, Obaseki, Oleñski, Pécha, Poullet, Radipotsane, Schubert, Signorini, Sodoma, Steger, Turnbull, Van Nieuwkerk, Van Wijk, Vojtisek, Wadagni and Zautzik.

Introduction

The Chairman (Mr Emerico Zautzik) opened the meeting at 5.45 PM. He called to mind that Mr Zoltan Kenessy, who had strongly supported the creation of the Irving Fisher Committee, had passed away in June 1998. Mr Hans van Wijk, who had had regular contacts with Mr Kenessey in the period that the committee was instituted, spoke a few words in commemoration of the deceased.

Future presentation

The Chairman said the IFC could be proud of the unexpectedly high attendance in the scientific meetings organized on behalf of the IFC, but he noted that the committee was still defining its aims and its strategy. The executive body had contemplated an increase in the number of meetings by means of organising an extra meeting between those in the framework of the ISI conferences. He thought that it was too late to organise an independent meeting in 2000, but he could imagine such a meeting in 2002. One option would be to organise the meetings in the even years as part of the sessions of the International Association for Official Statistics (IAOS), which would presume that the IFC became affiliated with that Association. However**,** he saw disadvantages as well as advantages in closer co-operation with IAOS. For him it was an important consideration that central banks were working in a field that comprised not only official statistics, but also other kinds of statistics like, most notably, financial market statistics. It would also be a disadvantage to lose independence. In the light of the satisfying attendance to this conference, he proposed to leave the discussion on co-operation with the IAOS to a later date.

In response to his invitation to give comments on the frequency and character of the meetings, Mr Assad Monajemi (Iran) noted that it would be attractive to have a meeting every year. Mrs Carol Carson (IMF) said she welcomed very much the central bank statisticians having a forum for sharing concern**s,** for example**,** about threats to financial stability. She thought that the IFC could contribute considerably to the improvement of statistical data in this field. Mr Marius van Nieuwkerk (Netherlands) supported the Chairman's view that it would be prudent to defer a deci-

sion on a possible co-operation with the IAOS to a later stage, when the IFC might be in a better bargaining position. Mr Van Wijk brought to mind that two years ago it was decided to seek co-operation with experts on financial markets; joining the IAOS would mean the IFC turning in the opposite direction.

Chairmanship, Executive Body and Programme Committee

Subsequently, the Chairman nominated Mr Van Nieuwkerk as candidate for his succession, and he proposed to re-elect Mr Bart Meganck as Secretary. His proposals were carried by acclamation, as was the Chairman's proposal to re-elect Mr Van Wijk, the editor of the IFC Bulletin, as member of the executive body. Furthermore, the Chairman proposed to institute a programme committee, with the task to organise the future meetings. In response to his request to nominate candidates for this committee, the following persons were suggested: Mr Mediyamere Radipotsane (Botswana) and Mr Oleński (Poland). Referring to the valuable contributions of Mr John McLenaghan to the IFC, the Chairman asked Mrs Carson whether the IFC could count on occasional assistance by the IMF. Mrs Carson replied that she would be ready to join the Programme Committee. Her willingness to replace Mr John McLenaghan was very much appreciated by the meeting.

The Chairman asked Mr. Satoru Hagino (Japan) if he would be interested to join the programme committee. Messrs Oleński, Radipotsane and Hagino accepted membership on the programme committee, the latter two persons with the proviso that their organisations would agree.

It was decided that the programme committee would also comprise the members of the executive body, over which the chairman of the IFC would preside.

Topics for future meetings

The Chairman asked those present to suggest topics for the future meetings of the IFC. He started with proposing the following subject: How to change the statistical system in response to the change in the economic environment brought about by liberalization.

Mr Philip Turnbull (United Kingdom) advised the IFC to give attention to the hole in the analytical framework that exists with respect to the macro-prudential system risks.

The chairman suggested that maybe Mr Radipotsane could give attention to the relationship between statistical institutes and central banks since, in his presentation, he showed an interest in other central banks.

Mr Martti Lehtonen (Finland) mentioned as a topic: the statistical methods in safeguarding the quality of statistics.

Mrs Carson endorsed the topic of macro-prudential statistics and added three more subjects: the measurement of external debt, the measurement of external reserves**,** and central bank statistics in a multi-national set-up, including groupings of central banks like the European Central Bank and the Banque Centrale des Etats de l'Afrique de l'Ouest.

Mrs Eva Nesvadba (Austria) proposed: How to explain statistics to the public? Mr Aurel Schubert (Austria) thought that this topic could be broadened to a more comprehensive treatment of dissemination problems of statistical information.

Mr Hagino recommended to study the relationship between statistics and commercial accounting. He noted that money statistics are being based on reporting by commercial banks, which apply international accounting standards. In Japan, standards had recently rapidly and greatly changed.

Mr Van Nieuwkerk suggested: statistics and the Internet. Mr Oleński would rather extend this subject to statistics and virtual information technology.

Mr Meganck said that it would be possible for the IFC to organize one of the meetings during the next ISI conference jointly with the IAOS, as was done during the present ISI conference. This meant that one topic should be earmarked for that joint meeting.

The chairman charged the programme committee with the task to decide on topics for the various meetings in 2001 and subsequent years, and closed the administrative meeting at 7.15 PM.

Analytic Hierarchy Process in Banking

Czes³aw Domañski
Jaros³aw Kondrasiuk

1. Analytic Hierarchy Process (AHP) Method

The AHP is a multicriteria decision support method that provides an objective way for reaching an optimal decision for both individual and group decision makers. The AHP is designed to select the best from a number of alternatives evaluated with respect to several criteria. It is taken by carrying out pairwise comparison judgements which are used to develop overall priorities for ranking the alternatives. This method allows for some level of inconsistency in judgements (that is unavoidable in practice) and provides some measures for limiting that. Originally the AHP method was created by Thomas L. Saaty who is still deeply engaged in the development of applications of this method.

In the AHP process there are four main stages:

1. Building a hierarchy model – the basic AHP model consists of three levels: goal, criteria level and alternatives. Depending on the complexity of the problem it is possible to add as many as necessary levels of subcriteria .
2. Identifying the preferences of decision makers – in AHP it is done by collecting information about pairwise judgements due to a goal (for criteria), a specified criterion (for alternatives or subcriteria) or a subcriterion (for alternatives) [classical Saaty solution in 1, 2, 6].
3. Synthesis – it is obtained by a process of weighting and adding down the hierarchy leading to a multilinear form in two possible modes:
   - the distributive mode in which the principal eigenvector is normalized to yield a unique estimate of the ratio scale underlying the judgements;
   - the ideal mode in which the normalized values of alternatives for each criterion are divided by the value of the highest rate alternative.
4. Sensitivity analyses that give an answer to the question whether the alternative chosen as the best would be changed if the criteria/subcriteria preferences were modified.

2. Applications of the AHP method in banking

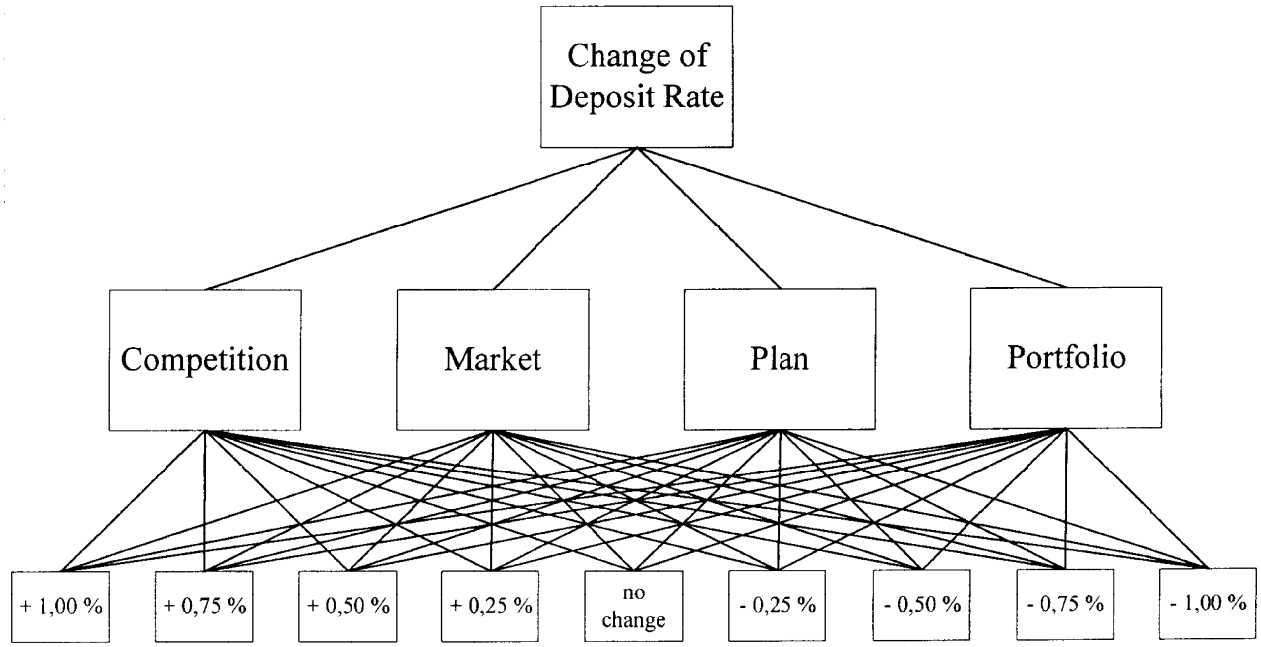
2.1. Establishing the price of bank deposits

Following the AHP methodology we have structured the AHP hierarchy presented in figure 1.

The final version of the model uses four criteria:

- COMPETITION – marketing point of view on pricing deposits according to deposit rates of competitive banks to “our” bank;
- MARKET – treasury point of view, including possible buying of bank deposits (and alternative costs);
- PLAN – financial planning and prognosis of future benefits and costs of the bank;
- PORTFOLIO – present assets portfolio of the bank as the measure of efficiency of already acquired deposits.

Figure 1 – The three level hierarchy used for changing the deposit rate of the bank [6]



Due to suggestions of decision makers, we have decided to limit possible alternatives to increases and decreases in the *average deposit rate* by 1.00 %, with 0.25 % steps [6].

2.2. Establishing the base loan rate of the bank

The base structure uses the following criteria:
- competition – loan rates of competitive banks to "our" bank;
- demand for loans;
- deposits – the source of the money converting into loans;
- interbank money market – an alternative source of the money converting into loans.

The possible alternatives are also limited from increasing to decreasing the base loan rate by 1.00 %, with 0.25 % steps [5].

2.3. The use of the models

Both models from chapter 2.1 and 2.2 were used in Polish banks. The models may be used individually or together. The general idea of the decision support by using them can be described in terms of the following theoretical case:
1. Occurrance of a market destabilisation factor (for example a change in central bank loan rates).
2. Actualisation of preference matrices for models 2.1 and 2.2.
3. Solving model 2.1 and solving model 2.2.
4. Further decision based on optimal solutions reached in previous steps concerning deposit and loan products of the bank.

The second step includes checking the inconsistency of preferences and limiting them according to the AHP method.

3. Conclusions

The presented model might be enlarged due to the specific characteristics of the bank in which they are implemented. It is possible to build a complex decision support system connecting both models – especially focused on scenario analyses. Generally, the AHP is a good method for supporting decision makers. Due to its open characteristics, allowing the combination of quantitative and non-quantitative aspects of the preferences, the AHP may represent an interesting basis for development

of combined optimisation methods.

The most important element for successful implementation of the AHP method is explaining to decision makers the general idea of the method combined with using (or preparing) special support software (for example *Expert Choice For Windows 9.0* – a software developed by Ernest H. Forman).

References

1. Saaty Thomas, L., 1986, *Axiomatic Foundation of the Analytic Hierarchy Process*, Management Science Vol. 32, No. 7, July 1986.
2. Saaty Thomas, L. 1994, *Fundamentals of Decision Making and Priority Theory with the Analytic Hierarchy Process*, Vol. VI, RWS Publications, Pittsburgh 1994.
3. Saaty Thomas, L. and L.G. Vargas, 1994, *Decision Making in Economic, Political, Social and Technological Environments with the Analytic Hierarchy Process*, Vol. VII, RWS Publications, Pittsburgh 1994.
4. Domański, Cz., J, Kondrasiuk and I. Morawska, 1997, *Zastosowanie analitycznego procesu hierarchicznego w przedsiêbiorstwie*, in T.Trzaskalik: Zastosowania Badań Operacyjnych, Absolwent, Łódź 1997.
5. Domański, Cz. and J. Kondrasiuk, 1998, *Podejmowanie decyzji kierowniczych w systemach bankowych*, in T. Trzaskalik: Metody i Zastosowania Badań Operacyjnych, Vol. 1, WUAE im. K. Adamieckiego w Katowicach, Katowice 1998.
6. Domański, Cz. and J. Kondrasiuk, *Implementing of Analytic Hierarchy Process in Banking*, in publishing.

APPENDIX 1

The AHP Method

The AHP is a general theory of preference measurement with providing necessary information for choosing the best decision.

In the AHP process there are four main stages:
1. Building a hierarchy model.
2. Identifying the preferences of decision makers.
3. Synthesis.
4. Sensitivity analyses.

The basic AHP model consists of three levels: goal, criteria level and alternatives. Depending on the complexity of the problem it is possible to add as many as necessary levels of subcriteria.

The most complex problem is identification of decision maker preferences. In AHP it is done by collecting information about pairwise judgements due to a goal (for criteria), a specified criterion (for alternatives or subcriteria) or a subcriterion (for alternatives). There are a view possible scales of converting collected information into numeric form – however it is not always necessary. Having one set of information we build a matrix of ratio comparison for a given goal/criterion. It is possible to find many ways of converting the matrix **A** (matrix of ratio comparison) into the vector of priorities **w**. However, the need of consistency make us to choose the eigenvalue formulation $\mathbf{Aw} = n\mathbf{w}$. Assuming that the priorities $w = (w_1, \ldots, w_n)^T$ with respect to a single criterion are known, such as the weights of stones – we can examine what we have to do to recover them. Having the matrix **A** :

$$A = \begin{bmatrix} w_1/w_1 & w_1/w_2 & \cdots & w_1/w_n \\ \vdots & \vdots & \ddots & \vdots \\ w_n/w_1 & w_n/w_2 & \cdots & w_n/w_n \end{bmatrix}$$

we multiply it on the right by **w**

$$w = \begin{bmatrix} W_1 \\ \\ W_n \end{bmatrix}$$

to obtain n**w**. Elements a_{ij} of the matrix of ratio comparison represents the importance of alternative i over alternative j. In order to guarantee the judgements to be consistent relevant groups of the matrix elements have to follow the equation: $a_{ij}\, a_{jk} = a_{ik}$. In case we do not have a scale at all , or do not have it conveniently as in the case of some measuring devices, we can only give an estimation of w_i / w_j. It leads to the problem:

$$\mathbf{A'w'} = \lambda_{max}\, \mathbf{w'},$$

where λ_{max} is the principal eigenvalue of $\mathbf{A'} = (a'_{ij})$, the perturbed value $\mathbf{A} = (a_{ij})$ with the reciprocal $a'_{ji} = 1 / a'_{ij}$ forced.

The solution is obtained by raising the matrix to sufficient large power – then summing over the rows and normalizing to obtain the priority vector $w' = (w'_1, \ldots, w'_n)^T$. The above mentioned process is stopped when the difference between components of the priority vector obtained at k-th power and at the (k+1)-st power is less than some predermined small value. The vector of priorities is the derived scale associated with the matrix of comparisons. The value zero in this scale is assigned to an element that is not comparable with the elements considered.

With the eigenvector for n = 3 normalizing the geometric means of the rows leads to an approximation to the priorities. In all the cases it is possible to get an approximation by normalizing the elements of each column of the judgement matrix and then averaging over each row. However, it is important to remember that such steps can lead to rank reversal (in spite of closeness of the eigenvector solution).

A simple way to obtain the exact value (or an estimate) of λ_{max} when the exact value of **w'** is available in normalized form is to add the columns of A' and multiply the resulting vector by the priority vector **w**.

After obtaining the principal eigenvector estimate **w** we should consider the question of consistency. The problem arises by the fact that the original matrix **A** need not to be transitive, for example A_1 may be preferred to A_2 and A_2 to A_3 but A_3 may be preferred to A_1. The solution to this problem is the consistency index (C.I.) of a matrix of comparison defined as:

$$C.I. = \frac{\lambda_{max} - n}{n-1}$$

The consistency ratio (C.R.) is obtained by comparing the C.I. with the appropriate one of the following set of numbers (table 1) each of which is an average random consistency index derived from a sample of randomly generated reciprocal matrices. The study of the problem and revision of the judgements should be completed if

$$\frac{C.I.}{R.I.} \geq 0.10$$

.***Table 1 – Average Random Consistency Index (R.I.)*** *[1,p. 9]*

n	1	2	3	4	5	6	7	8	9	10
Random Consistency Index (R.I.)	0	0	0.52	0.89	1.11	1.25	1.35	1.40	1.45	1.49

The above solution to the problem is considered to be the classical Saaty solution [2,p.7-9] and is used for reaching both local and global vectors of priorities – necessary for synthesis.

Hierarchic synthesis is obtained by a process of weighting and adding down the hierarchy leading to multilinear form. There are two possible modes of the synthesis:

- the distributive mode in which the principal eigenvector is normalized to yield a unique estimate of ratio scale underlying the judgements;
- the ideal mode in which the normalized values of alternatives for each criterion are divided by the value of the highest rate alternative.

The final step is sensitivity analysis that gives an answer to the question whether the alternative chosen as the best would be changed if the criteria/subcriteria preferences were modified..

APPENDIX 2

Application of the AHP Method in establishing the price of bank deposits

The mechanism presented below was experimentally implied in one of the smallest Polish banks for establishing the price of bank deposits. By establishing the price we considered the change in present deposit rates.

According to the AHP methodology the first step was getting expert knowledge of the present process of establishing the deposit rates. The next step was structuring the AHP hierarchy – the final version of the structure is presented in figure 1.

After consultations with decision makers we have decided to select four criteria:

- COMPETITION – precisely, it is the marketing point of view on pricing deposits according to deposit rates of competitive banks of "our" bank;
- MARKET – it is the treasury point of view, including possible buying of bank deposits (and alternative costs);
- PLAN – financial planning and prognosis of future benefits and costs of the bank;
- PORTFOLIO – present assets portfolio of the bank as the measure of efficiency of already acquired deposits.

Due to suggestions of the decision makers, we have decided to limit possible alternatives to changes in the average deposit rate, as follows:

A_1 – increasing the average deposit rate of the bank by 1.00 %;
A_2 – increasing the average deposit rate of the bank by 0.75 %;
A_3 – increasing the average deposit rate of the bank by 0.50 %;
A_4 – increasing the average deposit rate of the bank by 0.25 %;
A_5 – leaving the deposit rate without any change;
A_6 – decreasing the average deposit rate of the bank by 0.25 %;
A_7 – decreasing the average deposit rate of the bank by 0.50 %;
A_8 – decreasing the average deposit rate of the bank by 0.75 %;
A_9 – decreasing the average deposit rate of the bank by 1.00 %.

First, all the data and calculations were collected with the use of *Expert Choice For Windows 9.0*. In the next step the calculations were checked with *Excel 97*. Tables from 2 to 6 contain collected information about pairwise comparison judgements in the form described in appendix 1.

Table 2 – Pairwise comparison matrix of criteria

	Competition	Market	Plan	Portfolio
Competition	10/10	90/10	30/10	80/10
Market	10/90	10/10	10/80	10/20
Plan	10/30	80/10	10/10	50/10
Portfolio	10/80	20/10	10/50	10/10

Table 3 – Pairwise comparison matrix of alternatives according to the criterion PLAN

	A_1	A_2	A_3	A_4	A_5	A_6	A_7	A_8	A_9
A_1	10/10	10/20	10/30	10/40	10/60	10/70	10/80	10/90	10/90
A_2	20/10	10/10	10/20	10/30	10/50	10/70	10/80	10/90	10/90
A_3	30/10	20/10	10/10	10/20	10/40	10/60	10/80	10/90	10/90
A_4	40/10	30/10	20/10	10/10	10/15	10/35	10/55	10/75	10/80
A_5	60/10	50/10	40/10	15/10	10/10	10/15	10/30	10/45	10/50
A_6	70/10	70/10	60/10	35/10	15/10	10/10	10/15	10/30	10/30
A_7	80/10	80/10	80/10	55/10	30/10	15/10	10/10	10/20	10/20
A_8	90/10	90/10	90/10	75/10	45/10	30/10	20/10	10/10	10/10
A_9	90/10	90/10	90/10	80/10	50/10	30/10	20/10	10/10	10/10

Table 4 – Pairwise comparison matrix of alternatives according to the criterion COMPETITION

	A_1	A_2	A_3	A_4	A_5	A_6	A_7	A_8	A_9
A_1	10/10	12/10	14/10	16/10	18/10	20/10	22/10	23/10	30/10
A_2	10/12	10/10	12/10	15/10	18/10	20/10	22/10	22/10	25/10
A_3	10/14	10/12	10/10	12/10	16/10	18/10	19/10	19/10	21/10
A_4	10/16	10/15	10/12	10/10	12/10	16/10	17/10	18/10	20/10
A_5	10/18	10/18	10/16	10/12	10/10	12/10	14/10	15/10	17/10
A_6	10/20	10/20	10/18	10/16	10/12	10/10	12/10	13/10	15/10
A_7	10/22	10/22	10/19	10/17	10/14	10/12	10/10	13/10	15/10
A_8	10/23	10/22	10/19	10/18	10/15	10/13	10/13	10/10	14/10
A_9	10/30	10/25	10/21	10/20	10/17	10/15	10/15	10/14	10/10

Table 5 – Pairwise comparison matrix of alternatives according to the criterion MARKET

	A_1	A_2	A_3	A_4	A_5	A_6	A_7	A_8	A_9
A_1	10/10	10/20	10/25	10/30	10/40	10/50	10/60	10/90	10/90
A_2	20/10	10/10	10/20	10/25	10/30	10/40	10/60	10/80	10/80
A_3	25/10	20/10	10/10	10/20	10/30	10/45	10/65	10/80	10/85
A_4	30/10	25/10	20/10	10/10	10/20	10/35	10/50	10/65	10/70
A_5	40/10	30/10	30/10	20/10	10/10	10/20	10/30	10/50	10/52
A_6	50/10	40/10	45/10	35/10	20/10	10/10	10/20	10/30	10/35
A_7	60/10	60/10	65/10	50/10	30/10	20/10	10/10	10/15	10/17
A_8	90/10	80/10	80/10	65/10	50/10	30/10	15/10	10/10	10/15
A_9	90/10	80/10	85/10	70/10	52/10	35/10	17/10	15/10	10/10

Table 6 – Pairwise comparison matrix of alternatives according to the criterion PORTFOLIO

	A_1	A_2	A_3	A_4	A_5	A_6	A_7	A_8	A_9
A_1	10/10	10/20	10/30	10/40	10/50	10/60	10/80	10/90	10/90
A_2	20/10	10/10	10/20	10/30	10/45	10/60	10/75	10/90	10/90
A_3	30/10	20/10	10/10	10/20	10/40	10/60	10/80	10/90	10/90
A_4	40/10	30/10	20/10	10/10	10/20	10/50	10/70	10/80	10/80
A_5	50/10	45/10	40/10	20/10	10/10	10/20	10/50	10/80	10/80
A_6	60/10	60/10	60/10	50/10	20/10	10/10	10/20	10/60	10/60
A_7	80/10	75/10	80/10	70/10	50/10	20/10	10/10	10/15	10/20
A_8	90/10	90/10	90/10	80/10	80/10	60/10	15/10	10/10	10/12
A_9	90/10	90/10	90/10	80/10	80/10	60/10	20/10	12/10	10/10

As we can see in table 7, both local and global I.C./I.R. are lower than 0.10. It means that the matrices of pairwise comparison for all hierarchy levels allow us to complete synthesis.

Table 7 – I.C./I.R. computed for local and global priorities

	Competition	Market	Plan	Portfolio
Local priorities I.C./I.R.	0,00	0,03	0,03	0,06
Global priorities I.C./I.R.	0,04			

A_5	0.099	0.059	0.067	0.003	0.074	0.022	0.057	0.004	0.088	9
A_6	0.085	0.050	0.107	0.005	0.117	0.034	0.097	0.007	0.096	6
A_7	0.078	0.046	0.175	0.008	0.169	0.049	0.178	0.013	0.116	3
A_8	0.071	0.042	0.245	0.011	0.262	0.077	0.275	0.020	**0.149**	**1**
A_9	0.059	0.035	**0.284**	0.013	**0.269**	0.078	**0.295**	0.021	0.147	2

$$C.I. = \frac{\lambda_{\max} - n}{n-1}$$

The results of the synthesis are presented table 8. The optimal alternative is decreasing the bank's average deposit rate by 0.75 %.

We do not present the sensitivity analyses, however it is important to mention that decreasing the importance of the COMPETITION-criterion leads to changing optimal alternative to A_9 (decreasing the deposit rate by 1.00%).

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$$\frac{C.I.}{R.I.} \geq 0.10$$

$$A = \begin{bmatrix} w_1/w_1 & w_1/w_2 & \cdots & w_1/w_n \\ \vdots & \vdots & \ddots & \vdots \\ w_n/w_1 & w_n/w_2 & \cdots & w_n/w_n \end{bmatrix}$$

$$w = \begin{bmatrix} w_1 \\ \\ w_n \end{bmatrix}$$

New data on Financial Derivatives[1] for the UK National Accounts and Balance of Payments

Andrew Grice

This article introduces the first publication of UK banks' gross positions in financial derivatives in a National Accounts format. It provides background on why and how the Bank of England collects statistics on financial derivatives, some of the issues that banks face in compiling the data and a discussion of recent movements in the statistics.

Background

UK economic statistics do not currently include holdings of, or transactions in, financial derivatives. International statistical standards have, in the past, viewed these instruments as contingencies or as bilateral arrangements to be held off balance sheet.

This view of derivative instruments changed with the publication of new international standards.[2] These saw derivative products, such as futures and options, as financial assets which could be traded and which carried a market value linked to, but separate from, the underlying instrument or commodity from which they derived. The new standards now propose that these instruments should, in future, be recorded within the National Accounts and Balance of Payments, both in the financial balance sheets and associated financial flows.

The United Kingdom implemented most of the new national accounting standards required under ESA95 during 1998. However, the implementation of the new requirements in respect of derivative instruments remains an outstanding issue.[3] The development of new data sources has been underway within the Bank and the Office for National Statistics (the UK National Statistical Institution) for some time. Some of the results from this work are now ready for wider dissemination. However, the timetable for the full integration of these new data into the UK National Accounts is still to be set.

The new data will complement, but are entirely separate from, existing supervisory sources, developed for regulatory and market surveillance purposes. They represent the market value of outstanding positions held by the UK banking sector, that is, the balance sheet positions of all banks resident in the United Kingdom. Other sources, for example data collected as part of the survey of global market activity co-ordinated by the Bank for International Settlements, are more commonly compiled on a worldwide consolidated basis and do not allow the location of balance sheet positions to be identified.

Rapid growth in the scale of derivative business – global daily turnover in the "over the counter" (OTC) markets has risen from a notional $880 billion in 1995 to $1,265 billion in 1998[4] – has led to an additional need for information. Structural changes, such as mergers between equity and

1) *By "financial derivatives" we mean here most contracts – including commodity products – traded on exchanges or "over the counter" (OTC).*

2) *These international statistical standards include the System of National Accounts (1993), the European System of Accounts (1995) and the Balance of Payments Manual 5th edition (1995).*

3) *Up to now the only derivatives data included in the current UK National Accounts and BoP are settlement flows for interest rate swaps and Forward Rate Agreements – but this classification is likely to change in the near future because of revisions to international statistical treatment. For more information on this change, refer to the article "Recording financial derivatives in the UK National Accounts and Balance of Payments" of the Bank of England publication "Monetary and Financial Statistics," March 1998 issue.*

4) *Bank for International Settlements – Central Bank Survey of Foreign Exchange and Derivatives Market Activity 1998; May 1998. For a discussion on "notional" values see below.*

derivative exchanges, the ability of market participants to trade electronically from abroad and changes in the types of contract available also support this need.

What are financial derivatives?

The International Monetary Fund[5] defines them as *"financial instruments that are linked to a specific financial instrument or indicator or commodity and through which specific financial risks can be traded in financial markets in their own right. The value of a financial derivative derives from the price of an underlying item, such as an asset or index. Unlike debt securities, no principal is advanced to be repaid and no investment income accrues."*

National Accounting standards draw the distinction between a position (the current value of a contract) and a transaction (cash flows leading to a change in ownership associated with the opening, maintenance and closing of a derivatives contract).

How are they valued?

There are a number of ways to record the value of a derivatives contract. The simplest of these is the so-called *"notional value"* This records the value of the underlying principal amount, the notional principal, quoted within the contract. For example, a swap contract in which counterparties agree to exchange the hypothetical cost of borrowing £10 million at different reference rates for a pre-determined period, can be said to carry a notional value of £10 million. This value is therefore defined within the contract and is unaffected by factors such as the duration of the contract or, in particular, by subsequent changes in the reference rates or other market conditions.

An alternative valuation concept is that of *market value*. This may also be referred to as the replacement cost or fair value of the contract and represents the perceived cost or benefit associated with holding the contract. In the earlier example of the swap, this would be given by the net present value of the expected future stream of settlement payments. At the start of the contract this will normally be zero, both counterparties seeing the potential for gain or loss, but, as market conditions change and/or the contract moves closer to maturity, the value will typically become positive for one counterparty and negative for the other. This means it takes on the characteristics of a financial asset or liability in its own right. Unlike other financial assets, however, the market value of many derivative contracts can change freely from positive to negative during their life so that a contract which may appear as an asset on the balance sheet in one period, may be recorded as a liability in a subsequent period. Market values typically represent only a fraction of their equivalent notional value.

Notional and market value recording play complementary roles in the analysis of derivative positions. Notional values provide a better guide to both the scale of activity and the potential exposure to future gains or losses arising from changes in market conditions. By contrast, market values record the cumulative unsettled gains or losses which have already occurred. Viewed in isolation they represent credit risk exposure to a counterparty arising from derivatives trading. When set in the wider context of a financial balance sheet they can indicate the extent to which derivative positions can offset changes in the market value of other instruments, for example the local currency value of a foreign currency loan.

Perceptions of the size and relative importance of derivative contracts depend upon whether they are measured using notional or market values. For example, swaps are usually of longer duration than FRAs (Forward Rate Agreements) and so are likely to take larger marked-to-market positions whereas FRAs often have relatively larger notional values but because they are usually very short-term instruments they have relatively small market values. This is reflected in the BIS triennial survey results:

Global OTC positions	**Swaps**	**FRAs**
Gross market values	$1 463bn	$39bn
% of total market value	*57%*	*1%*
Notional amounts	$35 446bn	$6 602bn
% of total notional amounts	*49%*	*10%*

5) *IMF paper "The Statistical Measurement of Financial Derivatives" (reference BOPCOM98/1/24), available on the IMF Internet site at www.imf.org/external/bopage/agenda.htm.*

Derivatives data collected by the Bank

The Bank of England currently collects derivatives information as the UK contribution to the global surveys co-ordinated by the Bank for International Settlements. It collects information through two surveys – a global triennial market activity survey and a half-yearly positions' survey of key market participants. The BIS triennial survey contains a wealth of information – for example, statistics on gross market and notional values of contracts broken down by currency, counterparty and product. Comparisons between these BIS data (on gross market values) and the Bank's new national accounts data are drawn out later in this article.

The BIS half-yearly surveys cover both OTC and exchange markets, though on a worldwide consolidated basis. For a UK owned bank, the derivatives activity of its non-resident branches would therefore be included in the UK data. They do not meet the need for economic statistics such as those required for National Accounts.

To meet these needs a new Bank of England quarterly enquiry (Form DQ[6]) was established in late 1997. It is completed by 47 banks which, when grossed up, represents banking sector gross assets in derivatives of £618 billion and liabilities £613 billion (as at end of March 1999). The reporting population was selected using the 1995 BIS triennial survey as a starting point (with some adaptation) aiming to capture data from the most significant players in the market.

The Form DQ provides a quarterly analysis of banks' gross positions in financial derivatives, at market values, classified by both risk and product category and then by economic sector of the counterparty. These positions are also broken down by currency and country of counterparty. Net transactions in derivatives are also collected. The Office for National Statistics has introduced a similar (but shortened) survey covering securities dealers. Some seventy dealers are covered by this survey and gross assets for the sector are £165 billion.

Implementing derivatives data collection

After the first year of data collection with the new enquiry, the Bank undertook a detailed review of their data quality.[7] Anomalies in the data were queried and more generally banks were asked about the problems and issues they faced when compiling these returns.

After this data review was completed, it was decided that the first two derivatives returns covering positions as at end-December 1997 and end-March 1998 were not of publishable quality. Accordingly the data now being released only cover the period from end-June 1998 onwards.

Positions in financial derivatives

Banks can organise their financial derivatives business in a variety of ways, in part encouraged by the globalisation of markets. The liquidity of the market and 24-hour dealing makes London attractive for trading financial derivatives. A number of (predominantly UK owned) banks record the majority of all their group financial derivatives business in the UK. Other banks will record certain types of contracts in London and others abroad. Some will book similar contracts across the globe with no preference for location. Many trades are carried out in London on behalf of another part of the organisation (often located abroad). In this case two back-to-back trades may be carried out – first with the non-resident office and then with the counterpart in London. These factors mean the overall size of *gross* positions for the UK can be inflated with inter-group trades transferring risk between entities.

The data on overall gross positions are of a high quality because banks require these data for their own internal management accounts and for regulatory reporting. The product and risk category data should be seen as being of reasonable quality – banks' internal accounting systems capture these data. However, economic counterparty data are less reliable and are often estimated.

The only other country currently publishing financial derivatives positions for National Accounts and Balance of Payments purposes is Australia.[8] However, the Australian market is much smaller

6) *A copy of the form and its associated definitions are available on the Bank of England website (www.bankofengland.co.uk/mfsd/defs/index.htm).*

7) *See the paper "Collecting statistics on financial derivatives in the UK" – (ref BOPCOM98/1/14), available on the IMF Internet site at www.imf.org/external/bopage/agenda.htm for more information on this subject.*

8) *Many countries' financial derivatives positions (on a consolidated basis) are shown within BIS survey publications – available at the BIS website (www.BIS.org). This site also contains the results of the BIS triennial survey and the semi-annual surveys.*

than the UK – with daily turnover of $31.6 billion in 1998 compared to the UK's of $591.2 billion. In a recent report[9] the Australian Bureau of Statistics identified similar problems with the valuation of positions and the inability of banks to sectorise the data (in this case between residents and non-residents) as those experienced in the UK.

Transactions in financial derivatives

Banks have found it difficult to provide consistent transactions data. Initial statistical guidance called for *gross* reporting, separating transactions in assets from transactions in liabilities. Banks found this impossible because derivatives can rapidly switch from being assets to liabilities and vice-versa and they could not correctly classify cashflows on this basis.

The solution has been to collect *net* transactions data. However banks have found it difficult to provide data, even on this basis, because of problems in separating derivative transactions from other transactions within their accounting systems. The Bank has decided to delay until next year the publication of these data, by which time a more consistent time series should have been established.

Analysis of the data

The quality of the data collected from Form DQ has improved progressively as banks have become more familiar with the survey and the process of reviewing the data has borne fruit. However, data for the initial returns from the second and third quarters of 1998 must be viewed with caution and strong inferences should not be drawn from only four quarters' data. Changes in positions over the past year therefore need to be interpreted with care.

Banks use derivatives for their own internal hedging purposes as well as trading them for profit. These two motives give rise to different information needs for both internal management and prudential monitoring, with those contracts held as hedges against risk exposure in the banking book, typically valued and classified differently from contracts in the trading book.[10] Form DQ seeks to collect all derivative contracts at market value, and broken down by the economic sector of their counterparty, as required by national accounting standards. However, since this basis of recording is not always practicable for banking book contracts, separate provision has been made for these items within the enquiry. In practice, banking book contracts account for only around 5% of reported positions, with much of this provided at market value, so that the quantitative impact of this discrepancy is thought to be small.

In theory, *net* positions (assets less liabilities) should give an indication as to the profitability of an institution's outstanding book. In practice, these data need to be interpreted cautiously because relatively small errors in the *gross* data can materially alter the *net* position. The use of derivatives to hedge conventional instruments also means that a true profitability picture cannot be gained from looking at derivatives data alone. The attached table shows *net* assets data but any inferences drawn from them should take into account the factors detailed above.

There is growing demand for statistics on banks' credit derivatives business. The Form DQ does cover this type of instrument.[11] However, some banks are misclassifying these products and so the current data do not reflect the true level of activity. The relevant banks have made a commitment to improve their reporting systems throughout this year.

The data from the 47 DQ reporters are grossed up to account for the rest of the banking sector by using derivatives data reported by all banks on the balance sheet so that the statistics described in this article cover the entire banking sector. Despite the *caveats* listed above, the Bank is confident that the quality of these positions data is sufficiently robust to allow their publication.

9) *"Financial Derivatives in Australia's National Accounts" – (ref BOPCOM98/1/22), available on the IMF Internet site at www.imf.org/external/bopage/agenda.htm.*

10) *Take, for example, a bank that issues a foreign currency bond and wishes to guarantee against exchange rate movements through a forward currency contract. It will not trade the contract as it will lose the hedge and gain exposure to foreign exchange risk. It therefore uses accruals accounting to value the derivative in line with the bond being hedged.*

11) *Certain types of credit derivatives, such as credit default products, are excluded from the form because they only transfer default risk rather than market risk. As such we consider them to be analogous to traditional bank instruments such as guarantees.*

Product data

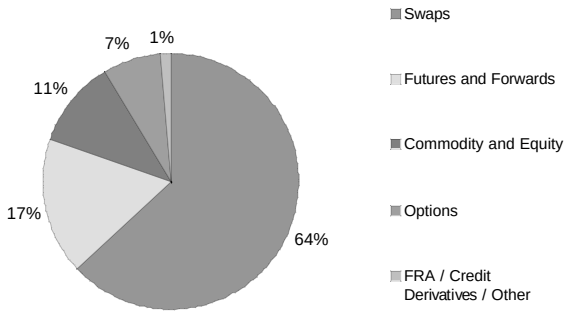
Both the Bank and the BIS triennial survey data shown in the charts are on a *market* value basis. The Bank data only covers UK banks' derivatives business whereas the BIS data is on a worldwide consolidated basis and covers all major participants in the market. The data reported from the new DQ enquiry covers the period from June 1998 to March 1999.

Swaps dominate the product classification with their relative importance growing throughout the period (rising from 63% to 70% of liabilities). The significant change has been the decline in the levels of futures and forwards (from 15% to 11% of liabilities) due to a decline in foreign currency business between the fourth quarter of 1998 and the first quarter of 1999 associated with the introduction of the euro.

There was a small fall in the percentage of banks' assets accounted for by options, falling from 8% to 6%. This was again due to a decline in foreign exchange business. Options have remained constant at 10% of liabilities over the period. Options data are somewhat erratic and reflect the problematic reporting by certain banks that, until the third quarter of 1998, were not providing data of robust quality.

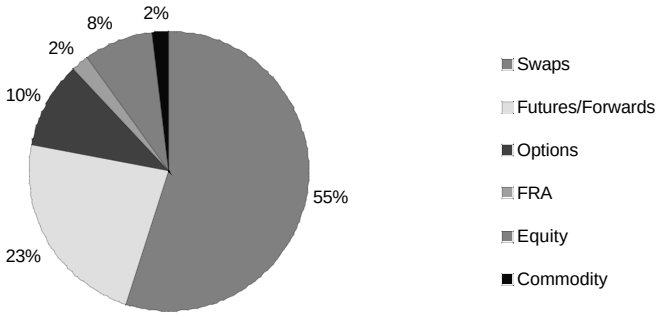
The DQ form collects data on interest rate, foreign exchange, credit derivative, commodity and equity risk categories – but only requires a full product split for the interest rate and foreign exchange risk types. Because there are no product data for commodity, equity and credit derivative risk categories these data have been placed within a separate "product" category. A final category here groups together FRAs, credit derivatives and "other" products, which account for 1% of total assets and liabilities. This grouping is dominated by FRAs (as can be seen from the table at the end of this article), which account for 95% of all positions in this category – credit derivatives are still insignificant.

Chart A – BoE Derivatives Survey: Products (Liabilities) at 30.6.98



Comparing the Bank data to the BIS data (on Charts A and B as at end-June 1998) the major difference is the importance of futures and forwards contracts, which account for 23% of gross market values in the BIS statistics, compared to 17% in the Bank survey. Options have similar market values (in percentage terms) in both surveys at 10/11%. Swaps are the most significant type of contracts accounting for 55% of gross market values in the BIS statistics, but this is smaller than the 64% figure in the Bank survey. These differences probably reflect the different bases on which the Bank and BIS data are compiled and the wider coverage of the BIS survey.

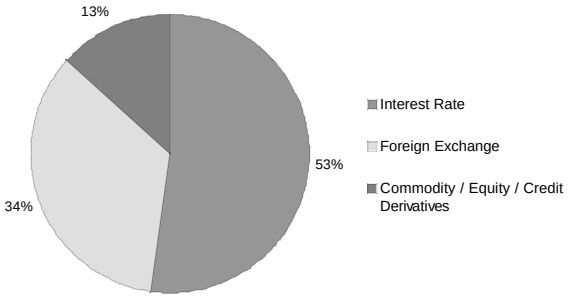
Chart B – BIS 1998 Survey: OTC Product Breakdown (gross market value)



Market risk data

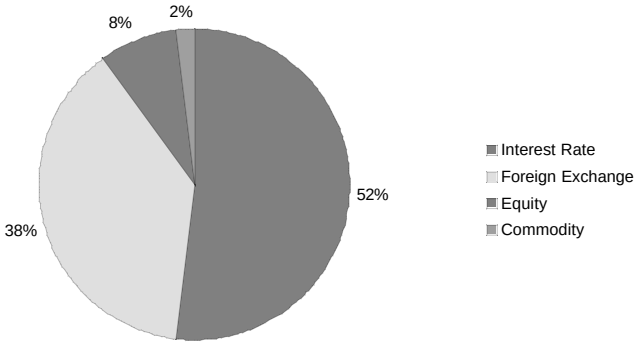
Data broken down by risk category showed a decline in foreign currency positions and a rise in interest rate positions over the period. This caused a relative increase in the importance of interest rate products (up from 52% of liabilities to 63%) with a corresponding fall in foreign exchange products (from 34% to 25% of liabilities over the period). Commodity, equity and credit derivatives (shown as "other" on the table) remained broadly flat over the period – accounting for 12% of total gross liabilities.

Chart C – BoE Derivatives Survey: Risk (Liabilities) at 30.6.98



The Bank and BIS datasets are compared at end-June 1998, in Charts C and D above. There are only slight differences between the two – interest rate products are almost identical (in percentage terms) whilst foreign exchange products accounted for a larger proportion in the BIS statistics (38%) than the Bank statistics (34%). However, the commodity and equity products, conversely, had a greater relative importance in the Bank data (13%) than the BIS data (10%).

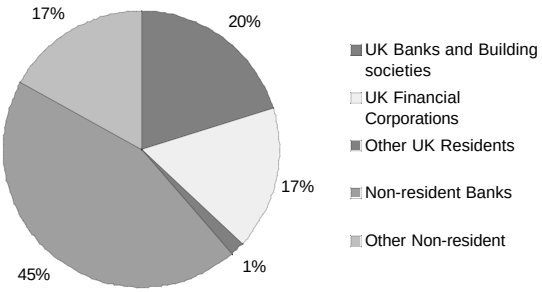
Chart D – BIS 1998 Survey: OTC Risk Breakdown (gross market values)



Counterparty data

This is a consistent time series, with two thirds of banks' derivatives business being undertaken with non-resident counterparties – almost 50% with non-resident banks. This was expected as London is a global market and there are a large number of foreign banks operating in the UK. Over the period, there was a fall in positions with non-residents due to a decline in the value of foreign exchange positions – from 66% of liabilities to 62%.

Chart E – BoE Derivatives Survey: Liabilities by Counterparty, at 31.3.99



Of the other third – business with UK counterparties – the positions with UK banks and with building societies (20% of liabilities in the first quarter of 1999) are slightly greater than those with UK

financial corporations such as securities dealers, pension funds and insurance companies (17% of liabilities). Positions with other UK reporters, such as industrial firms, are very small.

The following two sections describe data collected on form DQ but not included in the table at the end of the article. This is because their quality is not sufficiently robust.

Geographic analysis

The largest non-resident counterparty for banks' derivatives positions is the United States. It accounts for 32% of gross assets and 30% gross liabilities. Germany and France are the next most significant – with UK based banks having greater assets with Germany and greater liabilities with France. The EU countries in aggregate are the largest trading counterparty block – accounting for 40% of gross assets and 38% of gross liabilities in the first quarter of 1999. Positions with Japan accounted for less than 10% of total positions

Chart F – BoE Derivatives Survey: Country (Liabilities) at 31.3.99

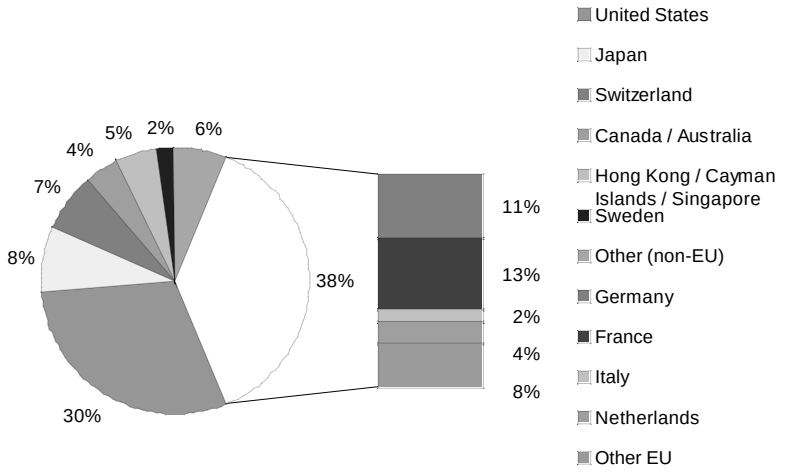
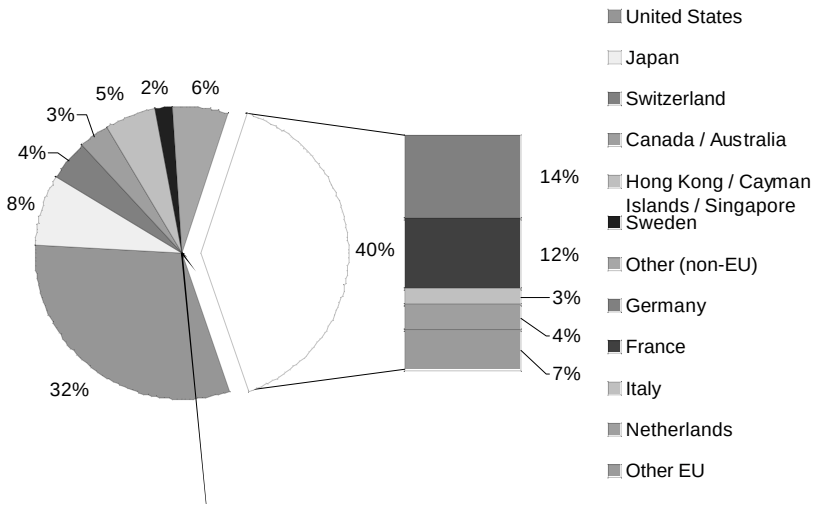


Chart G – BoE Derivatives Survey: Country (Assets) at 31.3.99



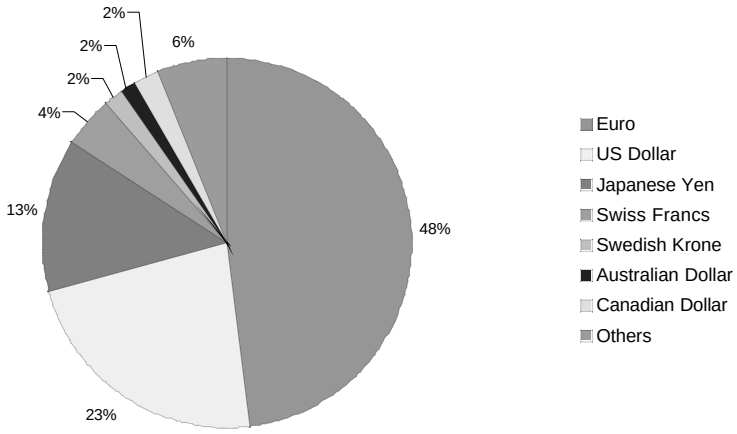
Currency analysis

The foreign currency data reported on the Form DQ are classified by the currency of the *receive* leg only.[12] Thus a contract where US dollars are swapped for sterling would not be included within

12) *Although this avoids double counting of contracts it does mean that the asset positions in one currency cannot be directly compared with the liability positions in that currency.*

these data because the receive leg is in sterling – and thus not a foreign currency. However, a sterling swap for US dollars would be included. Similarly, a dollar/yen swap would be classified as a yen contract within this analysis

Chart H – BoE Derivatives Survey: Currency (Liabilities) at 31.3.99



The most significant factor, seen through all the derivatives data analysed so far, has been the introduction of the euro. Initial evidence suggests that for liabilities the importance of the euro/legacy currencies has grown by about 10% between the second quarter of 1998 and the first quarter of 1999, with a fall in both Yen and US dollar liabilities of 8% each over the period. For assets, the relative importance of all three major currencies has remained relatively flat – euro at about 42%, US dollar at 30% and Yen at about 16%.

Conclusion

The length and complexity of the new derivatives enquiry raised some initial difficulties for reporters. However, after the first year of data collection we have found that many banks have welcomed the extra data afforded by this exercise – which has aided their own internal derivatives reporting.

The financial derivatives positions data collected by the Bank of England are sufficiently robust to warrant their regular publication. Comments on this article and table are welcome through the contact number below.

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UK banking sector – financial derivative positions at outstanding market values (£ millions)

Liabilities by product and risk category

	Product							Risk			*Total liabilities*
	Options	Futures & forwards	Swaps	FRAs[13]	Commodity /equity	Credit derivatives	Other	Interest rate	Foreign exchange	Other[14]	
1998 2nd	46906	102609	388841	4751	80920	1824	21	330918	212211	82745	*625874*
3rd	49198	96845	437363	6332	66969	1466	50	380266	209522	68435	*658224*
4th	41843	88869	426656	6782	81216	918	28	396359	167819	82134	*646312*
1999 1st	39221	65179	431802	5201	71146	411	68	388346	153125	71557	*613027*

Assets by product and risk category

	Product							Risk			*Total assets*
	Options	Futures & forwards	Swaps	FRAs[13]	Commodity /equity	Credit derivatives	Other	Interest rate	Foreign exchange	Other[14]	
1998 2nd	45060	104629	389339	5694	66389	1965	18	321652	223086	68354	*613093*
3d	48001	98033	444209	6634	50565	1826	56	388341	208591	52391	*649324*
4th	40299	91427	432624	8024	68266	452	24	403548	168850	68718	*641116*
1999 1st	36663	67609	447106	5860	60214	331	24	401172	156090	60545	*617807*

Liabilities by counterparty

	Counterparty						*Total liabilities*
	UK banks & building societies	UK public sector	Other financial corporations	Other UK residents	Non- resident banks	Other non-residents	
1998 2nd	111703	608	93856	9434	281485	128789	*625874*
3rd	123441	240	104140	14315	274039	132049	*658224*
4th	132683	115	110955	6988	287377	108192	*646312*
1999 1st	123373	125	102945	9176	272884	104524	*613027*

Assets by counterparty

	Counterparty						*Total assets*	*Net assets*
	UK banks & building societies	UK public sector	Other financial corporations	Other UK residents	Non- resident banks	Other non-residents		
1998 2nd	115382	1010	85974	9163	273026	128538	*613093*	*-12782*
3rd	124654	453	97381	15551	274829	136456	*649324*	*-8900*
4th	135412	261	103248	8514	285543	108138	*641116*	*-5196*
1999 1st	127949	246	102240	9933	267644	109794	*617807*	*4779*

13) *FRAs are "Forward Rate Agreements".*

14) *This "other" category comprises credit derivatives,commodity derivatives and equity derivatives.*

Quite satisfied with the success

In Helsinki, at the 52nd ISI Session, the Irving Fisher Committee on Central-Bank Statistics was involved in four scientific meetings, at which 27 papers were presented. Abstracts or more comprehensive versions of most of these papers had already been published in earlier issues of the IFC Bulletin (as indicated by the numbers behind the names of the authors in the list below). For presentational reasons, the four invited papers are reprinted on the following pages, together with the discussant's comments. Papers that had not yet been published in the Bulletin are also reproduced in the present issue or will be published in the next issue.

During an administrative meeting, important decisions were taken concerning the objectives and organization of the committee.

It is impossible to give a full report of all the meetings, but it should be noted that most participants seemed to agree that the gathering of central bank statisticians[1] in Helsinki was worthwhile and, hence, that the initiative to create a forum for discussion on statistical matters of common concern to central banks was meeting a need. This was most clearly put forward during the administrative meeting (see minutes on page 2). On several occasions, it was observed that the IFC Bulletin was indispensable as a means of communication. Participants welcomed the great interest for the aims and activities of the IFC displayed by the representatives of the International Monetary Fund, which was confirmed by the willingness of the Fund's chief statistician to participate in the IFC's new programme committee.

11 August	Invited Papers Meeting 73:	
	Globalization of markets and cross-border holdings of financial assets	
Organizer:	Emerico Zautzik	
Papers:	Robert Hamilton	2, 4
	Daniel Pérez Cid, María Pérez Jurado & Ana Sánchez	2, 4
	Satoru Hagino	2, 4
	Jan Bové & Carol Carson	4
Discussants:	Hans-Peter Glaab and Orlando Caliço	

11 August	Contributed Papers Meeting 43:	
	Globalization of markets and cross-border holdings of financial assets	
Organizer:	Hans van Wijk	
Papers:	Aureliano Gentilini & Valeria Pellegrini	2, 4
	Guido Melis	2, 4
	P. J. Obaseki & C. M. Okafor	2
	Raymond Chaudron	2
	Jorma Hilpinen & Heikki Hella	2, 4

12 August	Contributed Papers Meeting 42:	
	Function of central banks in the field of statistics	
Organizer:	Jacques Pécha	
Papers:	Rafael Álverez	3
	Gregor Bajtay & Branislav Sodoma	3, 4

1) *The following central banks were represented at the IFC meetings: Banca d'Italia, Banco de España, Banco de Portugal, Bank of Botswana, Bank of England, Bank of Finland, Bank of Indonesia, Bank of Japan, Bank of Latvia, Bank of Uganda, Banque Centrale des Etats de l'Afrique de l'Ouest, Banque de France, Banque Nationale de Rwanda, Central Bank of Barbados, Central Bank of Costa Rica, Central Bank of Cyprus, Central Bank of Iceland, Central Bank of Iran, Central Bank of Malta, Central Bank of Nigeria, Central Bank of Oman, Czech National Bank, De Nederlandsche Bank, Deutsche Bundesbank, European Central Bank, National Bank of Belgium, National Bank of Poland, National Bank of Slovakia, Österreichische Nationalbank, The Bank of Korea, The Central Bank of the Republic of Turkey, Ufficio Italiano dei Cambi.*

Daniel Boamah	3, 4
Sani Doguwa	3
Ending Fadjar & Soekowardojo	4
Bart Meganck & Ghislain Poullet	3, 4
Józef Oleński	3, 4
Eva-Maria Nesvadba & Aurel Schubert	3
Assad Monajemi	3, 4
Jacques Pécha & René Isnard	3, 4
D. Cowan & Mediyamere Radipotsane	3, 4
Petr Vojtisek	3
Anastase Munyandamutsa	3
Shousaku Murayama	
Czesław Domański & Jarosław Kondrasiuk	

12 August Invited Papers Meeting 46 (in co-operation with IAOS):
How to measure deregulation?

Organizer:	Marius van Nieuwkerk
Papers:	Edvard Outrata & Hana Hanková
	Rudi Acx
	Rudi Acx
Discussant:	Raymond Chaudron

At the invited papers session on globalization, reactions from the audience made it clear that the rapid development of transaction in derivatives is regarded as a major challenge in many countries. Hamilton's paper on internationalization of financial markets and implications for data collection and statistics, which focused at this issue, provoked a number of questions. The impression left was that it would take a great deal of time to find clear solutions to the problems relating to the definitions of concepts and the collection of data.

In her paper, Ana Sánchez raised one of the practical consequences of the extremely rapid increase in the number of reported transactions. Several participants shared the discussant's uneasiness on an automated process of correcting outliers.

From the many reactions it could be deducted that the subject of Satoru Hagino's paper on the distinction between service income and capital gains fell on rich ground. There was, however, some fear that an initiative in one country, i.e. Japan, to adapt concepts to changing needs would adversely affect the comparability of data. The debate on this issue is expected to continue for some time.

Carol Carson's paper on implications of globalization for international standards in statistics was well received, but the discussant doubted whether new information was really indispensable in all cases; he was not sure that existing information standards were fully utilized.

In the contributed papers meeting on globalization, there was no opportunity for discussion, owing to the limited amount of time available. The presentations were, however, clear and informative.

In the contributed papers meeting on the role of central banks in the field of statistics, a broad picture of practices was presented, although in essence the central banks' responsibilities appeared to be rather similar throughout the world. Nevertheless, maximalist and minimalist views were discerned: in some countries, the central banks were operating in an area that was normally reserved for statistical institutes. One central bank adopted the unusual attitude of regarding balance of payments statistics as alien to its responsibilities. One paper, presented by Stanisław Kondrasiuk, dealt with a somewhat different topic; it appears in this issue of the IFC Bulletin in the form of an article.

At the joint IFC-IAOS meeting on the measurement of deregulation, Rudi Acx presented two papers on deregulation in the Belgian banking sector. The first paper analysed the banks' behaviour with respect to portfolio investment in shares after the abolition of restrictions in this field. During the discussion, a common view emerged that, although the data showed some interesting trends, the blurring of boundaries between banks and other financial institutions made it difficult to put these in the right perspective. The discussion on the second paper concentrated on the analysis of the deregulation of retail interest rates. It was felt that the results were inconclusive and that further analysis could provide deeper insights. Edvard Outrata's paper on the measurement of the effects of deregulation on consumer prices sparked off a lively discussion on the general problems encountered in the Central and Eastern European countries in transition from centralized economies to market economies.

GLOBALIZATION OF MARKETS

INVITED PAPERS

Internationalisation of Financial Markets and Implications for Data Collection and Statistics

Robert Hamilton – Bank of England

The past three decades have seen far-reaching changes to financial markets the world over. This paper reviews market developments in the UK, and illustrates some of the associated statistical measurement problems. Examples are based on work undertaken within the statistics division of the Bank of England.

Introduction

Sound, efficient and liquid financial markets are essential for all market participants. Statistics provide a key role in the functioning and monitoring of these markets and new or revised data requirements arise as they evolve. Section 1 reviews the developments that have created such highly internationalized markets and identifies some of the associated challenges to data compilers. Section 2 reviews some of the recent work conducted within the UK to address these issues.

1. Issues Arising Out of the Internationalisation of Markets

(I) Growth and internationalisation of the UK financial market

The size of the UK banking sector's total balance sheet footings has increased by a factor of over twenty in the last thirty years and as at end 1998 was around £2000bn. This rapid growth has been driven by domestic, international and market developments. Domestic developments included the deregulation of the domestic banking markets in the early 70s and the abolition of exchange control in 1979. International developments have included the financing of the US (and other countries') Balance of Payments deficits, the growth of the Eurobond market – which is largely serviced in London, the recycling of oil producers' funds, the growth of many East Asian and Latin American economies and the geopolitical transformation of Eastern Europe and Central Asia. Market developments in the 80s included the rapid growth of financial intermediation as newly liberalized banking systems greatly increased the range of financing facilities provided to customers, whilst the 90s has seen huge growth in the use of derivatives – which transfer risk and encourage portfolio diversification and expansion – and in the collateralisation of exposures – which help reduce credit risk and encourage activity.

The UK is a highly internationalized market with roughly a quarter of UK registered banks' business being conducted abroad, whilst one third of the UK banking sector's balance sheet is made up of branches and subsidiaries of non-resident owned banks. In addition, over fifty percent of financial institutions' holdings are now denominated in foreign currency. The internationalized

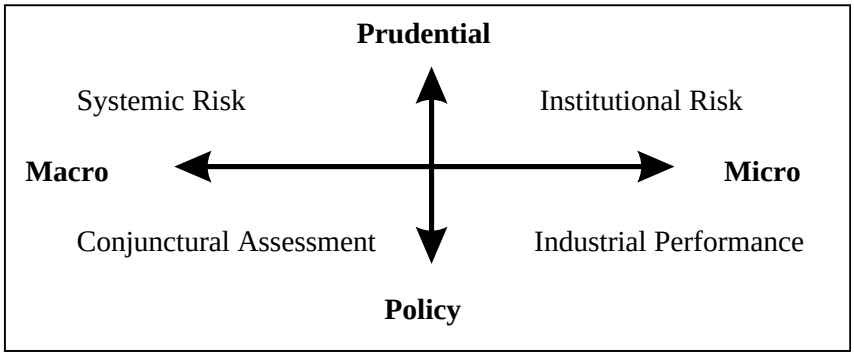
nature of the financial markets creates new challenges to both data compilation and analysis, and also means that most issues that affect domestic markets also have cross border significance.

(ii) Increased demand for statistics

The demand for statistics has grown rapidly over recent years. Statistics have contributed to the ability of markets to operate efficiently: for example, they are vital for institutions challenging for market share in new or changing markets. In addition, for capital and technology to move freely between countries, participants need to have data on the available risks and opportunities.

The figure below presents a stylized account of the main uses of financial statistics. Twenty years ago statistics were mainly used for macro policy purposes, but since then there has been rapid growth in their use for supervisory – micro prudential – purposes. Recent financial crises have focused attention on both macro prudential and micro policy statistics – including country risk data, sectoral breakdowns and greater information on the operations of institutions – themes that run throughout this paper.

Figure 1 – Principal uses of financial statistics



(iii) Increased complexity of analysis

Whilst the demand for statistics has grown over recent years, a number of factors have increased the complexity of data analysis. These include:

- Market de-regulation, leading to the blurring of sector boundaries. For example, there has been a growth in multi-functional financial conglomerates (e.g. banks offering insurance and pension products).
- Financial innovation, leading to the blurring of product boundaries. For example, derivatives enable institutions to trade risk without requiring transactions in the primary instrument.
- Radical advances in IT, enabling institutions to trade and manage risk centrally. For example, many institutions are now able to monitor market risk from a single global location, changing the way they manage (and therefore record) their portfolios.
- Political change, modifying geographical and economic boundaries. This has included greater integration within Europe, which has increased intra-European trade.

2. Practical examples of work recently conducted in the UK

The remainder of the paper considers some of the practical work that has recently been conducted within the UK to improve its statistics in response to these market developments.

(i) Risk based data

The growing internationalization of financial markets, and the recognition that financial crises have global effects, have led to an increased emphasis on country risk data (for example, G22, 1998). Like many other countries, the UK collects BIS banking statistics which record consolidated non-resident exposures of resident owned banks by maturity and sector of counterparty. However, there is no single measure of exposure and there are a number of modifications that can be made to simple cross-border lending figures. For example, local currency lending by non-resident subsidiaries can be included because it increases the cross border exposure of the consolidated institution, whilst data can also be collected on the basis of the ultimate rather than immedi-

ate counterparty.[1] User demands in the UK have also led to the use of other adjustments, including ones for local currency deposits and portfolio investments. Local currency deposits (up to the value of total lending) may in some instances be subtracted from total exposure because depositors are often economically related to the borrowers. Liquid portfolio investments can be subtracted from total exposure because they can be readily on-sold – although their value is likely to plummet in times of crisis and the adjusted exposure when the economy is healthy may underestimate the consequences of an economic downturn.

It is essential that users are educated in the alternative methods for calculating exposure as the different measures can produce very different figures. For example, compiling information on the basis of ultimate, rather than immediate, counterparty reduces UK banks' exposure to Russia by one third, whilst the inclusion of gross local currency lending increases UK banks' exposure to Malaysia by a factor of five. There are also potential credibility problems if users do not understand the reasons for differences between the alternative measures.

(ii) Calculating accurate non-resident figures

Financial intermediation is increasingly moving from the banking sector to the capital markets – making accurate recording of non-resident holdings of securities vital to measures of external debt. Like other countries, the UK has difficulties in establishing the current holders of domestically issued debt securities when they are tradable on secondary markets because the issuer may only be aware of the total value of debt outstanding, and not its current holders.

In the UK, financial institutions' holdings of securities are measured by surveys but accurate information is not available on the asset holdings of the household[2] sector, nor of liabilities to non-residents. Because of this, it is common to assign the residual value of securities, once the holdings of directly surveyed institutions have been deducted from total issues, between these sectors. However, assigning the residual element between the household and non-resident sectors is problematic because the split between the two fluctuates and because data from other sources might be approximate – running the risk of large errors in these sectors.

An alternative approach is to survey the institutions that either register the securities (registrars), make coupon payments (paying agents) or hold securities on behalf of the end investor (custodians). Registrars and custodians know the legal owner of registered instruments at all points in time, whilst, in many cases, paying agents only know the owner of bearer instruments at coupon paying times. These surveys reveal the legal owner of securities, which does not equate to the beneficial owner if the beneficial owner holds the securities in a nominee account – the beneficial owner can only be established if the nominee institutions are also surveyed. The UK conducts regular surveys that give full economic and geographical breakdowns of holdings of shares and British Government Securities (BGS), which are both registered instruments. Some custodial business on behalf of non-resident institutions is also monitored. However, using paying agents to compile information on bonds (bearer instruments) issued by UK institutions is currently considered unfeasible both because of the large number of paying agents and because many are non-resident based – where the UK would have no legal jurisdiction for data collection. In addition to being costly, the turnover of many securities is high and the composition of portfolios can change rapidly: further research needs to be conducted into the optimal frequency for these surveys. The IMF's Co-ordinated Portfolio Investment Survey is a good example of the international co-operation that is required if improved non-resident holdings are to be calculated.

The results of surveys of registrars and custodians are affected when the security can be used as collateral in repurchase (repo) agreements because surveys reveal the legal owner of securities, which changes during a repo, whilst the UK is interested in the beneficial owner, which remains unchanged. This problem led to the postponement of the 1996 and 1997 BGS surveys, but the end 1998 survey was reintroduced with the introductions of estimates for this activity. These estimates are based on data from the major players in the UK BGS repo market – banks and other large financial institutions. Data from these institutions are collected on a beneficial ownership basis and, as they include detailed counterpart sectorisation, can be used to adjust the survey to produce overall results on this basis. (Note that the vast majority of repos involve these major institutions on at least one side of the contract.)

1) *BIS reporting guidelines stipulate thet local currency lending should be collected. Data on the basis of ultimate, in addition to immediate, counterparty will be required from September 1999.*

2) *Strictly speaking, NPISH and household.*

(iii) Problems associated with residency – issues raised by derivatives

The use of financial derivatives has increased rapidly over the last decade,[1] posing new challenges to data compilers. The derivative markets are highly internationalized with core contracts being traded in all the major markets and cross border activity making up roughly fifty percent of transactions (BIS, triennial survey). Interest in these instruments is important because they can lead to capital flows in their own right, and because they can reduce the value of traditional cross border statistics for risk analysis purposes (Garber, 1998).

The UK has recently started collecting information on the marked to market value of institutions' gross asset and liability derivative positions on a residency basis. Gross reporting of levels is essential because it gives an indication of exposure of the reporting institutions and is feasible because it is consistent with institutions' accounting systems. Transactions in derivatives are also collected, but on a net basis because gross figures are not compatible with market practices.

The location of booking of outstanding contracts creates issues that may, for the moment, be unique to derivative contracts. Several multinational banks operate a single global book where all or most derivatives are recorded to a single office's balance sheet – irrespective of where they were arranged. Fortunately, contracts specify the exact details of the counterparty, for example, Bank X in Country Y: the counterparty should know whether it is dealing with a resident branch or a non-resident parent and accurate reporting should naturally fall out of institutions' reporting systems.

However, there are a number of unavoidable consequences of global booking that affect data analysis. The use of counterparty data (from, for example, the banking sector) as the main source of information on other sectors in a country would lead to incomplete figures if institutions book contracts to a non-resident country. Analytical interpretation of figures is also affected because the aggregate might exclude some contracts organized in that country and include others organized elsewhere. A related issue arises when multinational institutions monitor risk centrally but book certain types of contracts in one location and other types elsewhere – figures on a residency basis would then be highly susceptible to the booking practices of institutions. It is also possible for an institution to have large net figures in one office being hedged out by equally large net figures of the opposite sign in another office located in a different country.

(iv) Issues raised by repurchase agreements

The use of repurchase agreements (repos) has also increased rapidly over recent years,[2] and the accompanying demand for data has been driven by a number of factors:

1 Repos provide liquidity to the financial markets and are used by many countries to conduct monetary policy.

2 The scale of repos involving government securities may have an impact on government debt operations and the cost of government funding.

3 Repos can be used to influence an institution's short-term risk profile and can also be used to create highly leveraged positions.

Data for end 1998 indicate that over 50% of outstanding repo transactions involving UK banks were with non-residents and that UK banks were net lenders of cash to non-residents via repos of around £30bn. This reflects the highly internationalized nature of this activity; consistent reporting of repos across countries would help both in understanding these markets and in the reduction of world-wide balance of payments discrepancies.

The debate about the relative merits of the collateralised loan versus change of ownership methods of recording repos is ongoing. The collateralised loan approach would appear to be more able to meet the data needs outlined above, although this approach would also need to be supplemented by information on the collateralisation of other types of exposures to provide a full indication of leverage and liquidity. (Hamilton et al).

Although not currently collected by the UK, there is also some interest in information on repos where the currency of the security and the currency of the cash are different. These transactions enable institutions to swap their exposures into that of a different currency, and can be used to raise finance in one currency, and lend it on in another.

1) *For example, figures from the International Swaps and Derivatives Association indicate that the total notional value of all swap and interest rate options contracts increased by a factor of over 30 between 1987 and 1997.*

2) *Although long runs of data on international repo activity are unavailable, the level of outstanding contracts has roughly trebled in the UK in the last two years.*

(v) Spread Earnings

Whilst the primary concern of global market surveillance is related to the scale and direction of capital flows and risk exposures, there is also interest in valuing the economic role of financial intermediaries. The growth of trading volumes, in the UK and elsewhere[5], prompts the question "how do intermediaries benefit from these activities and how can the effects be measured?" In particular, the growing volume of cross border transactions raises the issue of how these contributions could be measured within the balance of payments.

The services provided by financial corporations are viewed within the statistical framework as falling into one of two broad product types. Intermediation services, such as market making and credit granting, require the intermediaries' use of its own balance sheet as the means of delivering the product. By contrast, auxiliary services, such as broking, fund management and financial consultancy, deliver the product in a directly comparable way to that for most non-financial services. Whilst auxiliary services are normally provided in return for an explicit fee or commission, the precise nature of financial intermediation is less transparent and the service provided by the intermediary is typically paid for through an embedded charge which need not be directly measured, or even measurable, by either party.

The System of National Accounts draws a clear conceptual distinction between income derived through the application of dealing spreads and holding gains/losses that result from changes in the external market environment. Dealing spreads should be reported in the current account whilst holding gains and losses should be reported in the financial account. BPM5 defines the spread earnings (also sometimes called service earnings) of forex dealers as the spread between the mid point rate, and the buy/sell rate for each transaction.

In practice, market makers typically calculate their earnings through the daily marking to market of their trading book positions and so have no operational need to maintain individual transaction data – direct observation of the spread earnings would therefore be impossible. Estimates of cross border spread earnings have therefore required the use of supplementary information on representative dealing spreads and market turnover – areas that the UK is currently investigating further.

(vi) Financial Market Data for International Financial Stability (hosted by Bank of England)

The recent international crises, like others before them, have given prominence to the need for good quality and timely economic and financial data. A view has emerged that better data provision allows investors to make better informed investment decisions, leading to improved resource allocation, as well as highlighting potential problems at an early stage so reducing the likelihood of sudden shocks to the economy.

Following a week-long workshop at the Bank of England, a group of three participants researched into these issues and have produced a report of their findings (Hamilton et al). This report contained a list of data requirements that were requested by users; examined existing frameworks to see the extent to which they meet these needs; and investigated issues related to banking indicators, derivatives and repos. Inter alia, the report recommended improved data on: external debt, banking indicators, capital markets and risk type data. It also highlighted the need for continued harmonization of frameworks and the value of a web page containing all data sources.

3. Conclusion

The internationalization of markets has increased the complexity of data production and analysis, generating a number of problems for data compilers. This paper has identified a number of these problems and outlined some of the UK's practical solutions. This includes work related to: risk based data, the calculation of non-resident positions, problems associated with residency of booking of derivative contracts, issues raised by repos and spread earnings and the increasing need for data for financial stability purposes.

There are also some fundamental questions that will need to be addressed in the next few years: with the globalisation of markets, should data be aggregated according to the location of the immediate or ultimate counterparty? Should and can there be greater international co-operation to assist

5) *For example, FX turnover in the UK increased by around 40% between April 1995 and April 1998 (BIS, 1998).*

in data production? Should statistics reveal the legal or beneficial owners? Should there be more data on risk based measures?

References

Bank of England, *Monetary and Financial Statistics* (monthly)

BIS, *Distribution of International Bank Lending* (semi-annually)

BIS, *Triennial Central Bank Survey of Foreign Exchange and Derivative Market Activity* (triennial)

Garber, 1998, *Derivatives in International Capital Flow*, NBED (working paper 6623)

G22 Working group, 1998, *Transparency and Accountability*

Hamilton, Mackie and Narain, *Financial Market Data for International Financial Stability* (unpub.)

Résumé en français

Pendant les trente dernières années, les marchés financiers du monde entier ont connu des changements d'une portée considérable. Le présent document fait le point sur les principaux développements des marchés financiers du Royaume-Uni et illustre certains des problèmes de mesure statistique associés. Les exemples ont été tirés des projets en cours au sein de la division Statistiques de la Bank of England.

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DISCUSSANT'S COMMENTS

Hans-Peter Glaab – Deutsche Bundesbank

Mr Hamilton has pointed out the main problems arising for statisticians from the internationalization of financial markets and the approaches adopted in the United Kingdom to tackle them. I suppose that the situation is similar in many countries. This is certainly true as far as Germany is concerned. Not only the problems, but the approaches envisaged to solve them are in many cases roughly the same.

Of course, due to the specific economic and political situations, but also to differing legal and institutional frameworks, solutions that work in one country may not always work in the same way or even not at all in another country. In Germany for example it is particularly difficult to estimate with a satisfactory degree of precision the amount of government bonds (and other bonds of German issuers) that is held by non-residents. Outstanding amounts of German bonds are more or less completely covered by German custodian statistics. But foreign financial institutions, which have deposited large amounts of German bonds with German custodians, will normally not hold these bonds for their own account but as custodians for their customers. Unfortunately, it cannot be assumed that in most cases these customers will be residents of the same country as the custodian bank. In fact, a very considerable part of them will be German residents, who hold these securities – and receive coupon payments – abroad, often in Luxembourg, in order to avoid taxes on their interest income. Thus in our case neither registrars nor paying agents could give the required information. The best hope of capturing these holdings in a reasonably reliable way would probably be an extended co-ordinated survey of custodians in the relevant countries.

A number of unsolved problems is mentioned at the end of the paper. Unfortunately, I am not in a position to offer solutions. I would rather like to mention two additional aspects which, from the perspective of a balance of payments statistician, are making our task increasingly difficult.

One, which has been mentioned implicitly, is the blurring of the concept of residency, which not only makes data collection more difficult but also creates problems for the interpretation of the results. In the case of a merger between two major companies, for example, the choice of the location of the head office and (with that) the residence may depend on differences in the tax regime rather than on the centre of gravity of their production. This means that situations that are relatively similar economically may lead to statistical results which are quite different. If there is for example a merger between a French and a German company, the new firm might decide to take its headquarters in France or in Germany. In the first case this will be reported as a French direct investment in Germany, in the second case as a direct investment in the opposite direction. In both cases the reported flow of direct investment will be analytically misleading, because it will normally not lead to the consequences with which direct investment is usually associated (enhanced economic growth, creation of jobs).

The other problem that I would like to mention is the sheer size that some types of transaction have taken in the last years. Though the rates of growth in Germany have not been as impressive as those mentioned in the Spanish paper, in general there has been a tendency for external transactions to increase more rapidly than domestic ones. While in 1990 for Germany portfolio transactions between residents and non-residents were 1.373 billion DM (taking sales and purchases in both directions), the equivalent figure for 1998 was 12.770 billion DM. Together with a considerable growth in the complexity of transactions, this has increased considerably the risk of major errors in the measurement of the balance of such transactions. On the basis of the figures just mentioned, if we had made an error of 1 percent on both sides – and with an opposite sign – this would have lead to errors and omissions of 14 billion DM in 1990. The same percentage of over- or underreporting in 1998 would have produced errors and omissions of 128 billion DM. So even if we manage – despite increasing complexity – to keep relative errors low, it is not easyto avoid that in absolute terms the margin of error increases.

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The effects of the Globalization of Financial Markets on the obtaining of Statistical information on Cross-border transactions: the Spanish experience

Daniel Pérez Cid, María Pérez Jurado and Ana Sánchez – Banco de España

1. Introduction

The abolition of exchange controls and the development of information technologies and telecommunications have given rise to an extraordinary increase in the number of cross-border transactions. In larger and more transparent markets, with lower transactions and information costs, economic agents react more rapidly to changes in the profitability of their assets – including those derived from their tax treatment and tax opacity – and in their perception of the risks of the different instruments and borrowers. In this context, the financial account of the balance of payments is of vital importance, provided that it can furnish frequent, rapid and reliable information. If the rapidity of reaction of investors is the main feature of financial and foreign-exchange markets, then only statistics that are capable of reflecting these changing flows will be of any use to monetary and foreign-exchange authorities.

In other words, the response of current and capital account transactions to the "fundamental" macroeconomic variables that determine them may be expected to display some stability in the medium term. And consequently, the possible erraticness of their monthly behaviour may be addressed, without a serious loss of informative content, using the usual statistical techniques for analysing and estimating the trends of time series. However, in the case of financial account transactions the aim is to capture as reliably as possible the frequent changes that may be expected in their behaviour, so that distinguishing measurement errors from true but rapid responses of economic agents becomes a crucial task.

In view of the growing complexity of the web of macroeconomic and microeconomic relationships explaining cross-border transactions, it should be borne in mind that, if the producers of these statistics are facing growing difficulties in obtaining the data, the validation of the results through economic analysis – the definitive test of the relative reliability of any macroeconomic statistic – is, if that is possible, even more difficult. The financial integration of economies with different tax regimes, including very varied degrees of fiscal opacity, which compete for limited world savings is doubtless one of the decisive factors in the explanation of financial flows. There are, however, other economic and political factors at least as important as direct profitability, net of taxes, which have a bearing on the expectations of investors and the risk premium demanded for the different assets and borrowers, with rapid adjustment of portfolios.

In this context data producers are having greater difficulty distinguishing, in an intrinsically volatile phenomenon, the apparently anomalous values which are a consequence of measurement errors from those which reflect the rational behaviour of investors. Removal of errors by traditional methods is becoming increasingly costly. There is a clear need to find error detection methods with a reasonable trade-off between effectiveness and cost.

As a result, the Balance of Payments Office of the Banco de España has instituted, for the time being purely on an experimental basis, a system for error detection based on the use of ARIMA models. The program used is called TERROR (TRAMO for Errors), an adaptation of the program TRAMO (Time Series Regression with ARIMA noise, Missing observations and Outliers). It is designed to be applied wholesale to a large number of time series, with total automation and no need for specialized staff.

2. Cross-border capital mobility and complexity: the Spanish experience

The financial account of the Spanish balance of payments since the abolition of exchange controls at the beginning of 1992 has reflected the general features of international financial markets. These have included a massive increase in gross financial flows; growing banking disintermediation, with a decline in the relative importance of traditional credit institutions in the settlement of cross-border transactions; larger flows of direct financial transactions between firms belonging to the same economic group; notable diversification of financial instruments and rapid incorporation of market innovations; and, above all, broad substitutability of instruments and institutional sectors, with rapid changes in the claims and liabilities outstanding vis-à-vis the rest of the world.

A few figures on the behaviour of the Spanish balance of payments in the 1990s may be illustrative, because the economy was still very closed at the beginning of the decade. Gross flow data (receipts plus payments) should be used to illustrate the growth in recorded flows. Between 1990 and 1998, total recorded gross flows, excluding reserves, grew by almost 6,500%. If reserves and currency transactions are included in these calculations, the figure for this period is considerably higher.

These figures are certainly spectacular, but they give only a rough idea of the phenomenon. In fact, it was highly complex, differing according to the instrument and institutional sector concerned. The growth was most striking on the assets side not only due to the lower starting figures, but also because the decline in Spanish interest rates has been conducive to capital outflows, an alternative for domestic savings in the search for greater profitability and risk diversification.

In fact, the gross asset flows of the non-credit private sector grew by almost 27,000% between 1990 and 1998. This has certainly been the most spectacular development in the Spanish balance of payments in the 1990s, and it has also been marked by frequent changes in the sign of the net flows, precisely in the institutional sector in which the obtaining of data is most difficult.

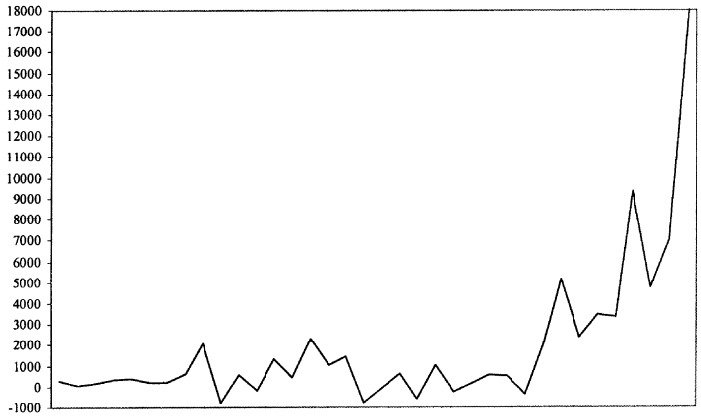
Notably, this volatile behaviour occurred across the board, as can be observed in the examples shown in the charts. Although it was obviously most striking in "other investment" and portfolio investment, it was also observed in direct investment. Indeed, the development of complex financial relationships between firms belonging to the same economic group is another of the challenges facing the data producers. Multinational groups dispose of very significant financial resources, normally using a specialized firm to manage the entire group's cash, which means, in this case too, that the search for higher profitability introduces greater mobility.

Thus, the greater breadth and liquidity of financial markets and their lower transaction costs has made it easier for firms to reduce, or expand, their equity holdings, including when these investments are defined as direct. The result has been an increase in the relative volatility of "equity capital", usually considered to be the most stable item, with frequent changes in the complex web of cross-holdings that characterizes multinational groups. These characteristics can be observed in the Spanish case, as is shown in figure 1.

It is, however, the other component of direct investment, that reflecting loans and financing between firms belonging to the same economic group, which has posed the greatest challenges for data producers. Cash pooling systems mean that funds are transferred daily from firms with excess liquidity to the treasury manager, which redistributes them according to the needs of the group, seeking the most profitable investments for any overall surplus. Indeed, it is increasingly common for all the receipts and payments of the firms of a group, and not just their cash, to be centralized.

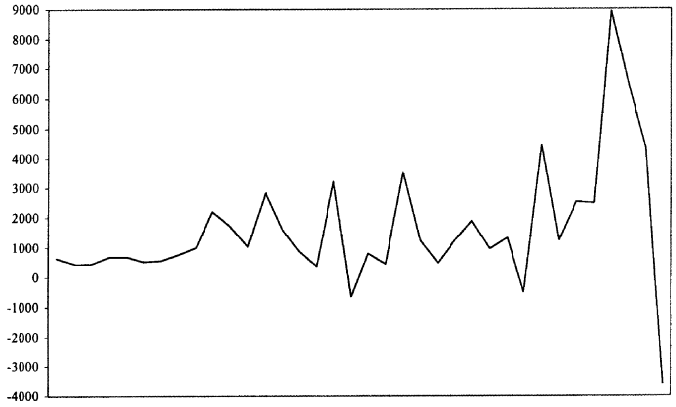
Figure 1 – Direct investment abroad, shares, private non financial sector (million euros, quarterly

Figure 2 – Portfolio investment abroad, all sectors (million euros, quarterly 90-98).



Measurement difficulties are even greater in the case of portfolio investment and "other investment", whose behaviour is more unstable, as can be seen, for example, in figures 2 and 3. Besides, in the face of the cuts in the profitability differentials on Spanish assets, these have sought more profitable markets, but also with higher risks, including foreign exchange markets, with the consequent development of derivatives transactions. Although they are essential for covering risks adequately, they are also potentially highly destabilizing.

Figure 3 – Deposits abroad, private non financial sector (million euros, quarterly 90-98).



A detailed description of the growing complexity of the flows recorded by the Spanish balance of payments is beyond the scope of this paper. However, it should be pointed out that, on the liabilities side, the growth of gross flows has also been significant, especially in the case of transactions involving Spanish government debt. The favourable tax treatment received by non-resident holders of Spanish public debt has led to large outflows and return inflows connected with coupon washing. In addition, this debt has been widely used as collateral for repo operations. In fact, non-residents have, on a massive scale, financed their purchases of Spanish government debt by selling it under repurchase agreements to resident banks, with the cost saving deriving from cover of the currency risk which they would have incurred had they financed such purchases with their own currency. The result of this behaviour is the positive relationship that can be observed in figure 4 between portfolio investment in Spanish public debt and the item "repos, assets" of the resident banks. The appropriate recording in the balance of payments of these inflows under "portfolio" and of parallel outflows under "other investment" was important for analytical purposes since, for the Spanish economy, they implied that one part of the public deficit apparently financed by non-residents was, in fact, financed by the resident banking sector. Further, it explained why there was not a noticeable effect of these transactions on the foreign exchange market of the peseta.

The final example of the behaviour of Spanish financial cross-border transactions, shown in figure 5, is about substitutability between assets, which is a cause of the apparent instability of the individual items. The graph shows the behaviour of the "deposits" and "repos" of the banking sector, assets less liabilities. The net figure (assets less liabilities) was selected because the deposits of banks with their correspondents are not "per se" assets or liabilities but mutual accounts, so the

breakdown of flows between assets and liabilities could be quite conventional and misleading. As can be seen in figure 5, deposits and repos are seen to be substitutes in the financial transactions of resident credit institutions, depending on differentials in profitability that are sometimes minimal, explained in part by the greater or lesser availability of collateral in domestic markets. The evidence of substitutability found in the Spanish case is a reason for treating repos, sell-buy back transactions and similar types of financial instruments as deposits (other investment) instead of portfolio investments.

Figure 4 – Portfolio investment in Spain, pta., general government and repos, assets, banks (million euros, quarterly 93-98).

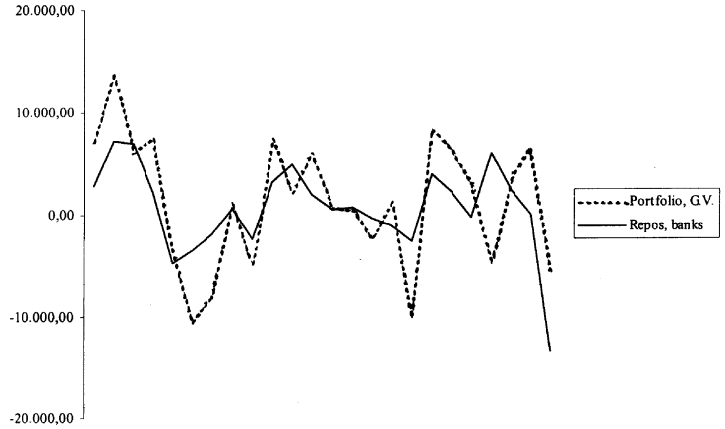
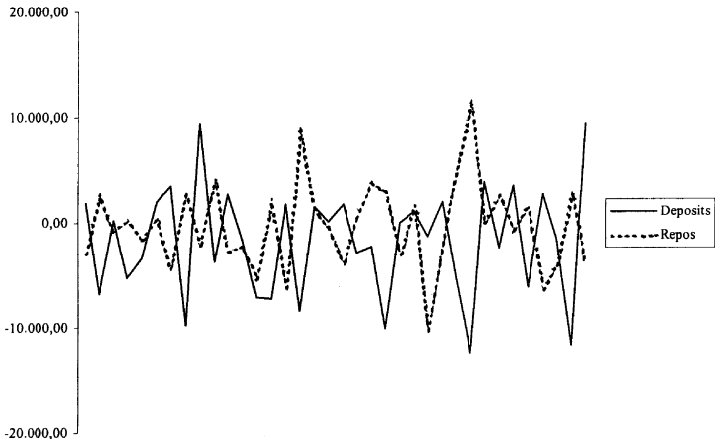


Figure 5 – Deposits and repos, banks, assets less liabilities (million euros, monthly 96-98).



3. Error detection with ARIMA models: the TERROR program

In sum, the huge increase in the complexity and mobility of recorded gross flows has led to growing measurement difficulties, which the Banco de España has been addressing through new data collection mechanisms, with direct reporting for transactions not settled through resident credit institutions. But, in parallel, the correction of errors has become increasingly costly.

Currently, the Balance of Payments Office of the Banco de España uses the following error-detection procedures: a) comparison, for each basic series, with the same month of the previous year; b) investigation of large-value transactions, above a threshold; c) investigation of the latest figure when it is the highest in the series; d) reconciliation with other sources of information, mainly for general government and credit institutions' transactions. In particular, data on foreign investment in Spanish public debt are compared with the information provided by the book-entry debt system and data on credit institutions' transactions are compared with bank balance sheets.

For each basic series investigated, the individual entries are analysed and the reporting institutions are requested to corroborate or, where applicable, correct those containing errors. The credit institutions contact the resident party if the suspect entries correspond to transactions by their clients. In the case of reconciliations with other sources of information, the reporting institution must explain any divergence and, where applicable, correct the relevant entries.

The effectiveness of this system of error detection and correction is high, but declining, and the cost is high and increasing. Consequently, there is a need to prioritize what to investigate in order to reduce the number of cases analysed.

The program TERROR (TRAMO for errors) is an adaptation of the program TRAMO (Time series Regression with ARIMA noise, Missing Observations and outliers) designed to be applied wholesale to a large number of time series.

The program is based on the automatic identification of an ARIMA model in which the regression variables are outliers (also identified automatically) of three possible types: additive outliers, level changes and transitory changes. It also interpolates missing observations, if any. The program computes the model prediction for each new period (excluding the observation for that period) and the standard error of the forecast. The forecast error is obtained as the difference between the forecast and the actual observed value. The "t" statistics (forecast error divided by standard error) is compared with the values K_1 and K_2 associated with the previously selected level of probability:

If $|t| < K_1$ the observed value is accepted as error-free.
If $K_1 < |t| < K_2$ it is deemed "possible" that the figure contains an error.
If $|t| > K_2$it is deemed "likely" that the figure contains an error.

For the lay user, the interpretation of the result is the following. If K_1 and K_2 are values associated with probabilities of 0.010 and 0.001%, which are the model's default selections, then:
If $|t| > K_1$, a forecasting error like that obtained by the model only occurs once in every 10,000 cases.
If $|t| > K_2$, a forecasting error like that obtained by the model only occurs once in every 100,000 cases.

The higher the values of K_1 and K_2, the smaller the number of cases in which the model deems it "possible" or "likely" that there is an error, and the higher the risk that observations which are erroneous are deemed not to contain errors. The lower the values of K_1 and K_2, the larger the number of cases in which it is deemed "possible" or "likely" that there is an error, and the greater the risk of investigating observations which are not erroneous. Accordingly, the selection depends on the resources available for investigating errors, the number of series it is wished to investigate and their characteristics.

The program requires a maximum of 600 observations; and a minimum of 36, in monthly series, and of 15 in quarterly series. The program has been processed on MVS system HOST, with the possibility of complete automation in a nocturnal process.

The program is designed to be used completely automatically by users who, though lacking any theoretical knowledge of the treatment of time series, can contribute firsthand knowledge of the possible nature of the errors. However, interaction between modelling experts and persons familiar with the series analysed opens up extensive possibilities, depending on the human resources available, for its flexible use, ranging from "blind" and wholesale use of the TERROR version, to selective use of all the possibilities of the program TRAMO.

Nonetheless, it is precisely the "blind" TERROR version, used automatically and wholesale, that offers the most promising possibilities in the Spanish case. This is because around two million time series are available (monthly series from January 1990), combining the heading of the transaction with other data collected: the country, currency, institutional sector and branch of activity, where appropriate. Wholesale application to all these series enables errors, which when occurring in a single observation reinforce the error hypothesis, to be detected by cross-checking which, in turn, enables a selective analysis of the most probable cases of error to be made. This is thus a powerful automatic preliminary detection mechanism, which enables the cases to be studied to be prioritized.

4. Relative effectiveness of TERROR and the traditional method: preliminary view

To evaluate the relative effectiveness of TERROR and the traditional method, a very helpful tool has been used: the file of selected incidents produced monthly in the Balance of Payments Office of the Banco de España. The file registers the main cases investigated each month, with a brief ex-

planation of the nature of the error, if that was the case, or the actual economic behaviour that explained the observed values investigated not being errors.

Drawing on the information in this file, a calculation has been made of the percentage of incidents investigated using the traditional method which were not errors in relation to the total cases analysed. Such percentages could be used as rough measures of the "inefficiency" of the traditional method in terms of the time devoted to investigating facts that were not errors. The following examples show the results obtained for the average of 1997 and 1998.

Private non-financial sector
Liabilities
Direct investment, shares: 16.7%
Direct investment, other equity: 42.9%
Direct investment, real estate: 100.0%
Direct investment, other capital, affiliated enterprises: 55.6%
Portfolio investment, shares: 41.2%
Portfolio investment, market funds: 66.7%
Portfolio investment, bonds and notes: 88.9%
Portfolio investment, money market instruments: 33.3%
Derivatives: 57.1%
Assets
Direct investment, shares: 45.0%
Direct investment, other equity: 33.3%
Direct investment, other capital, affiliated enterprises: 66.7%
Portfolio investment, shares: 12.5%
Portfolio investment, market funds: 53.8%
Portfolio investment, bonds and notes: 40.0%
Portfolio investment, money market instruments: 57.1%
Derivatives: 18.2%

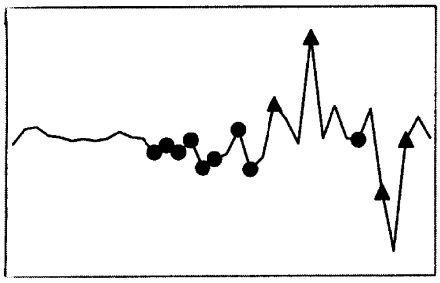
Banking sector
Liabilities
Direct investment, shares: 57.1%
Direct investment, other equity: 80.0%
Portfolio investment, shares and market funds: 65.0%
Portfolio investment, bonds and notes: 40.0%
Derivatives: 60.0%
Assets
Direct investment, shares: 44.4%
Direct investment, other equity: 87.5%
Portfolio investment, shares: 17.6%
Portfolio investment, market funds: 28.6%
Portfolio investment, bonds and notes: 22.2%
Derivatives: 50.0%

As can be seen in the selected examples, the results differ widely from item to item. They run from around 12.5% of incidents investigated that were not errors in the case of portfolio investment abroad by the private non-financial resident sector, in shares (in this case the effectiveness of the traditional method was quite high), to one-hundredth of a per cent in the case of direct investment by non-residents in real estate in Spain (an extreme example of total inefficiency of the traditional system). In general, the results show that too many resources are being assigned to investigate cases that prove not to be errors. The effectiveness in detecting true errors is high, but so too is the cost.

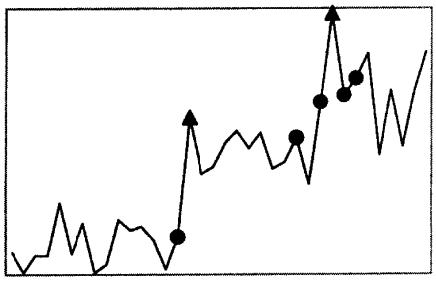
To compare the effectiveness of TERROR and the traditional method from the point of view of the saving of resources used to investigate data without errors, the TERROR program has been run for each month of 1997 and 1998.

The incidents without errors marked by TERROR as likely errors as a percentage of those investigated by the traditional method that were not errors – as recorded in the above mentioned file – give a rough idea of the relative effectiveness of TERROR compared with the traditional method. As can be seen in the percentages included in the following examples (averages of 1997 and 1998), TERROR, if used, would have saved a lot of time in the investigation of true data:

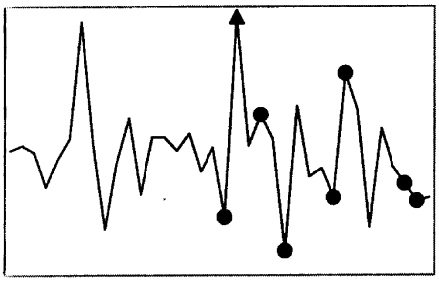
Figure 6 – Relative effectiveness of TERROR



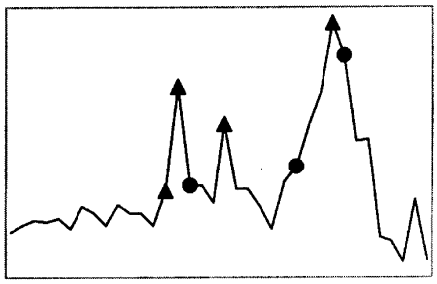
Portfolio investment in Spain, shares and market funds, banks (million euros, monthly 96-98)



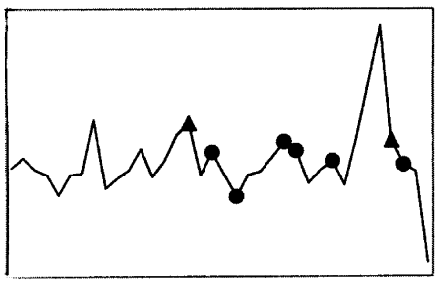
Portfolio investment in Spain, real estate, private non financial sector (million euros, monthly 96-98)



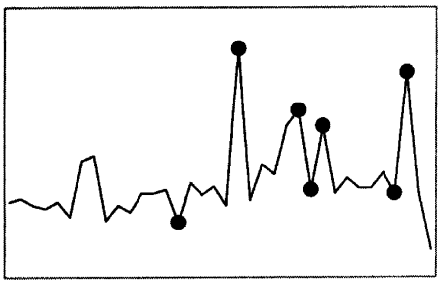
Portfolio investment in Spain, bonds and notes, private non financial sector (million euros, monthly 96-98)



Portfolio investment abroad, market funds, private non financial sector (million euros, monthly 96-98)



Direct investment abroad, shares, banks (million euros, monthly 96-98)



Direct investment abroad, other equity, banks (million euros, monthly 96-98)

Liabilities
Portfolio investment, shares and market funds, banking sector: 31.0%
Portfolio investment, bonds and notes, private non-financial sector: 13.0%
Portfolio investment, real estate, private non-financial sector: 29.0%
Assets
Direct investment, shares, banking sector: 25.0%
Direct investment, other equity, banking sector: 0.0%
Portfolio investment in market funds, private non-financial sector: 57.0%

The same examples are shown in figure 6, which offer a "snapshot" of the relative effectiveness of TERROR. The observations detected by TERROR as likely errors that were true facts are marked in

the figures with a triangle, and those investigated by the traditional method that were true facts with a circle. All the observations considered by TERROR as likely errors have been also considered as such by the traditional method. As can be seen in the graphs, there would have been an important saving of the resources used investigating true facts if only the observations marked with a triangle had been analysed.

To complete the picture of the relative effectiveness of TERROR, we need an evaluation of the risk of the program not earmarking as likely errors observations that were such. The work so far in this respect is very preliminary, since only partial experiments have been conducted on a limited number of series. The results suggest that TERROR does not identify fewer true errors than the traditional method when the latter is based exclusively on the observed behaviour of the series.

The increase in the value of parameters K_1 and K_2 does not seem to improve the relative effectiveness of the approach, since the cases earmarked as possible errors that prove to be real increase at a higher rate than actual errors.

The error-detection process seems to improve if the outliers of the observation previous to the observation being investigated are not corrected. Treatment of the outliers for the latest observation is crucial in this type of series, since, as mentioned above, their behaviour is characterized both by the increase in their absolute values and in their variability. The latest observations are often considered outliers when they are observed for the first time, becoming "normal" observations as time goes by. Adequate treatment of the outliers of the latest observations in the application of TERROR to error-detection in the Spanish balance of payments series is, no doubt, one of the issues that will require more comprehensive experimental work than that carried out to date.

It is important, however, to underline that the requirements that statistical tests to assess the quality of the fit of the ARIMA models to the related time series must meet for economic analysis and forecasting purposes are, no doubt, far stricter than those imposed when the sole purpose is error-detection. In this respect, neither the forecasts derived from the program nor its treatment of outliers are used to replace the values observed, whether erroneous or not.

The decisive step in furthering the work presented here will be the mass-experimentation phase, when all the basic series available will be considered. As mentioned above, these series combine the information obtained on the nature of the transaction, the country, the currency, the resident institutional sector and its activity. Moreover, the declaration includes the name of the credit institution where the transaction is settled in the case of resident institutions. Indeed, in such cases the credit institution reports its customers' cross-border transactions directly to the Banco de España Balance of Payments Office. Thus, the TERROR program would be most useful in connection with the time series available for each individual credit institution, as it would make it easier to look for the individual errors underlying the anomalous observations of the aggregate series. The identification of the economic agent ultimately responsible for the accuracy of the data provided (and also for their correction, if wrong) would likewise be easier.

TERROR could also be successfully used in the treatment of those series that cross-check the information on the nature of the transaction against that of the counterpart country, since users set great store by the geographical distribution of foreign transactions.

Finally, the program is being adapted to include an automatic signal from those series which, being equal to zero for most of the observations, exhibit values above a particular threshold for their last figure. Series with a large number of zeros are not treated by the program, since an ARIMA model cannot be estimated for such series. However, data compilers would find it most useful to have a program output that included a list of those series with but a few non-zero observations that have a significant value in the period under study. Such series should be studied as possible error cases.

References

Banco de España, 1993-1997, The Spanish Balance of Payments. Annual publication.

Gómez, V. and A. Maravall, 1998, Guide for using the programs TRAMO and SEATS (beta version: December 1997). Banco de España – Servicio de Estudios. Working Paper no. 9805.

Gómez, V., A. Maravall and G. Caporello, 1998, Program TERROR. An application of TRAMO to the detection of errors in time series. Internal Document. Banco de España.

Résumé

L'abolition du contrôle des changes et le développement des technologies de l'information et des télécommunications ont donné lieu à une extraordinaire augmentation du nombre des transactions transfrontalières

dans le cadre de l'innovation financière et de la croissante désintermédiation bancaire. Sur des marchés plus vastes et transparents, les agents économiques réagissent plus rapidement aux variations du rendement attendu de leurs actifs, y compris les changements découlant de leur traitement fiscal et de leur perception des différents risques.

L'augmentation du nombre des transactions et de leur complexité provoque des erreurs importantes de mesure. Cependant, ce que les analystes peuvent percevoir comme des erreurs importantes peuvent ne pas l'être, reflétant au contraire le comportement rationnel des agents. L'expérience espagnole des opérations du compte financier de la balance des paiements nationale, décrite dans cet article, illustre cet aspect de la question.

Une des conclusions de cet article est l'intérêt que peut présenter, dans le contexte d'une plus grande volatilité des phénomènes certains, l'exploitation des possibilités d'utilisation des techniques statistiques de détection des erreurs basée sur le comportement stochastique des séries temporelles correspondantes.

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DISCUSSANT'S COMMENTS

Hans-Peter Glaab – Deutsche Bundesbank

I fully agree with the description of the increasing problems in capturing cross border financial flows.

The method proposed to identify and reduce errors in data collection by comparing any new observation with a forecast value produced by an ARIMA time series model seems to be an interesting and promising approach. If I understand it correctly, it involves measuring the deviation of the new observation from the value extrapolated by the model and considering as outlier (and therefore as possible error) any new observation outside a margin that – at least to some degree – may be chosen by the user. This could probably be done in an analogous way on the basis of other programs for time series analysis, like for example Census X11 or X12; so I assume that the proposed approach would, in principle, be independent of the availability or the current use of the TRAMO/SEATS program.

It would be interesting to hear what sort of experience has been gathered so far with the new method. Personally, I would expect the approach to be particularly helpful when it is used only to **detect** possible errors and when these individual observations are then – where they turn out to be in effect false – replaced by the correct values. Without having any experience with the method, I would however, feel somewhat uneasy a priori, about using the program not only to detect, but also to **correct** any new observations that lie outside a given confidence threshold of the extrapolated value, at least if this is done automatically and wholesale. This would probably contribute to producing relatively smooth and plausible time series. But some observations may be "truly" outside the normal range of fluctuation even if the reason for this movement in the series cannot be explained in the individual case. If such an observation would be replaced by a more plausible one, would that improve the analytical value of the results?

On the other hand, if – as mentioned in the paper – the number of time series that has to be checked regularly is very large, it might not be feasible to control individually each observation that is identified as a possible error by the program. Maybe it could be a solution to check individually each of the major corrections made by the program and – where appropriate – correct them and accept all the "smaller" corrections without further checks, if it can be expected that they average out between a larger number of component series and over time. One would still run the risk that, in individual cases, correct but irregular values are replaced by false though more plausible ones, but the overall effect would be limited. In addition it might also be possible to make automatic corrections and then check a sample of them case by case to find out whether on the whole the modified values are better than those originally collected. Perhaps it is also possible to introduce a sort of automatic control to make sure that no bias is imparted on important time series.

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POSTSCRIPT

Daniel Pérez Cid, María Pérez Jurado and Ana Sánchez
– Banco de España

ARIMA methodology is used in data quality control in order to derive, in a swift, automatic and, of course, accurate fashion, a set of possible outliers requiring investigation. To this end, the one-period-forward forecast obtained from the model is compared with the new figure received. If this new figure is relatively far removed from the forecast, the new observation will be classified as possibly erroneous.

In other words, the ARIMA model needs to be fitted to a series and a one-period-forward forecast made. This could be achieved by means of other computer programs. Irrespective of which are the best programs for treating time series, some requirements must be met if they are to be operational for these purposes. And TERROR actually meets these requirements.

First, such programs must be rapid and fully automatic, since their application is intended for a large number of time series. Moreover, they must yield results that are straightforward and readily understandable to those not versed in time series analysis.

Second, determining the threshold beyond which a forecasting error is deemed to be excessive is no trivial matter. In other words, the degree of strictness applicable to the detection of potential errors will ultimately depend on the number of series to be analysed. It will also depend on each analyst's particular requirements. Any program used must allow for changes in the sensitivity level beyond which the figure is considered to be erroneous.

Lastly, it should be noted that treatment of outliers in the last observation poses problems. The reason is that if a program detects an outlier in the last observation, it will not be able to determine whether an additive outlier or a change in the level of the series is involved. However, this is important since it will decisively affect the forecast. Determining whether the program should correct outliers in the last observation is not clear, and experimentation in this area is important. Thus, the implementation of any program must provide for the possibility of detecting outliers in the last observation, without these having necessarily to be corrected.

As previously stated, the aim here is to obtain an automatic method capable of detecting potential errors. In other words, it is sought to harness the advantages of ARIMA modelling to uncover dubious data. Yet, in no circumstances is it sought to replace a figure which is probably erroneous with the model's forecast. That could impair data quality. The procedure would be as follows. First, TERROR would signal those potentially erroneous data requiring investigation. Second, these data would be investigated. If errors were actually found, the erroneous figure would be replaced with the corrected figure, but not with the ARIMA model's forecast.

Admittedly, applying TERROR to a large number of series, the number of potential errors to be investigated may be excessive. This is because neither the material nor the human resources needed to investigate are available. But, as stated, the number of figures to be investigated also depends on what the analyst has in mind. Thus, sensitivity levels could be altered accordingly. The data signalled by the program as potential errors could then be reduced. Further, the "most significant" errors could be obtained and the number of data ultimately with no error could be reduced, thus saving time and resources.

Distinction between Capital Gain and Income Gain

[Revised version]

Satoru Hagino – Bank of Japan

1. Revision of Flow of Funds Accounts

The Bank of Japan (BOJ) has been compiling Flow of Funds Accounts statistics (FOF) since 1958. In view of recent changes in Japan's financial structure, the BOJ started in 1996 a project to review the FOF. It has just published the data on a revised basis.

The revision of the System of National Accounts (93SNA) and the compilation of the Manual on Monetary and Financial Statistics (MMFS) by the IMF have also motivated the project. We have tried as far as possible to adopt the recommendations of 93SNA and MMFS.

In the process of the project, we have co-ordinated with the Economic Planning Agency (EPA). This agency compiles Japan's National Accounts. The co-ordinated work aimed at realizing a consistent revision of FOF and National Accounts. However, the distinction between income gain and capital gain was left unclear. Here, I would like to discuss a few conceptual issues on which we have not reached a clear conclusion.

2. Distinction between income gain and capital gain

(1) Interest-related financial derivatives

In regard to the treatment of interest-related financial derivatives, the modification of 93SNA recommendations is currently under discussion. The most important question is whether the market value of interest-related financial derivatives should be recognized on an accrual basis: cash payments thereby being recorded as the realization of holding gains/losses.

The essential element of the proposed treatment is that volume changes of financial assets should be treated as revaluations if they are caused by the changes in the present value of the future cash flow. Taking account of this point, we must reconsider the treatment of the reinvestment of property income.

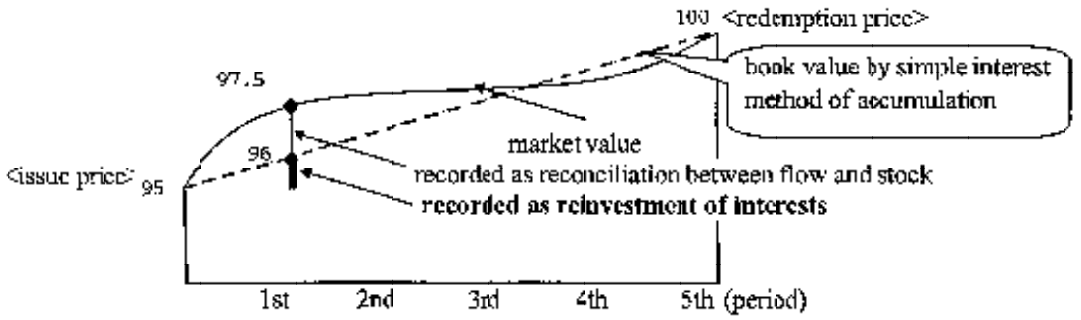
(2) Discounted bonds

Do interests really accrue from discounted bonds? If we recognize changes in the market value of discounted bonds as revaluations, we find they do not bear interest. Since the market value is decided by the present value of the cash flow at the time of redemption, this treatment seems theoretically appropriate.

93SNA recommends the accumulation method. By this method, we can avoid the practical problem of bonds not bearing interest. However, the distinction between interest and revaluation is blurred at any rate because the reinvestment of interest can be estimated in various ways.

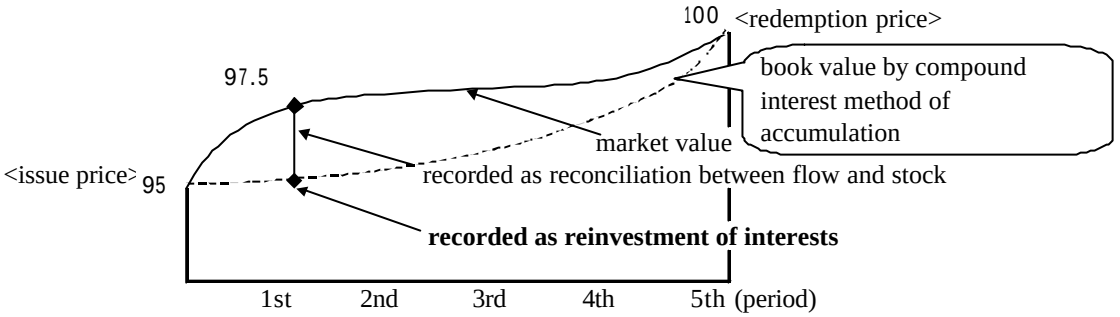
Let us say that a bond of 100 yen was issued at 95 yen, and its maturity is 5 years. 1 yen is recorded as interest income and is reinvested each period until its redemption if we adopt the simple interest method of accumulation. The difference between changes in the market value and the estimated amount of reinvested interest is recorded as revaluation.

Graph 1 – Value of discounted bonds by simple interest method



If we use the compound interest method, the estimated amount of reinvested interest increases period by period and the amount of revaluation, accordingly, does not equal that of the simple interest method.

Graph 2 – Value of discounted bonds by compound interest method



The accumulation method can be used in estimating reinvestment of interest for interest-bearing bonds issued at a discount. In this case, it should be noted that we do not record interest actually paid but calculate interest payments based on the market interest rate. This treatment also means that capital gains of bondholders are converted to income gains.

(3) Reinvested earnings

The treatment of accrual of dividends is much more controversial. The estimation of reinvested earnings is recommended in the Balance of Payments Manual (BOPM) 5th edition. Its concept is to regard retained earnings of a company as payments of dividends to equity holders. These dividends are then reinvested in the company. In the financial market, however, the amount of retained earnings influence the market price of equity.

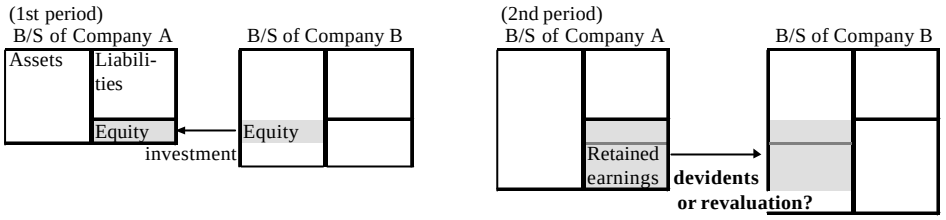
If a company does not return dividends to equity holders and retains its earnings, the company invests the retained funds. The investment will bring an increase in its earnings and equity holders will receive more dividends in the future. Since the equity value is estimated by discounting future dividend payments, the market price of the equity would rise promptly. Therefore, we should not treat retained earnings of the company as payments of dividends to equity holders. Instead, we must choose between either the estimation of reinvested earnings or a mark-to-market valuation.

Regarding the concept of reinvested earnings, let us take company A. Its equity is held by Company B. B records the retained earnings of A as dividends from A. The dividends are reinvested in A. This treatment is appropriate unless the equity of A is traded on the market. If the equity of A is held by many investors, including B, and traded on the market, an increase of retained earnings in A is appreciated by market participants. The equity of A would gain value. In this situation, B would record the increased value of the equity as holding gains.

How should we record the following situation? A is a domestic company and its equity is traded in the market. B is non-residents and holds 60% of the equity of Company A. Residents hold 40% of the equity of Company A. To be consistent with the IMF BOP Manual, 60% of the retained earnings of Company A is treated as reinvested earnings because it is recognized as a cross-border transaction. At the same time, 40% of the retained earnings are recorded as a stock fluctuation

because those earnings increase the value of Company B and the increased value is recognized as holding gains on the side of resident equity holders.

Graph 3 – Value of equity



3. Treatment in revised FOF, BOP and National Accounts

Because we were faced with the above-mentioned problems in the process of revising Japan's FOF statistics, we adopted the following treatments. They are different from treatments in the National Accounts and the BOP.

We have applied the accumulation method only to discounted bank debentures. They are evaluated on a market value basis and changes in stocks are recorded either as revaluations in the flow-stock reconciliation table or as reinvestments of interest in the financial transactions table. Other discounted bonds and interest bearing bonds issued at a discount are evaluated at market value and changes in value are recorded in the flow-stock reconciliation table.

The above-mentioned treatment of discounted bank debentures is related to FISIM. Since FISIM is calculated only by interest, we have to estimate the interest of discounted bank debentures.

The accumulation method is applied to foreign-issued deep discounted bonds in Japan's BOP. In National Accounts, the accumulation method is applied to discounted bonds from which interest accrual is estimated in FOF and BOP.

Concerning equities, we have not adopted the concept of reinvested earnings. Listed shares and OTC shares are evaluated at market value and changes in value including the changes in retained earnings are recorded in the flow-stock reconciliation table. Other equities are evaluated at the book value of issuers, and retained earnings are not recorded in any tables in FOF.

In contrast, reinvested earnings are recorded in BOP. National Accounts combine the FOF approach and the BOP approach. Changes in equity value are recorded as the reinvestment of dividend for cross-border equity holdings (direct investment) and as revaluation for domestic equity.

4. Future problems

Recent financial innovation has facilitated the conversion of many types of cash flow to capital. In Japan, a new type of bond might be issued that is based on future interest income. If this occurs, we might have to record normal interest payments as realization of holding gains/losses.

To be consistent with the treatment of discounted bonds, we should record the interest of deposits by estimating interest to be paid. If the depositor holds deposits with a lower interest rate than the market interest rate, we should calculate interest payments based on the current interest rate and record the capital losses on deposits. In this case, capital losses are compensated with increased interest.

Why are capital gains not included in income in the SNA framework? In the circumstance in which the distinction between transaction and revaluation becomes more and more blurred, should capital gains be taken out of the production frontier? Is it possible, within the SNA framework, to reflect the economic substance of many financial transactions that capital losses are compensated by increased payments of interest or dividends, and where smaller payments of interest and dividends are compensated by capital gains? In addition, the fact should be noted that many intermediaries allocate their resources to dealing activities, and taking capital gains necessitates economic costs.

If the financial market gives "marketability" to formerly non-traded instruments, we can measure their market value or fair value. Market participants that hold the instruments would regard the changes as revaluations in the same way as is done with tradable instruments such as listed shares. In Japan, the trading of unlisted shares is becoming common and securities firms that estimate their prices are increasing.

Taking account of the above-mentioned problems, it might be inappropriate to measure the production of financial intermediaries only by interest received and paid.

5. Distinction between transfer and revaluation

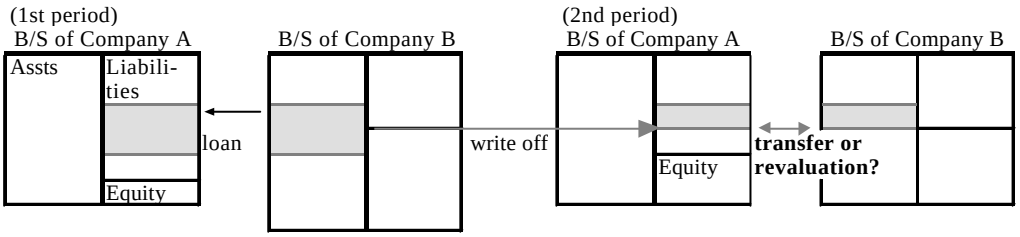
A similar problem occurs in the evaluation of loan claims in which the distinction between transfer and revaluation is blurred. According to 93SNA, volume changes in loans should be recorded as other changes in assets if creditors recognize that a financial claim can no longer be collected. On the other hand, the cancellation of debt by mutual agreement between debtors and creditors should be recorded as a capital transfer from the creditor to the debtor.

In recent years, many Japanese banks have been faced with financial difficulties due to the increase of bad loans. Many of the bad loans are evaluated on a discounted cash flow basis and assigned to third parties. Loans are now traded instruments. On the other hand, there are cases in which the claims are cancelled under corporate reorganization schemes. Those cases also should be treated as revaluations because without resorting to reorganization schemes creditors collect their claims whenever possible.

Forgiveness of debt as capital transfer, accordingly, would be executed only by public institutions. Some public institutions extend loans with contracts to forgive their debts under specified conditions. These conditions normally meet their policy purposes. However, what if public loans decrease in value as a result of debtor insolvency? Should we suppose that public loans with debt forgiveness contracts never depreciate?

In principle, changes in the value of loans are recorded as revaluations in the revised FOF. The changes include the increases of provisions for loans and the removal of loans from the balance sheet. As an exceptional case, we treat the removal of student loans by a public institution as a capital transfer.

Graph 4 – Value of loan claims



6. Relationship between Flow of Funds and Balance of Payments

As a conclusion, I would like to state that it looks worthwhile to provide a conceptual model in which Flow of Funds and Balance of Payments are more consistent with each other.

References

System of National Accounts 1993

Balance of Payments Manual Fifth edition, 1993

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DISCUSSANT'S COMMENTS

Orlando Caliço – Banco de Portugal

I. Distinction between income gain and capital gain

a) Interest-related financial derivatives "income"

The document starts by referring to the change proposed to the SNA93, namely that interest-related financial derivatives' "income" should not be considered in the Income Account, but instead in the Revaluation Account. In this context, the treatment envisaged in the SNA for reinvested property income is questioned.

The case of financial derivatives "income" is indeed one of the examples showing that the border between "property income" and "capital gains/losses" is increasingly thin. However, one of the reasons behind the change proposed to the treatment of financial derivatives is that these operations do not have underlying assets managing income and, therefore, are not in accordance with the SNA's definition of "property income".

b) Bonds issued at a discount

This item addresses the question of whether interest "accrues" on these bonds or if all changes in their market value should be recorded in the Revaluation Account.

Reference is made to the recommendation of the SNA on the recording through the "cumulative method". In the example shown a simple interest method is considered, i.e. the difference between the issue value and the repayment value is uniformly distributed throughout the maturity of the bond. Nevertheless, as mentioned, the results differ when using a compound interest method.

This compound interest method, though based on a less simple calculation procedure, is deemed to be more accurate, and the longer the maturity of the bond and the higher the interest rate, the more the results differ. Nevertheless the situation for Japan, where the interest rate factor may be not so relevant, is significantly different from that for other countries, particularly European countries.

In both cases, the part in the change in the market value that corresponds to accrued interest in each period should be recorded in the Income Account (reflected in the Financial Account), whereas any other change in the market value of the bonds should be recorded in the Revaluation Account. This procedure is deemed to be the most correct and should be applied from the perspective of the debtor sector. Subsequently, the amount should be distributed among the holding sectors, in accordance with the respective portfolios.

c) Reinvested earnings on foreign direct investment (FDI)

This is the only case envisaged in the SNA 93/ESA 95 and in the 5 th edition of the BoP Manual as regards undistributed earnings recorded in Income Accounts. The underlying reason is that this is an artificial operation of profits distribution, where profits are subsequently reinvested in the company receiving the direct investment. The counterpart to this operation is recorded in the Financial Account under the items "direct investment operations" (BoP) and "shares and other equity" (FoF).

The document raises an inconsistency problem between the "measurement" of reinvested earnings and the change in the appreciation of the equity of the company receiving the investment.

This seems to be merely a "partial" problem. It appears as one that should be dealt with considering that the changes in the company's market value arise from other factors in addition to that reinvested earnings.[1]

In order to reconcile positions and transactions accounts, we would say that the change in the market value of the equity of the company receiving the investment (item "shares and other equity" of the Financial Account), as at two different moments, is partially explained by transactions ("net issues of shares: reinvested earnings"), the remainder being accounted for by price changes.

Although the SNA/ESA does not explicitly refers to the insertion of the item reinvested earnings on FDI in financial operations, with the exception of the SNA's correspondence table between the National Accounts and the BoP, it seems that the counterpart, in the resident sectors, of this FDI operation in the BoP, must be a resource increase (as "shares and other equity") of the sector receiving the investment[2], in addition to the net issues of shares carried out in the market.

The second question raised deals with the asymmetry in the treatment of reinvested earnings by foreign direct investors and reinvested earnings by resident investors.

This issue concerning treatment asymmetry appears to be more relevant. In fact, only the part regarding foreign investors (and direct investment) is considered income. As already referred to, this is an exceptional situation in the SNA/ESA, which can be accounted for as a treatment which allows a better gauging of the National Income. To extend this treatment to the overall amount of reinvested earnings would, from a conceptual point of view, solve the issue of asymmetric treatment, albeit by raising other types of problems. One, of a mainly practical nature, concerns the gathering of information for the overall amount of reinvested earnings[3]. Another one, of a more methodological nature, relates to the fact that this treatment implies an overvaluation of financial transactions, since not only the amounts effectively traded, but also the artificial reinvested earnings operations would be classified as resources/ investment in shares. This treatment would further bias the valuation of fund flows, namely when making estimates of the economy's financial intermediation.

II. FoF, BoP and National Accounts treatment

As regards the solutions adopted in Japan's Flow of Funds, our main concern is the non-harmonization with international standards. This situation is particularly important when attempting to establish comparisons at the international level, as in the case of the ECB Monthly Bulletin, which compares flow of funds data for the euro area, the United States and Japan.

A further issue, but in this case more a question of clarification, concerns the definition of the instrument "discounted bank debentures". Why is the cumulative method applied only to these instruments?

III. Future problems

It appears that the financial innovation process increasingly hinders the distinction between income gains and capital gains. However, even in the case of a possible bond issue based on future interest income, there will have to be an expected interest income at the time of issue. This income could be recorded in the Income Account on an accrual basis, and the difference between the market value of these bonds and the issue value plus the interest accrued up to that moment could, in turn, be recorded in the Revaluation Account. If the expected income value of these bonds is zero, the appreciation differences would be recorded in the Revaluation Account.

In this context, the question is raised on whether revaluations should not be considered in the Income Account, or even in the financial intermediaries production account, which will have a significant share of their activities assigned to dealing operations.

We may take into account that transactions within the economy should be recorded in the financial and non-financial (transaction) accounts, thereby assuming the existence of resources in

1) *In Portugal, this information is obtained through business surveys carried out by the Bank of Portugal.*

2) *It should be noted that it is a "new" issue for the Portuguese BoP after 1993, and consequently for the Financial Accounts, as this information is only available from now onwards.*

3) *It should be noted that, in our case, the direct investment item is obtained through a direct business survey.*

a given sector, and employment in another, whereas for revaluations, there is no correspondent sector for these resources.

As for financial intermediaries' dealing activities, the ESA95 envisages that the implied margin between the assets' disposal and acquisition prices shall be recorded in the professional dealers' production account similarly to the trade margins on goods[1]. It should be further noted that capital gains / losses should be removed from these margins to the greatest extent possible, acknowledging that this distinction is in fact difficult to make in practical terms.

IV. Distinction between transfers and revaluation

At this point, a question is raised on the fact that the recording of write-offs is different depending on whether banks acknowledge the existence of bad debts (for instance, due to the bankruptcy of the debtor company) or whether there is a mutual agreement between debtor and creditor. In the first case, the change in the balance sheet is considered as "other volume changes", whereas in the second case a capital transfer is recorded with a counterpart in the Financial Account. The document further refers to the rule that only debt forgiveness by public institutions could be treated as capital transfer.

At the European level, the subject cannot be faced in these terms. According to either ESA95 or to Eurostat decisions, specific capital transfers from the general government to the entrepreneurial sector – such as those for companies to be privatized – should be classified as financial operations, and not as capital transfers.

Additionally, another practical problem is raised for compilers of flow of funds: generally the information on write-offs is gathered from the financial institutions' balance sheet, and it does n ot allow for the distinction between unilateral acknowledgement by the creditor and mutual agreement. Therefore, these changes in the balance sheet are always classified as "other volume changes".

The other issue mentioned in the paper, which concerns the change in the market value of loans, also seems to need further clarification. Apparently, loans are recorded net of provisions, but according to the SNA the latter are not recognized by the system, and are only considered an internal accounting record of the company[2]. The fact that loans to students repaid through a capital transfer from a public institution are subject to a special treatment needs also some justification.

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1) *Paragraph 3.63. of ESA95. The SNA does not include this reference.*

2) *Paragraph 10.140 of SNA93.*

POSTSCRIPT

Satoru Hagino

1. Recording on a cash basis or an accrual basis?

Should compilers of statistics record on a cash basis or on an accrual basis? If compilers follow the rule of simultaneous recording of transactions, they have to make a choice. They should not record certain transactions on a cash basis while recording others on an accrual basis. Interest-related financial derivatives should be recorded on an accrual basis because current transactions and other capital transactions are also recorded on an accrual basis. In this sense, the debate on the interest-related financial derivatives should not be linked with the question of how financial institutions keep their positions on their books.

Let us suppose, however, that financial institutions, which for internal accounting purposes recognize their market value on a daily basis, are not obliged to disclose these amounts for the use of the country's financial accounting framework (the accounting system for public use). Then, compilers of statistics have to use their judgement whether they collect internal accounting data or financial accounting data.

2. What is a financial service?

Measuring financial services would be a challenging issue. In particular, it would not be easy to estimate brokerage fees procured by financial institutions which are implicitly included in capital gains.

It is interesting to reflect on the following. What would be more difficult for compilers of statistics: regarding all the capital gains as income or specifying income included in capital gains. The former would be in line with the "comprehensive income" of the international commercial accounting standard, but the compilers' need to specify the counterparty of financial transactions in the national accounting framework would be stressed.

3. Focus on flows or on stocks?

Why differs the treatment of debt forgiveness in BOP statistics from that in FOF statistics? It might be caused by the difference in the compilation method and the source data. In general, BOP statistics focus on flows and try to collect flow data directly. On the other hand, FOF statistics focus on stock data as much as on flow data and try to estimate flow data from collected stock data. In addition, compilers of FOF statistics pay attention to the revaluations that cause stocks to change without transactions.

It seems that compilers of FOF statistics tend to determine transactions more prudently than compilers of BOP statistics. This would be even more so if the tradeability of financial instruments further expanded in domestic financial markets.

4. Standards: Goal or record of experience?

As discussed above, the international standard of national accounting is due for reconsideration. Although the international standard must be consistent with experiences and practical aspects of every country, it should also provide a goal and suggest the future direction of national accounting.

Globalization: Implications for International Standards in Statistics

Jan A.J. Bové and Carol S. Carson – IMF

Globalization, in the context of financial markets, refers to the growing economic interdependence of countries as evidenced by the increasing volume and variety of financial transactions. It reflects a combination of deregulation of domestic financial markets, a sharp reduction of foreign exchange and capital controls, and the creation of new financial instruments (often based on technological advances). As part of a review of country practices on international reserves and external debt statistics in the context of the increased external payments vulnerability associated with financial globalization, the IMF has identified a number of critical data gaps both with respect to international reserves and external debt. From the vantage point of statistical standards, the gaps that have been identified, so far, or still need to be identified, could be broadly categorized as (i) supplementary information outside the existing statistical frameworks; (ii) further enhancements of existing methodologies; and (iii) the development of additional statistical concepts or frameworks.

1. Supplementary information outside the existing statistical frameworks

The need for supplementary information outside (but not replacing) the existing statistical frameworks relates essentially to data on the quality of assets held as reserves, such as encumberments of certain assets, or various types of guarantees; or gross commitment value (in addition to net market value) of financial derivatives. Indeed, the crisis that began in Asia demonstrated that gross reserves can be a misleading indicator of the monetary authorities' foreign currency liquidity position, i.e., of the foreign currency resources available to meet sudden increases in demand for foreign exchange, and of the potential drains on those resources. The new data template on international reserves/foreign currency liquidity which is now prescribed under the IMF Special Data Dissemination Standard (SDDS) for subscribers to that standard, calls for the supplementation of data on actual financial liabilities with additional instrument categories that may represent either predetermined or contingent short-term net drains on foreign currency assets of monetary authorities. An example of the former would be gross commitments in forwards and futures in foreign currency vis-a-vis the domestic currency; examples of the latter would be undrawn, unconditional credit lines, and collateral guarantees on liabilities falling due within one year, or other contingent liabilities. The methodological issues on guarantees and contingent liabilities are also relevant in the broader context of external debt statistics (as a component of the international investment position (IIP)).

It can be mentioned here, that the SDDS has set higher standards for the frequency and timeliness of international reserves data in view of the increased volatility of capital flows. An important issue that has arisen in this connection is the perceived asymmetry when higher requirements are imposed on the official than on the private sector, which may put the official sector at a disadvantage as a market participant (e.g., central bank operations in the foreign exchange market in relation to the SDDS data category for international reserves).

2. Enhancements of existing methodologies

Some concepts covered in fifth edition of the *Balance of Payments Manual* (*BPM5*) may need amplification in the form of operational definitions, to assist compilers to apply the concepts and to help users to assess the quality of the data. This is the case for official reserves, both with regard to reserve assets and drains upon reserves (see above). An important issue is the definition of reserve assets, which may need to be complemented by a clarification of the conditions under which foreign currency deposits of monetary authorities held with domestic banks are part of reserve

assets. In this area, where comparability of data across countries is particularly important, there could be great value in an internationally agreed understanding that such deposits should be treated as reserve assets if the commercial bank holds a counterpart foreign currency claim on a non-resident entity that is itself available to meet balance of payments needs, and if that claim, by mutual agreement, is readily available to the monetary authorities. In connection with external debt statistics, there may be a need for operational definitions regarding the valuation of debt that is not readily tradable and for which the principle of market valuation espoused by *BPM5* has no practical meaning. Here too, there might be value in adopting an internationally agreed operational definition valuing such debt, e.g., at the net present value of the associated future payments streams.

Some other concepts may also need amplification in the form of additional guidance to be provided to compilers and users. This may be the case for the provision of additional details/classifications on the currency of denomination or the holders of financial instruments. The Asian crisis demonstrated that some countries were holding part of their reserve assets in branches abroad of banks headquartered in the reporting country, and those assets became illiquid during the payments crisis. Such assets could, therefore, usefully be broken out under the broader foreign asset concept – as an alternative to a more fundamental approach, involving the adoption of a nationality – consolidating transactions of units on the basis of the ownership and nationality of its headquarters (see below).

With respect to external debt, there has been increasing interest in defining the concept squarely in the context of the IIP. This could improve the comparability of data between countries, and between debtor and various creditor sources. Some important definitional issues will need to be resolved with regard to the coverage of instruments (e.g., are financial derivatives part of external debt?). At the same time, demands from policy makers point to a possible need for different (or additional) classifications, including (i) debt as a data category within the IIP; (ii) a new debtor classification (government, financial, and corporate sectors; or alternatively, the government sector, monetary authorities and banking corporations, and the rest of the private sector); and (iii) a classification by type of creditor.

Additional guidance may be required for instruments for which no clear or explicit standards were developed so far, such as reserve-related liabilities and gold loans, or where the standards need to be changed (or work is in train to change them), such as for financial derivatives. For gold loans, the issue is whether they should be considered to be transactions at all (which might in practice lead to asymmetrical recording of international reserves), or whether (or not) they should be treated either (a) as a sale/purchase of gold to be recorded in the financial account if both transactors are monetary authorities, or, (b) if only one party is a monetary authority, a demonetization of official gold accompanied by an export of merchandize gold. As to financial derivatives, agreement has been reached at the international level on several changes, including the recording of net cash settlements payments of interest rate swaps and forward rate agreements (the most important derivative types) in the financial account, instead of in the current account. (The new agreements are expected to be reflected in a revision of the *BPM5*, probably later in 1999.)

With respect to external debt, the treatment of cross-border intrabank liabilities is known to be the subject of diverse national recording practices. Additional guidance for this critical data category would be useful.

3. Development of additional statistical concepts or frameworks

The question has also arisen whether some statistical concepts outside existing frameworks may need to be considered further. Two alternative concepts are considered below, namely, data based on the nationality principle, and data based on residual maturity.

Data based on a *nationality principle* may need to be developed. Presumably these would supplement data based on the residency (of transactors) criteria, because other macroeconomic data sets use a residency basis. The issue of nationality-based data is related to work being done on "foreign affiliates statistics" to develop additional statistical standards and compilation methods to meet the needs of the globalization phenomenon – with most of the work, so far, focusing on Foreign Affiliates Trade in Services (FATS). FATS statistics measure selected host country activity of enterprises that are controlled by an enterprise or enterprises resident in some other economy. These statistics may be approached from the point of view of both the host and controlling economies. This statistical measurement, relating primarily to the production of services, might be extended to activity involving both merchandise and financial transactions. It should be noted that foreign affiliate statistics deviate not only from the residency principle

espoused by *BPM5*, but also from the concept of "lasting interest" used to define affiliates for direct investment purposes, as foreign affiliate statistics follow the 50 percent ownership guideline of the *System of National Accounts 1993* (*1993 SNA*) rather than the 10 percent ownership guideline of *BPM5*.

From the point of view of the financial markets and the financial accounts, the transposition from FATS would (at least) require the introduction of balance sheet concepts (as in the IIP), in addition to the transactions concept. As is the case for FATS, nationality based financial accounts need to identify and measure a complex array of transactions/positions falling outside the scope of current balance of payments standards. These transactions/positions can then be presented either in a consolidated form, by way of a possible correction to the balance of payments of the recording country, or, unconsolidated, as individual types of transactions having specific analytical or policy interests (e.g., trade of foreign affiliates in their (foreign) home countries).

At present, an example of the foreign affiliate statistics approach in the context of financial accounts can be found in the consolidated "ultimate risk" international banking statistics that the Bank for International Settlements (BIS) is developing. These data are particularly relevant to gauge bank "exposure." They also add an element to the foreign affiliate statistical framework – namely transactions/positions of affiliates abroad are consolidated only to the extent that they are denominated in foreign exchange. In addition, in order to help assess external payments vulnerability, interest has recently focussed on other nationality-based data series, such as domestic positions in derivatives for inclusion in official international reserve assets. With respect to external debt, interest in the nationality concept has been aroused especially with regard to the treatment of offshore financial centers and banking units.

Data based on *residual (instead of original) maturity* may need to be developed with a view to getting better insights into the liquidity risk associated with globalization and the volatility of capital flows. Alternatively, proposals have been under consideration for assessing liquidity risks on the basis of statistics on repayment schedules or debt service schedules. Both the residual maturity and the schedule approaches can potentially generate analytically useful (future) payments profiles. For the residual maturity approach such profiles could be in the form of time series that could range, for example, from one month upward, with intervals extending as far as needed into the future (but probably not further than one or a few years). Neither approach has a priori methodological superiority over the other. However, if only one cut off point is required (e.g., one year), the residual maturity approach could have advantages from a compilation and presentational point of view. As to forward schedules, the debt service approach (comprising redemption of principal, and possibly also interest payments) may have greater analytical value than that of simple repayment schedules since it is a more comprehensive concept from the point of view of potential drains on official reserve holdings. But it may be more complex. Also, all the alternatives mentioned above are more difficult for compilers (especially for private sector debt) than the original maturity approach espoused in *BPM5*. Moreover, widespread use of put options in international bonds and syndicated loans tend to diminish somewhat the value of statistics based on residual maturity or repayment schedules, especially in the event of acute payments difficulties. Therefore, consideration should probably be given to the collection of data on positions subject to put options.

4. Conclusions

The debate on implications of globalization for statistical standards has intensified, and many questions are yet to find answers. Some questions, which follow from the above review, are: (i) in what way can adaptations of statistical standards meet the needs of policy makers (and what are tradeoffs on resource costs)?; (ii) which definitions, treatment of financial instruments, or classifications, need to be updated most urgently, and in what sense? How can the time dimension – maturities and schedules – be adapted to be more useful for general as well as stress analysis? Is there, in the longer run, a need to replace existing statistical frameworks, beyond the suggested enhancements?

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DISCUSSANT'S COMMENTS

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The document starts with some gaps in the statistical information that have been identified by the IMF in the context of statistical standards with respect to international reserves and external debt. Three areas were identified:

i) Supplementary information outside the existing statistical frameworks
ii) Enhancements of existing methodologies
iii) Development of additional statistical concepts or frameworks

i) Supplementary information outside the existing statistical frameworks

The crisis that began in Asia demonstrated that gross reserves could be a misleading indicator of the monetary authorities' foreign currency liquidity position. The new template of SDDS calls for supplementary information on actual financial liabilities with additional instrument categories that may represent either predetermined or contingent short term net drains on foreign currency assets of the monetary authorities. In fact, the SDDS has set higher standards for the frequency and timeliness of international reserves data in view of increased volatility of capital flows. An important issue that has arisen in this connection is the perceived asymmetry when higher requirements are imposed on the official than on the private sector, which may put the first at a disadvantage as a market participant.

ii) Enhancements of existing methodologies

Some concepts covered in the 5th edition of Balance of Payments Manual may need amplification in the form of operational definitions to help users to assess the quality of data, namely in the domains of international reserves, external debt and financial derivatives. In the first case, the inclusion in the concept of reserve assets of foreign currency deposits held with domestic banks, since the commercial bank holds a counterpart foreign currency claim on a non-resident entity that is itself available to meet balance of payments needs, and, if that claim, by mutual agreement, is readily available to the monetary authorities. In the case of external debt, attention could be given to the valuation of debt not readily tradable. According to an internationally agreed operational rule based on the net present value of the associated future payments streams, to a possible need of different (or additional) classifications of instruments, debtors and creditors, or even to the harmonization of the treatment of cross-border intra-bank liabilities. As to financial derivatives, agreement has been reached at the international level on several changes, including the recording of net cash settlements payments of interest rate swaps and forward rate agreements in the financial account instead of in the current account of the balance of payments.

iii) Development of additional statistical concepts or frameworks

Two alternative concepts outside the existing statistical framework may need to be considered further:

a) Data could be gathered, based on the nationality principle to develop additional statistical standards and compilation methods to meet the needs of the globalization phenomena. The work that has been done on Foreign Affiliates Trade Statistics (FATS), relating to the measurement of production of services by companies controlled by an enterprise resident in another economy, could be extended to the merchandise and financial transactions. That would require the introduction of balance sheets concepts (as in the IIP), in addition to the transactions concept. An example of the foreign affiliate statistics approach in the context of financial accounts can be found in the consolidated "ultimate risk" international banking statistics that the BIS is developing. Namely, for measuring bank "exposure", the consolidation of foreign affiliates being done to the extent that their transactions/positions are denominated in foreign

exchange. With respect to external debt interest in the nationality concept, it has been aroused especially with regard to the treatment of offshore financial centres and banking units.

b) Data based on residual (instead of original) maturity may need to be developed with a view to get better insights into the liquidity risk associated with globalization and the volatility of capital flows. Since it can generate analytically useful (future) payments profiles in the form of time series that could range, for example, from one month upward, with intervals extending as far as needed into the future.

Looking at the considerations made on the document, which show some direction for the implementation of new solutions, we may say that, in general, they have our full support. Therefore, in our very brief comments, we want to stress the relevance of some points that, in our perspective, deserve due consideration before a decision on implementation is taken.

We know that the IMF's implementation practice of new statistical requirements is a guarantee that our comments are carefully taken into account. But, excessive analyses of the implications of the successful implementation of new requirements are, of course, easier than the decision process usually based on the *a priori* principle that the new information is so valuable that any further analysis would mean time and money losses.

As a general comment, one could say that the request for additional statistical information, totally justified in the need of assessing the quantitative impact of actual quick and often changes in international capital flows and financial markets, will imply additional costs in the process of statistical compilation of the new data.

For example, collecting data on residual maturity of external liabilities, namely from the private sector, will represent a significant additional burden for both the reporting agents and the national compilers.

Thus, in this case, as in all others when new compilations of data are proposed, it is necessary to make clear that the present information is insufficient for analysis and policy purposes; and thatthe potential benefits from the additional statistical requirements compares favourably against a certainty of effective high costs of compilation.

Are we convinced that the statistical information that was available for economic analysis wasn't enough to envisage some of the problems that occurred in some Asian countries? Or, in other words, the fact that the Asian crisis wasn't anticipated wouldn't have occurred with the existence of additional statistical information like the one that is suggested along the text?

Further, in the context of a strategy for the development of the international statistical system it seems appropriate to question if one should develop new statistical frameworks without the consolidation of the already existing ones. This could be the case when additional information on external debt is required without an achievement of a full implementation of the international investment position statistics by a majority of countries yet (the external debt being one component of the liabilities of the IIP).

The additional detail in statistical information will necessarily be supplied to the international community by the major creditor countries, with more resources to apply in the process of production and disclosure of statistics, in comparison with the possibilities of debtor or more "exposed" to crisis countries (and implicitly with a stronger need of being monitored).

In fact, according to our understanding, only a small number of debtor countries are in a position to correspond to the SDDS requirements, the majority of countries adhering to the standard being creditor countries. Of course, one could try to have a measurement of the endebtment of debtor countries through the mirror statistics compiled by creditor countries. However, it should be pointed out that the statistical burden in the reporting countries to international organizations is already quite heavy, with an asymmetry being introduced in this case of report by creditor countries comparing to debtor (and not due to report) countries.

It adds that, in the case of data on nationality to complement or substitute data based on the residence criteria, information is not traditionally available in (balance of payments) statistics. But rather in the banking supervision area, which would imply a need of co-ordination of efforts in order to avoid data reports' redundancies.

Coming to the additional information concerning international reserves, it could be argued that, instead of compiling data on reserve assets and reserve-related liabilities, a concept of international reserves pondered by country, currency and sector risks would be of a great potential analytical usefulness.

We agree with the question of asymmetry introduced in the text, relating to the higher requirements imposed on the official than on the private sector which may put the official sector at a disadvantage as a market participant. In this concern, we think that the availability of timely information on private sector activities is also very important in order to obtain a complete picture of the international exposition of a country, reason why we recommend also an approach to the private sector's external debt.

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POSTSCRIPT

Carol Carson – IMF

Mr. CaliHo usefully makes the point that a proposal for compilation of new data must be justified on the grounds that the existing data were insufficient for purposes of analysis and policymaking. Further, the potential benefits from the additional statistical requirements must compare favourably with the certainty of higher costs of compilation.

I welcome Mr. CaliHo's comments, for I would like to encourage full discussion of the costs and benefits. We in the IMF find ourselves caught in the middle. On the one hand, in the examination of how the international financial architecture can be strengthened against reoccurrence of crisis and contagion, there are calls from the highest policy levels for more data—more detailed, more timely and frequent, and more comprehensive. For example, the G-22 Working Group on Transparency and Accountability, in the October 1998 report, in speaking of the responsibilities of national authorities, called for strengthening the Special Data Dissemination Standard (SDDS) in the areas of reserves, external debt, and indicators of financial soundness. For reserves, the report called for publishing timely, accurate, and comprehensive information about the authorities' foreign exchange liquidity positions. For external debt, the report called for authorities to supplement the international investment position (IIP) with information about the foreign currency liquidity position of the public sector and the private financial and nonfinancial sectors. On the other hand, those who speak for statistical units, whether in central banks or national statistical offices, raise concerns. They point to the potential disadvantage in which the national authorities might be placed in conducting exchange operations if the private sector were not called upon to provide comparable information. They also point to the resource costs of the additional data—costs to the respondents, who must be asked to answer additional questions, and costs of compilation and dissemination.

I mentioned that we in the IMF encourage a full discussion. Because we find ourselves caught in the middle, trying to reconcile these points of views as we carry forward our work on standards and methodologies, we would benefit from discussion that sets the broader context. Such discussion would bring out that the policy maker's interest in statistics is a part of their broader concern for transparency and thus statistics is only one element, albeit a very important one. Statistical organizations had already been responding to the challenges of globalization by the changes in their practices to be in line with the SDDS, so they were among the first to feel any additional pressure on their resources. Meetings such as this are one we can work toward full discussion. The IMF has also used discussion papers and other vehicles. For example, with respect to external debt, in order to gauge better the problems and prospects, the Fund undertake a survey of country practices. A questionnaire was sent to SDDS subscribers, posted on the Internet with a request for comments from other interested parties, and discussed with other relevant international organizations.

As this work goes forward, I encourage those interested in statistics in general, and the Irving Fisher Committee in particular, to be alert for occasions to participate in the dialogue. I believe we

CONTRIBUTED PAPERS

Accruals Methodology: Statistical problems in the Estimation of Interest for new Financial Instruments in the context of Globalization of Financial Markets

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1.The Issue

The definition of a common standard for the recording of income is a central problem underlying all Financial Statistics. The treatment of the accrual of interest affects the balance of payments current and financial accounts' balances and gross national income, as well as it has an impact on National Accounts. Three different basic principles can be distinguished in recording interest: the cash basis principle, the due for payment principle and the accrual principle. Conventional cash basis accounting systems record the interest transfers as settlements occur. When interest is recorded on a due for payment basis the contracted date of settlements is taken into account instead of the actual settlement date. Both cash based and due for payment criteria inadequately represent the use of economic resources and timing of economic events. In the accrual recording principle, interest is considered as the payment for continuing use of capital. As a consequence it should be recorded on a continuing basis, not when it is paid or when it comes due for payment.

The accrual principle is now commonly accepted as a basic criterion for the System of National Accounts and Balance of Payments since BPM5[1] and SNA93[2] have introduced this principle as a standard.

"Under investment income, interest is recorded on an accrual basis, which is the continuous method of recording that matches the cost of capital with the provision of capital. If the interest is not actually paid, an entry is required, together with an offsetting credit entry in the financial account for the claim associated with the non-payment (i.e., an increase in liabilities). The two entries are particularly important for zero-coupon and other deep discounted bonds" (5th edition of the Balance of Payments Manual).

The application of the accrual recording, according to the IMF Balance of Payment Manual, has raised specific methodological problems with regards to BoP and Financial Account compilers, still outstanding to date.

As a matter of fact, settlements-based accounts are relatively simple to prepare, because the interest amounts to be recorded are exclusively defined by the occurred payments or by the contractual obligations. Nevertheless, the limits of the cash basis and due for payment criteria have worsened with the diffusion of innovative financial instruments such as deep discounted and zero-coupon bonds

The accrual recording produces statistics which are in their appropriate forms as far as the economic analysis is concerned, but at the same time it is difficult to define how virtual interest transfers are distributed over the time. In order to distribute the accruing interest over the life of bonds, a theoretical framework should be chosen since more than one among the available calculation methods could fit the analysis. At present, a common accounting framework conveying the general consensus does not exist for the BoP compilers seeking to implement the standard.

1) *Balance of Payments Manual (fifth edition)*

2) *System of National Account (1993 edition)*

The international guidelines for national accounts compilers (SNA 93 and ESA 95) are not sufficiently detailed and introduce different criteria from those set out in the BPM5 and the BoP compilation Guide. In this respect, the studies issued by the national central banks and panel of experts have shown a lack of consensus on a common theoretical framework related to the full accrual recording.

From a theoretical point of view, every single approach gives similar results under the whole life of the financial instrument. The difference would be in the split between transactions (in the financial and current account) and other flows (in the revaluation account).

The main distinction runs between the debtor approach and the creditor approach. In actual fact, the debtor approach basically assumes that interest should represent the issuer cost of borrowing that is determined at the issue date. As a consequence, the changes occurred in the market condition and the transactions in the secondary market do not affect the interest rate during the life of a bond.

The creditor approach is opposed to this static view of the financial market in favour of a dynamic one, since tradable financial instruments are exchanged continuously in the secondary market. The creditor approach represents the point of view of an investor and interest is the expression of the obtained yield. This approach takes the assumption that investors do not take into consideration the prevailing interest rate at the issue. Only the current market conditions are relevant when it comes to making portfolio decisions. In the context of the creditor approach, two possible criteria can be adopted, the acquisition approach and the full market approach. Under the first criterion, the rate to be used is the one which is implicit at time of acquisition by the holder. This approach is in actual fact impossible to adopt since it implies an individual treatment of each security. Under the Full Market approach interest is continuously recalculated on the basis of the current interest rates.

Debtor approach *(issuer point of view)*

Creditor approach:
- Acquisition approach *(investor point of view)*
- Full market approach *(market point of view)*

2. Theoretical Overview

Interest accrual depends on the coupon payment and the ratio of the number of days from last coupon payment to settlement date to the number of days in the coupon period. Thus, adding accrued interest to the price of financial instrument, we obtain the full price or dirty price. The price that the buyer pays to the seller is the dirty price. It is important to note that in computation of the dirty price, the next coupon payment is a discounted value, but in computation of accrued interestit is an undiscounted value. From a theoretical point of view, the price of each financial instrumentis equal to the present value of the expected cash flow.

Following the full market approach the interest rate used to compute the present value depends on the present yield offered on comparable securities in the market. Instead, in case of the debtor approach, the present value computation is based on the interest rate prevailing at the time of issuance of the financial instrument.

In our presentation, the yield measure calculated for coupon bonds and zero-coupon bonds, given their price, is the yield-to-maturity. For floating rate notes the reference rate, which form the basis of the floating rate, in the future is not known. Therefore, the cash flows cannot be determined properly.

The conventional measures used to estimate the potential return for a floating rate security are: a) the discounted margin or effective margin and b) the total return analysis. However, in our point of view, for BoP purposes, a reasonable measure to define, even for floating rate securities, the potential return could be represented by an estimate of the yield-to-maturity. In the full market approach, the future coupon rates could be estimated on the basis of the implicit forward rates. In the debtor approach, the accrual could be computed on the assumption that the future interest rates are equal to the last coupon calculated.

With respect to the full market approach, provided that we know any two points on the term structure, we can infer the rate that is expected to prevail at the end of the shorter term-to-maturity (m) for the time interval that will be remaining (n-m) until the end of the longer term-to-maturity. The notation to derive the forward rate implicit in two observed spot rates is the following:

$$(1+ {}_{t+m}r_{n-m,t})^{n-m} = (1+ {}_{t}R_{n})^{n} \Big/ (1+ {}_{t}R_{m})^{m}$$

where:

${}_{t+m}r_{n-m,t}$ = unobservable forward rates, with the first *t* representing the time at which the rate goes into effect, *n* indicating the term to which it applies, and the second *t* indicating the time at which the forecast is made (for example, the currently, i.e. at time 0, implied rate of two-year bond that is expected to prevail in four years is ${}_{4}r_{2,0}$*);*

${}_{t}R_{n}$ = current, observable spot rate with *t* indicating the time at which it is observed and *n* (or *m*) indicating term.

For the scope of the analysis, the determination of the cash flow of a debt instrument has been limited to option free-bonds (not containing a call or put option), with a bullet repayment, that i s to debt instruments where the cash flow is known with certainty or assumed to be known.

Fixed-coupon and floating rate-coupon bonds

The yield-to-maturity (y) on these bonds is the interest rate that equates the present value of the future cash flows to the price. Solving for the yield (y) requires a trial-and-error procedure. The formula can be expressed as follows:

$$DP = \sum_{i=1}^{n} CF_i \Big/ (1+ y)^{(DD/365)}$$

where:

DP = dirty price;
Cf_i = i-th cash flow of the bond, including both coupon and any principal redemption;
n = number of cash flow periods from settlement to maturity;
DD = number of days from the value date (the date on which the buyer becomes entitled to receive the interest accrual) to the payment date of the ith cash flow.

The accrued interest is calculated as follows:

$$AI = c\left[\frac{\text{Number of days from last coupon payment to settlement date}}{\text{Number of days in coupon period}}\right]$$

where:

AI = Accrued interest;
c = Coupon payment.

Zero-coupon bonds

The computation of the yield-to-maturity on a zero-coupon bond is similar to the calculation for a coupon bond. The only difference is that, in this special case, it is not necessary to go through the trial-and-error procedure to determine the yield. The formula to determine the yield (y) is the following:

$$y = (FV)^{(365/DD)} - 1$$

where:

DD = number of days, including the extremes, between settlement date and cash flow due-date;

FV = future value per euro invested = $\dfrac{\text{Cash flow from bond (maturity value)}}{\text{Price of the bond}}$.

For the purpose of the analysis, the determination of the cash flow of a debt instrument has been limited to option free-bonds (not containing a call or put option), with a bullet repayment, that i s to debt instruments where the cash flow is known with certainty or assumed to be known.

3. Financial instruments of structured finance

The scenario in the Euromarket of low or declining nominal interest rates and subdued inflation has increased the demand for higher returns. This and other factors have drawn new categories of investors and issuers to the international marketplace.

The resilience of international issuance has resulted in financial innovation, thus extending the range of financial services and products on offer. The facilitated market access enabled intermediaries to unbundle and repackage underlying risks, by means of the introduction of equity/index-related issues, securities with coupons linked to the credit rating of issuers or "synthetically" based on baskets of outstanding emerging market issues.

New financial instruments, in particular equity/index-linked issues, have highlighted the inadequacy of the traditional definition of interest to represent the complexity of the financial markets. In particular, financial innovation has shown the difficulty of distinguishing between interest and capital gain/loss without adopting complex and innovative theories. The pros and cons debate on the debtor approach versus the full market approach shows the impossibility to have a definition of interest income capable of satisfying all the constraints imposed by the accrual recording criterion.

The choice between the debtor and the full market approach should be based on both the data collection system and the information available on securities. Furthermore, BoP compilers, once they selected one of the two recording criteria, will have to give up the idea of distinguishing between interest and capital gain/loss in a way that could be relevant for both issuers and investors.

According to the SNA 1993, "*The index-linked securities are instruments for which either the coupon payments (interest) or the principal are linked to a price index, the price of a commodity, or to an exchange rate index. When the coupon payments are index-linked they are entirely treated as income as in the case of any variable rate financial assets. When the value of the principal is indexed, the issue price of the security is recorded as the principal and the indexed payment paid periodically and at maturity is treated as interest. The payment owing to indexation should be recorded as interest (property income) over the life of the security, and the counterpart should be recorded under security other than shares in the financial account*".

However, in our opinion, as price fluctuations of this kind of securities, currently recorded among income items, are affected, indeed, by price movements originating in the market of the underlying assets, a typical gain/loss component could be identified. We have attempted to define for new financial instruments (typically structured securities) the income component versus the capital gain component, the former being defined as the securities' running yield. In this respect, a potential estimate of capital gain/loss component could be represented by a correlation matrix approach. The statistical measure should derive the correlation among the statistical series of quotation prices of the structured security and the quotation prices of the underlying assets.

A structured security can be decomposed in its elementary components. For the purpose of our analysis we make reference to a plain vanilla bond indexed to an equity market index or to a basket of equities. The payoff of the bond can be defined as follows:

$$F = \max \{P_e (1+i), P_e (1+\mu\Delta RA)\}$$

where:

Pe = issue price;
i = minimum guaranteed interest rate;
μ = participation rate (in percentage) to the increase of the reference asset;
ΔRA = percentage of increase of the reference asset (RA).

Being $P_e (1+i)$ a constant, the previous notation can be expressed as follows:

$$F = P_e (1+i) + \max \{0, P_e (\mu\Delta RA - i)\}$$

which follows:

$$F = P_e [(1+i) + \max \{0, (\mu\Delta RA - i)\}]$$

Therefore, the issuer should pay to the holder of the structured security a certain amount (1+i) and, in addition, an uncertain amount ($\mu\Delta RA - i$), if positive. In particular, the component max {0, ($\mu\Delta RA - i$)} represents the payoff of an option.

The correlation matrix exercise, worked out on a sample of four securities (European Investment Bank 97/02 basket linked, Mediobanca 97/00 basket linked, Crediop 98/02 Dow Jones Euro Stoxx 50 index linked, Mediobanca 98/05 3.15% basket linked), has revealed a positive correlation (with a minimum value of 0.329 and a maximum value of 0.679) among the series of official closing prices of the structured securities and the series of mid closing prices of the underlying assets.

4. The database structure.

In our analysis we focus on the Italian foreign portfolio assets, since Ufficio Italiano dei Cambihas built a complete security-by-security database, giving the composition of portfolio assets were at the end of 1997, on the occasion of the IMF Portfolio Survey. A new portfolio survey will be launched with reference to 1998. The information on financial instruments used to derive our statistics on BoP, supporting both creditor and debtor approach, can be listed as follows:

- ISIN code (as defined by the Standard ISO 6166)
- Issue description
- Nominal value
- Date from which interest starts to accrue
- Maturity date
- Coupon frequency
- Coupon interest rate
- Market price (ex-coupon)
- Issue price
- Redemption price

In 1998 Ufficio Italiano dei Cambi (hereafter referred to as UIC) planned to change the interest recording system, formerly based on settlements, and moved to an accrual basis system. The UIC planned to implement the new system with reference to debt securities and money market instruments when it comes to drafting the Balance of Payments for the year 1999. The accrual basis recording methodology will be extended to all the other financial instruments by taking a step-by-step approach.

In this paper, just an abstract of the entire analysis, we intend to give an overview of our experience in implementing the new recording system and to set out the conclusions drawn up as a starting point for further debates. Finally, we tried to quantify the impact of the methodological change on each debt security category with reference to the Italian Balance of Payments.

The composition of Italian portfolio assets at the end of 1997 is presented in the table 1.

Table 1 – Composition of the Italian Portfolio Assets at the end of 1997 *(Data in millions of euros)*

Financial categories	Amount	Percentage
Zero-coupon bonds	6,056	3.65%
of which: Index-linked	*1,163*	*0.70%*
Floating rate bonds	34,679	20.90%
Fixed rate bonds	125,192	75.45%
Total	165,927	100.00%

5. The implementation of the accrual recording methods on the security-by-security database

In order to quantify the net effect due to the different recording methodologies on the Italian BOP, a joint analysis of both assets and liabilities should be carried out. The present paper represents just a theoretical exercise on foreign assets. We have classified the securities portfolio into the

following main categories: fixed rate bonds, zero-coupon bonds, variable interest bonds, equity/index-linked bond with coupon payments, other equity/index-linked bonds. First of all we have tried to test how much each of these categories of Italian portfolio assets is sensitive to the change in the interest recording methodology by analysing their main features (i.e., reference parameter of the coupon, coupon frequency, and residual life to maturity). Secondly we highlighted some critical points in the recording system that go beyond the problem of choosing between debtor and creditor approach.

In the following report, we have shown the results, of a comparison between the accrued interest calculated with the debtor approach and accrued interest calculated with the full market approach. The acquisition approach has not been taken into account. In fact, in order to implement this standard a transaction-by-transaction assets database including the entry date in the balance sheet should be built.

The comparison refers to fixed rate bonds (bullet repayment) and to zero coupon bonds (not indexed). For this kind of bonds the whole information is available which is required for an exact calculation of the accrued interest. The difference observed in the results is quite negligible. For the zero-coupon bonds, since the weighted average of the issue date is approximately one year, the occurred changes affecting the interest rate recalculation mainly refer to a short previous period. With regard to fixed rate bonds it is more difficult to draw some conclusion, because the number and the variety of security included in the portfolio assets produce compensating effects.

Table 2 – Comparison Exercise between Different Recording Approaches

Financial categories	Accrued interest 1998		Assets 1997 (millions of euros)
	Debtor Approach (millions of euros)	Full Market Approach (millions of euros)	
Zero-coupon bonds (other than index-linked)	305	295	4,894
Fixed rate bonds (bullet repayment)	8,132	8,144	112,783

The floating rate bonds do not raise the theoretical problem of choosing between the different approaches but rather difficulties relating to the availability of information. The floating rate bonds are quite relevant in the Italian portfolio assets as can be observed in Table 1. For this category of bonds any occurred change is recorded as interest, as a consequence debtor and creditor approach converge to the same concept. We can distinguish between securities with "predetermined interest" and "post-determined interest". In the former, the interest amount is known in advance (these securities cover approximately the 50% of the entire amount). In the latter, the interest computation is obviously more problematic. At the recording time the amount of the accrued interest is unknown and it has to be estimated on the basis of the implicit forward rates.

6. Conclusions

The implementation of a full accrual basis recording system involves both theoretical and practical problems relating to the recording of income.

The quantification of the discrepancies between two different approaches (debtor approach and full market approach) in the calculation of accrued interest for 1998 with reference to the Italian portfolio assets, shows that the results are scarcely sensitive to the change of methodology.

The analysis on income recording highlighted methodological problems for both floating rate debt instruments and structured financial instruments. As a matter of fact, the interest to be recorded cannot be easily estimated.

In our opinion, a reasonable measure to define, even for floating rate securities, the potential return could be represented by an estimate of the yield-to-maturity. In the full market approach, the

future coupon rates could be estimated on the basis of the implicit forward rates. In the debtor approach, the accrual could be computed on the assumption that the future interest rates are equal to the last coupon calculated.

The treatment of index-linked bonds proposed by the BoP and NA manuals shows some limits from a theoretical point of view. Price fluctuations of this kind of securities, currently recorded among income items, are affected, indeed, by price movements originating in the market of the underlying assets. This would reveal the existence of a typical gain/loss component. In this respect, a potential estimate of this component could be represented by a correlation matrix approach.

Even though the analysis is mainly based on the framework and database currently in use for the compilation of the Italian BoP, the views expressed here are those of the authors and not necessarily those of the UIC.

References

Banque de France, 1996, Accrued Coupons on transactions in bonds.

Deacon M. and A. Derry, 1994, Estimating the Term Structure of Interest Rates, Bank of England, working paper series no. 24.

Eurostat, 1998, Report of the Task Forces for the ESA 95 Handbook. Recording interest on accrual basis, proceedings of the joint meeting of the Working Parties on Financial Accounts and National Accounts, Luxembourg, 21 October 1998.

International Monetary Fund, 1993, Balance of Payments Manual, Fifth Edition.

International Monetary Fund, 1995, Balance of Payments Compilation Guide.

International Monetary Fund, 1998, Accrued Interest on Debt Securities with a Fixed Rate of Interest at the Time of Issue, proceedings of the 11th meeting of the IMF Committee on BoP Statistics, Washington, D.C., October 21-23, 1998.

Wright C. and G. Semken, 1998, Income Accrual: interpreting and implementing the new statistical standards, Bank of England, working paper.

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Globalization of Financial Markets: Implications for Domestic Macroeconomic Management

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Introduction

Globalization is the integration of national economies through trade and financial interaction. A sub-set of globalization which has become very pervasive and in some cases destabilizing is financial markets integration across the globe. The rapid flow of goods, services and capital, especially the latter, has made national controls on these aggregates less effective without consideration for countervailing measures that other nations could impose in the absence of co-ordinated responses. The rapid advance in technology and telecommunication has reduced the cost associated with foreign portfolio and direct investment. Without moving from one location to another, a foreign investor could deploy funds across the globe with the aid of telecommunication facilities. The ease with which capital can be redeployed to take advantage of better returns has often proved adverse for the economies experiencing the outflow.

Reductions in transport and communication costs, capital account opening, financial market deregulation and privatization of state enterprises have combined to create a favourable environment for increased capital mobility [Fischer (1998:164)]. The globalization of financial markets has proved complex to understand because the phenomenon encompasses both product and capital markets. The integration of financial markets has exerted considerable constraints on the conduct and effectiveness of macroeconomic policies in recent times, as depicted by the financial crisis in South East Asia. The rapid advance in globalization, especially after the end of the cold war, has tended to re-enact the laissez-faire doctrine that was prevalent before the ideological polarization of the world. The fact that globalization could mean many things to different people depending on where they fit into in the current dispensation makes it imperative to explore the implications of the phenomenon for domestic macroeconomic management. The extent to which the effectiveness of domestic economic policy can be compromised if adequate consideration is not given to countervailing responses of other nations is a major area of inquiryof this paper. This is more important as the interdependence between nations is an indication that growth could be undermined if nations build protective walls around their economies.

Stabilization of finance and financial risk has been attributable to an increase in the technical capabilities for engaging in precision finance, the integration of national financial markets, the blurring of distinctions between financial institutions and the activities of the markets they engage in, the emergence of the global bank and the international financial conglomerate, each providing a mix of financial products and services in a broad range of markets and countries. Financial globalization has resulted in two distinct developments in global finance. In the first place, traditional banking institutions have evolved into financial services firms. Additionally, nonbank financial institutions now actively compete with banks both on asset and liabilities sides of the balance sheet, thereby blurring the distinction between banks and non-bank financial institutions. Also, the rapid growth in the share of other earning assets in total assets and the relative growth in off-balance sheet items have been unprecedented [IMF (1998:180-182)].

The rest of the paper is structured into four parts. Theoretical concepts and review of relevant literature are discussed in Part II, followed by trend analysis of global capital flows in Part III. Problems with tracking international capital flows and implications for macroeconomic management are treated in Part IV. The paper ends in part V with summary, conclusions and recommendations.

1) *The authors are Assistant Directors, Research Department, Central Bank of Nigeria (CBN).* *We are grateful to Mrs. O. O. Akanji, Deputy Director of Research, CBN for her support in the course of writing this paper. The views expressed are personal to the authors and do not represent those of the CBN.*

II. Theoretical Concepts and Review of Relevant Literature

Net capital flows are the product of imbalances between savings and investment across countries. Both net and gross capital flows respond to economic fundamentals, official policies and financial market imperfections. Thus, fundamental determinants of international capital flows are factors such as the investment opportunities available in the global economy, the covariances between the expected returns on various investment projects, and the preferences of individuals for present and future consumption, as well as attitudes toward risk. As the international financial system becomes more integrated and portfolios more diversified, assets prices are more likely to change than are net capital flows to restore market equilibrium [Taylor (1997:453)]. The process of deregulation, innovation and globalization has increased both the efficiency of and volatility in financial markets. The volatility in international financial markets makes it more difficult to ascertain the value of financial assets and has encouraged in some instances unstable portfolio flows. Although, Bekaert (1995:107) argues that volatility is not correlated with any measure of financial integration and that it does not arise because of financial liberalization, recent evidence point to the contrary. What is important is that unsystematic risk which can be controlled is largely overwhelmed by systematic risk which cannot be diversified.

The adjustment in the prices of assets to reflect systematic risk has not been uniform, thus introducing further instability into the international financial system. Other factors that influence the inflow of capital to emerging markets and developing economies include the degree of openness of the economies, rates of returns on investments, credit rations and secondary market prices of sovereign debts. Overall, international capital flows are directly dependent on arbitrage opportunities.

The traditional theory of international borrowing and lending assumes that financial markets are highly integrated. Demand and supply for loanable funds are assumed to be equilibrated by interest rates which adjust instantaneously. Thus, each country may borrow or lend at a given interest rate, subject only to the constraint that the borrower is able to repay its debt in the long run by using its resources. Interest rate adjustment is held to ensure the movement of capital across the globe, thereby ensuring equilibrium. The modern theories of financial market integration are built on the traditional school. The degree of financial markets integration is held to be dependent on the extent to which asset prices are equalized. This is derived from the popular notion of the law of one price. Yields on the same assets are expected to be the same at home and in the rest of the world when risks and transaction costs are discounted.

The elimination of such risks and transaction costs are expected to equilibrate yields on similar assets across the globe. The reliance on asset yields to explain the movement of capital around the world derives from the efficient market hypothesis, which assumes that market players are rational and that they apply all available information in their pricing decisions. Thus, markets are efficient when prices fully reflect available information and when the forward exchange rate becomes an unbiased predictor of the future spot rate. If this holds, the regression of the observed spot rate on the lagged forward rate should yield an estimated constant not significantly different from 1 and serially uncorrelated errors [Ott, M. and T.W.M. Veugelers (1986:7)]. However, the intercept may be significantly different from 0 in the real world as a result of risk premium, shifts in monetary policy and changes in expectations. The efficient market hypothesis assumes that the distinction between domestic and foreign assets is blurred and that differences in the value of both are equalized ultimately through cross border movements. Interest and exchange rates adjust to equalize the yields on domestic and foreign assets. Before the equalization, funds flow from areas of saturated returns to areas of increasing returns. Financial liberalization across the world appears to have taken the wind off the automatic adjustment mechanism under the efficient market hypothesis. The dismantling of controls and rapid embrace of liberalization has opened up hitherto closed markets to capital inflow. This has not in any way faulted the efficient market hypothesis. The rapid financial integration of the world economies, especially after the end of the cold war and the application of structural adjustment and financial reforms by the emerging market economies is a further confirmation of the relevance of the efficient market hypothesis in explaining financial capital flows across the globe.

The law of one price, which the efficient market hypothesis is a sub set of, makes it possible for domestic financial markets to be integrated into the global economy. Exchange and interest rates are the main channels by which adjustments through the efficient market hypothesis are effected to trigger funds movement. Under rational expectation, the future spot rate should be equal to the actual observed value in addition to the risk premium and a random error. The assumption of market efficiency without risk in the foreign exchange market has been roundly rejected on empirical grounds. The uncovered interest parity (UIP) which is based on the same assumptions of

the efficient market hypothesis, relates the expected change in the spot rate and the risk premium to the forward premium. The covered interest parity (CIP), which relates the interest rate differentials at home and abroad with the forward premium, holds most of the time. The fact that the CIP holds most of the time means that capital would move from high risk to areas of those with low risk and stable returns. Thus, countries would be forced to apply policies that would reduce risks to foreign capital inflow in the quest to attract such funds, in addition to preventing marginalization from increased global financial interaction.

With the barriers between national markets greatly diminished, and not inhibiting potential arbitrage flows between national markets, and with currency risk eliminated by forward cover, departures from CIP have on average become much smaller. Divergences between the CIP and domestic short-term interest rates declined in the early 1980s in response to the financial deregulation and liberalization of capital movements undertaken by many countries [World Economic Outlook (May 1997:64)]. A more fundamental issue is the extent to which the CIP helps to ensure that expected changes in inflation rates are reflected in expected exchange rates. Capital flows are expected to equalize real interest rates between countries. If this holds, it will be possible for short-term interest rates and nominal exchange rates to converge with relative purchasing power parity (PPP). In the long-run, it is expected that changes in relative inflation rates are important in explaining trade and capital flows between countries.

Capital markets have become more integrated in the last twenty years. In spite of the phenomenal growth of cross-border flows and the rapid progress toward the integration of financial markets, financial globalization seems to be confined to heavily traded, highly liquid financial assets, while countries' overall investment performance continue to be determined predominantly by their domestic savings rates rather than by net capital inflows. But the highly integrated segment of the capital market is large enough to exercise higher constraints than in the past on the conduct and effectiveness of macroeconomic policies (Fischer, 1998:166). Apart from the fact that capital flows, especially when they are destabilizing, can undermine macroeconomic stability, they are important elements to watch because unlike trade flows, they are subject to herd behaviour, panics, crashes, destabilizing speculation and self justifying outflows and currency speculation [Bhagwati (1998:338)]. Capital flows are porous and can easily evade municipal control. Thus, the case for capital account liberalization should be cautiously approached for it n ot to be counterproductive.

The policy imperative of the theoretical basis of capital and financial markets integration are clear. Without liberalization of financial markets, capital would seek avenues for higher returns through arbitrage flows. With liberalization, capital will flow more rapidly and in the process affect the abilities of nations to operate independent stabilization and macroeconomic policies.

III. Trends in Global Capital Flows

From 1990 to 1995, borrowing on international capital markets rose by one-fourth, to US $41.3 trillion. Net resource flows from the Organization for Economic Co-operation and Development (OECD) to non-member countries amounted to US $252 billion in 1995, twice their 1990 level. The trend towards a dominant role for private flows accelerated significantly in recent years. Their share in the total has risen from one-third in 1990 to two-thirds in 1995 [Fischer (1998:164)].

Net capital flows to the developing countries showed that net private capital increased from an average of $15.1 billion in 1983-88 to $107.6 billion in 1989-95. For 1991 alone, $136.1 billion was recorded and in 1994, the figure dropped to $118.3 billion before rising again in 1996 to $200.7 billion. Net direct investment flows largely exhibited the same trend. Net portfolio investment which recorded an annual average of $3.4 billion in 1983-88, was $34.3 billion in 1992 and reached a high of $90.7 billion in 1996. Net official flows which averaged $29.0 billion in 1983-88 dropped to the average of $21.4 billion in 1989-95. In 1995 alone, $31.0 billion was recorded while an outflow of $3.8 billion accrued in 1996. Whereas net private capital flows and net direct investment accounted for the bulk of capital flows to the developing countries as a group, Africa as a sub-set exhibited a contrasting trend. Net official flows constituted the bulk of capital inflow to Africa with net direct investment as the next major category. The substantial level of net private capital flows to developing countries in 1996 reflected relatively low interest rates in industrial countries; the continued development of capital markets; in particular, bond and equity markets, in many emerging market economies; structural adjustment and market-friendly policies; the significant progress in privatisation; enthronement of small government and transparent governance. The most important aspect of the trend in private capital flows to developing countries is the increasing reliance on foreign direct investment and less resort to bank loans in financing productive economic activities.

There are measurement problems with private capital flows. Some of the critical flows may be difficult to track arising from a number of factors, the most important being that intra-firm transfer of resources and other unintended flows may not be captured precisely. Taking into account that about 50 per cent of trade in goods and services is intra-firm trade and two thirds of international capital flows are managed by private concerns, it becomes evident that the private sector, in particular multinational firms and institutional investors, is the major player in international financial integration and the Globalization process [Fischer, (1998.164)]. The entire environment has been compounded by the activities of speculators, fund launderers, hedge funds and derivative instruments, and private banking. These and other factors have made it increasingly difficult to monitor and clearly determine the quantum of funds involved in the international financial market.

Private capital flows have overtaken official capital flows in terms of overall share of aggregate capital flows to the developing countries. The share of global Foreign Direct Investment (FDI) flows by developing countries is about 40 per cent, compared with 15 per cent in 1996 while their share of global portfolio equity flows is currently 30 per cent, compared with 2 per cent in 1990. Portfolio flows, bonds and equities which were hitherto negligible now account for more than one-third of total private capital flows. Private capital flows to developing countries have been particularly resilient. Developing countries, however, vary in terms of their integration into the global market and the amounts of private capital they have attracted. Only a handful, about a dozen that are integrating with the global system accounted for 80 per cent of net private flows to developing countries during 1990-95 (IMF, 1998). Private capital flows to these group of countries have been rather large when compared to the size of the economies. They constituted as much as 5 per cent of the gross national product (GNP). Most developing countries have just started the process of financial integration with less than 5 per cent of private capital flows. FDI flows have been relatively more stable as they are contingent on developments in long-term economic, political and cultural fundamentals. Portfolio flows have been very volatile as they can easily be influenced by integration and the globalization process (Fischer, 1998.164). The entire environment has been compounded by the activities of speculators, fund launderers, hedge funds and derivative instruments, and private banking. These and other factors have made it increasingly difficult to monitor and clearly determine the quantum of funds involved in the international financial market.

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An examination of capital inflows to 21 developing and transition economies, accounting for 95 per cent of FDI and portfolio flows to developing countries, showed that substantial inflows began in 1988-89 in several East Asian economies that survived the debt crisis of the 1980s. In addition, the inception of the Brady Plan paved the way for many Latin American countries to attract substantial private capital. Annual inflows of private capital averaged 4 – 5 per cent of g ross domestic product (GDP). In some of the countries, net private inflows averaged 8 per cent. The extreme cases recorded net inflow as high as 40 per cent of GDP in 1995. This was true for Hungary, Malaysia and Thailand. Overall, financial integration has been associated with levels of capital inflows that have been both large and persistent for many of these countries, resulting in cumulative net inflows that in several cases are bound to carry enormous challenges for domestic stabilization policy [World Bank (1997:176)]. The trend analysis has clearly revealed the pattern of foreign capital flows to developing countries over two decades. The ascendancy of private capital flows for the developing countries as a group and the relative importance of official flows to Africa, a subgroup of the developing countries, is a reflection of the level of integration of the

latter into the global financial system. The factors accounting for these are not far-fetched. They include the external debt problem of the region, poor macroeconomic and sectoral policies, and poor infrastructure for attracting FDI and other capital flows. This is because private capital would migrate to areas of high returns and relatively low risks. The profit motive encourages risk diversification and divestment in bonds and equities that have lost their market values.

IV. Problems with Tracking Capital Flows and Implications for Macroeconomic Management

International capital flows present a unique problem for the managers of a national economy. Apart from the fact that some components of international capital flows are difficult to track, the movement of capital across national boundaries present additional problem for macroeconomic management. Therefore, whether tracked or not, international capital flows have dire consequences for macroeconomic policy, especially in a volatile environment characterized by policy slippages. The problem is worse in such an environment since portfolio flows and other short-term capital are highly volatile and may not be entirely influenced by developments in economic fundamentals.

IV.1 Problems with Tracking Capital Flows

The problems with tracking international capital flows are many but the most important are examined as follows.

1. Difficulty in Identifying All Sources of Capital Flows
It is very difficult to identify all sources of cross-border capital flows. This is accounted for by natural factors, error of judgement, weak technology, information asymmetry and disguised capital arising from money laundering and capital flight. The rapid liberalization of capital accounts has contributed to the inability to identify all sources of net foreign capital flows.

2. Volatility of International Capital Flows
The volatility of international capital flows has also made it difficult to adequately capture the magnitude involved in the flows. The volatility of international capital, especially portfolio flows and short-term capital, has tended to impair efforts at capturing the exact magnitude involved. Short-term capital is highly volatile and can easily move across national boundaries even when economic fundamentals are strong in the resident economy. The judgement of fund managers may sometime be at variance with market sentiments, although most of the time they react rationally. Portfolio flows in equities and bonds are also very volatile. Small changes in share prices and interest rates can precipitate rapid divestment and outflow of funds from the resident economy to other economies with better market prospects. These developments occur rapidly and as such makes it difficult to determine the net movement in international financial flows.

3. Inability to Discern Transmission Mechanism
It is rather difficult to discern the transmission mechanism of some components of international capital flows. The transmission mechanism of hedge and financial derivatives may appear clear, but definitely difficult to imagine practically. Were it possible to determine or ascertain the transmission mechanism of all categories of capital flows, the problem of identification and proper tracking would have been reduced considerably.

4. The Increasing Complexity of the International Financial System
The international financial system is becoming more complex. This has made it impossible for national and international organizations to monitor and capture adequately the movement of capital across national boundaries. The volatility of some of the financial flows creates its own problem. Capital flows out of a problem economy rapidly. The herd behaviour of short-term capital makes it rather difficult to adequately track the magnitude involved. In some cases, capital movements take place without the physical movement of resources. The funds could remain in their places of domicile while ownership had been transferred. Certain operators in the international financial system have also exploited the sophistication of the system by disguising their transactions. The aim is to keep such transactions away from scrutiny and close monitoring. In this sense, the activities of fraudsters compound the measurement problem of international

capital flows. The unbridled activities of speculators has contributed to the heightening volatility in the international financial markets, thus compounding the measurement problem.

5. Adverse Effects of Advance in Technology and Telecommunication

The advance in technology and international telecommunication has brought in its train numerous problems for the international financial system. International telecommunications facilitate financial transactions to the extent that some offsetting transactions undertaken within seconds could easily be omitted from overall capital flows. Rapid advance in telecommunications has helped in the integration of global financial markets while at the same time compounding the measurement problem associated with international capital flows. This is because a lot of funds can be transferred within seconds through telecommunication systems. The possibility of some swift movements being omitted from the global aggregates is very high. The international telecommunications system has also been invaded by parallel pirate telecommunication systems operated by fraudulent fund managers. In some cases, telecommunication systems are deliberately manipulated for purposes of avoiding the payment of certain charges and evasion of municipal rules where they can be enforced.

IV.2 Implications for Macroeconomic Management

Financial and capital integration has helped in accelerating global economic growth. This has been achieved through the linkages between domestic savings and investment outlay and international capital. The inflow of foreign savings, to augment domestic savings and in some cases compete with it, has helped in improving output in many emerging market economies. Capital markets integration has also ensured the global pooling of risks and created ample opportunities for the shifting of investment mix towards projects with assured risks and higher expected returns. The enhancement of the depth and efficiency of domestic financial markets through the flow of FDI has also improved the productivity of capital and output growth in recipient economies. Overall, financial markets integration has improved the major macroeconomic aggregates of countries that have applied policies that converge with the global trend while those that have failed to apply growth-inducing macroeconomic policies have been marginalized and rewarded with stunted growth and volatility in both the domestic and external sectors.

The favourable impact of Globalization on the world economy is captured by the slow growth in inflation, reduced fiscal imbalances with improved real interest rates and good prospects for investment and structural reforms, especially in transition and heavily debt-distressed economies applying adjustment programmes. Current and capital accounts liberalization across the globe has also helped the rapid integration of the world economy. National macroeconomic policies, including financial policies have to give due consideration to the sustainability of rapid capital flows that tend to narrow the yield on various assets across national boundaries. The narrowing of the yield spread, predicated on high interest rates, easily result in volatility, especially in a fully saturated system where the capital importing country may be saddled with an increased burden of repayment and a rapid outflow on account of default. Fragile and overexposed banking systems with inadequate prudential regulation also accentuate reverse capital flows at periods of crisis and turbulence.

Capital flows exhibit herd behaviour, precipitate and accentuate volatility. The associated contagion effect results in the rapid outflow of capital even when economic fundamentals are sound. The rapid integration of the global capital market has made the reverse flow of capital very destabilizing. Hedge funds and financial derivatives have also compounded the problems of international financial integration. Gains that had been made in growth and financial stability can be easily eroded through sustained capital outflow. A very critical fall out of financial integration are the adverse consequences from the inability of a country to develop the required absorptive capacity to utilize inflow of capital or sterilize the portion that cannot be deployed for economic use. Thus, economic overheating may become manifest with dire consequences for future inflows. A reverse flow of capital may follow such overheating when the situation is not well managed. In addition, the reverse flow of capital may result in both internal and external imbalances. The domestic investment outlay may become over-ambitious and unsustainable. This may be because the inflow of foreign savings had sustained the investment outlay in the past and such funds are no longer coming in. Moral hazard issues also become relevant here as the impression would have been created that the funds would always flow into the economy. Cessation of such inflows usually leads to the problem of sustainability.

The reduction in external sector competitiveness owing to inappropriately determined exchange rates and drop in export performance leads to balance of payments difficulties. This was

the problem most East Asian economies faced when they were afflicted with the twin problems of fiscal and current account deficits. Above all, the monetization of huge inflows of capital results in increases in monetary aggregates and expansion of aggregate demand with implications for monetary management and inflation control. Thus, the degree of policy autonomy declines as financial integration progresses.

Rapid capital flows arising from Globalization can pose difficulties for macroeconomic management. A weak external sector can be financed only temporarily as hidden current account deficits easily show up when capital starts flowing outwards as soon as the investment climate becomes unfavourable. Thus, excessive growth in investment, financed by foreign capital when domestic savings are low, could result in difficulties, especially current account deficits with concomitant problem for macroeconomic stability. With the rapid integration of financial markets, it becomes difficult to control effectively the movement of capital across national boundaries. More importantly, the distinction between destabilising and stabilising short-term capital flows becomes blurred. Sterilisation policies may also prove difficult to implement successfully as a result of the cross-border operations of the multinational financial institutions that have accelerated the process of international transmission of funds with the aid of advanced information technology. The large and abrupt reversals of capital flows could cause sharp dislocations in macroeconomic planning and management. Such sharp reversals may not be based on economic fundamentals but rather on creditor and fund managers' perceptions. Such movements are destabilising and rather injurious, especially when they are not exact indications of economic distress. Reverse capital outflows are also dangerous because they are self-sustaining.

The rapid integration of financial markets may result in macroeconomic volatility as an economy may be faced with peculiar problems. In particular, the banking system may suffer from stiff competition arising from the influx of foreign capital and expertise. This would tend to reduce banks' net worth and expose them to more risks. The surge in private capital flows may increase bank lending and the vulnerability of the banking system to macroeconomic shocks when market sentiments are adverse. The swiftness with which these flows occur leaves limited room for policy makers to manoeuvre.

The integration of financial markets has significantly altered the environment confronting national policy makers in the conduct of monetary and fiscal policies. The liberalisation of controls on capital flows and the development of various categories of derivatives and off-balance sheet instruments have made it difficult to appropriately target monetary policy. The conduct of monetary policy has also been affected as the transmission mechanism is not only determined by the interest rate but also by the exchange rate. In a sense this may be good as the burden of monetary adjustment is no longer borne by the interest rate alone. The integration of markets can lead to the achievement of less than expected results from monetary actions by government if volatile short-term capital inflows persist. This could undermine the achievement of macroeconomic stability.

The rapid spread of shocks and disturbances from one financial market to another is a major problem of Globalization . The herd and contagion effects of financial market crisis have become very difficult to tame and tackle. The rapid inflow of capital to benefit from high domestic interest rates may undermine the pursuit of macroeconomic stability if such flows are not based on improved domestic fundamentals. To sustain the inflow, interest rates may have to be maintained at high levels with attendant inflationary pressures, especially when capital inflow cannot be sterilised. A more serious problem is the sustained increase in the real exchange rate which may be counter-productive, especially for external sector competitiveness when funds start flowing outwards on the realisation by investors that there are no more long-term prospects for productive investment in the domestic economy.

V. Summary, Conclusions and Recommendations

V.1 Summary

The world economies has been characterised by the rapid integration of financial markets in the last two decades. Financial Globalization has proved more difficult to contend with because of its peculiarities. The ease with which cross-border financial transactions take place has further compounded the problem of independent domestic macroeconomic management. Reductions in transport and communication costs, capital account liberalisation, financial market deregulation and privatisation of state enterprises have created a favourable environment for increased capital mobility.

The theoretical basis of the paper is the law of one price and the assumption of the efficient market hypothesis. Markets are efficient when prices fully reflect available information and when the forward exchange rate becomes an unbiased predictor of the future spot rate. The rapid financial integration of the world economies, especially after the end of the cold war and the application of structural adjustment and financial reforms by the emerging market economies, is held to be a confirmation of the relevance of the efficient market hypothesis.

Trends in global capital flows showed that net capital flows to developing countries had been dominated by net private capital since 1989. The trends also showed that net private capital flows and net direct investment accounted for the bulk of capital flows to the developing countries as a group while net official flows constituted the bulk of capital inflow into Africa, a sub-set of the developing countries' group. The paper observed that international capital flows present a unique problem for the managers of a national economy. Apart from the difficulty in tracking some components of international capital flows, the movement of capital across national boundaries present problems for macroeconomic management.

V.2 Conclusions

The paper reached a number of conclusions, some of which are:

Financial integration is the consequence of the dismantling of capital controls and the application of sound adjustment policies. The process has helped to raise global welfare, rewarded countries applying the right policies while those that apply policies that are divergent from the global trend have been penalized.

Without the liberalization of financial markets, capital would seek avenues for higher returns through arbitrage flows. With liberalization, capital will flow more rapidly and in the process affect the abilities of nations to apply independent stabilization and macroeconomic policies. Thus, rapid financial integration has made it difficult for countries to operate independent macroeconomic policies without weighing the countervailing effects of competing policies applied by other countries.

The volatility of financial capital flows has made it rather difficult to implement independent monetary policy successfully. Developments in short-term capital flows often make monetary projections unrealistic, threatening an entire monetary programme. The inability to effectively distinguish between stabilizing and destabilizing short-term capital flows has made the problem more intractable.

V.3 Recommendations

The recommendations for benefiting from financial integration and minimizing its adverse effects include the following.

1. Stable Macroeconomic Policies

Globalization increases the cost of macroeconomic distortions while enhancing the reward for sound policies. As a result, it is important that sound macroeconomic, sectoral and structural policies are applied to improve internal balance, ensure external sector viability and increase the overall rate of economic growth. Stable macroeconomic policies would ensure that the domestic economy is insulated from disruptive short-term capital flows as investment and savings decisions would be based on domestic economic fundamentals rather that market sentiments or fund managers' perception that may be unrelated to developments in the economy. With sound macroeconomic foundation, it will become easier to develop additional mechanisms for internalizing short-term shocks associated with financial integration.

2. Supply Side Measures

Appropriate supply side responses are required to develop the productive sectors of an economy to provide a cushion for the monetization/sterilization of rapid capital inflow and in the process ensure the competitiveness of the economy. Overall, a strengthened domestic economy would provide adequate safeguards for internalizing the effects of adverse short-term capital inflow. In this respect, the manufacturing sector should be strengthened to provide the basis for absorbing large scale injection of capital into the economy.

3. Development of the Capital Market

The domestic capital market should be well developed before opening it up to international competition. Gradual opening up would help to reduce the influx of destabilizing short-term

capital which in some cases may result in economic overheating. Capital market opening should, therefore, be in tandem with the growth of the productive sectors to ensure that inflation is contained and the economy is able to absorb the inflow of capital, whether they are short-term or long-term.

4. Strengthening! of the Banking and Financial System

The banking and financial system should be strengthened through adequate supervisory and prudential regulations to ensure that financial integration does not disrupt the financial sector, precipitate macroeconomic instability and weaken the productive sectors of the economy. Fragile and corrupt banking practices in an environment of weak prudential regulations accounted for and perpetuated the imbalances which eventually triggered the East Asian financial crisis. Prudential rules are also required to ensure sound banking behaviour in addition to reducing the problem of moral hazard associated with fraudulent banking culture. Development of well functioning capital markets is an adequate recipe for reducing risks of instability and attracting foreign investment.

In order to ensure that international capital flows are adequately tracked, the following is recommended.

a. Identification of all Private Sources of Capital Flows and Transmission Mechanism

All sources of private capital inflow should be identified and their transmission mechanism ascertained. In this way, it will become less cumbersome to track rapid flows of private capital. The underlying transactions leading to such flows should also be tracked in order to properly classify accompanying capital flows. Once the transmission mechanism is discernible, the problem of tracking would be reduced.

b. Standardization of Presentation of External Trade and Financial Data

External trade and financial data should be presented in a standardized format. In addition, financial flows should be related to underlying trade transactions where applicable. Standardization would reduce the problem of misrepresentation, especially where international rules are inoperative. Additionally, most of the items now lumped under errors and omissions in balance of payments statements should be properly

linked with either the current or capital accounts in order to reduce the global asymmetry/discrepancies in these accounts. This would further ensure transparency and reduce the problem associated with tracking capital flows.

c. Co-ordinated Approach to Banking and Financial Sector Regulation

A co-ordinated approach should be adopted under the multilateral system to ensure that prudential regulations are observed. In addition, proper disclosure of the affairs of banks and other financial institutions should be enforced to guide the investing public, while loans should be granted only after proper credit assessment. In addition, international regulators should apply common standards for monitoring the performance of national banking and financial systems. Disclosure rules should also be uniform. Information asymmetry should be reduced through the sharing of information by regulators across the globe. With this practice, the issue of moral hazards would not arise while the true state of affairs of the financial system in each country would be easily appraised on a comparative basis. There is no doubt that in the context of rapid financial integration, more would be gained than lost if international co-operation is forged between regulators and information is adequately pooled and shared at all levels. This is because financial markets would become safer and more efficient.

d. Openness, Reduced State Control and Good Governance

Openness and liberalization should be increasingly embraced by governments because this is the surest route to competitiveness.

Isolationist policies have become outdated and incapable of improving growth on a sustainable basis. Openness subjects an economy to the discipline of the market, wastes are reduced while resource allocation is more efficient. Protectionist policies often provoke retaliatory measures which cumulatively reduce global prosperity. Openness would also make it less likely for financial transactions to be disguised.

To ensure efficient allocation of resources and improved economic growth, the role of the state should be reduced while the private sector is increasingly relied upon for the production of economic goods. In this direction, state owned enterprises should be privatized. Financial conglomerates should however, be kept under surveillance through international co-operation to ensure that they do not make the international market place fraud-prone, through inadequate disclosures. This reorientation, especially for developing economies, would ensure that capital is

not corruptly exported abroad through disguised means. Additionally, good governance based on the rule of law should define public policy. This would reduce the incentives for corruption and create an enabling environment for the efficient allocation of resources through the interplay of market forces. In such an environment, international capital flows would be adequately tracked. The incidence of capital flight and subsequent repatriation would be avoided, thus reducing the inflow of destabilizing short-term capital.

e. A Co-ordinated Approach Through the Multilateral System

The recurring global financial crisis has led to discussions on the need for the strengthening of the international financial system to cope with the new challenges posed by financial markets contagion. There are even recommendations for the creation of a new architecture for the international monetary and financial system. The intention is to ensure that the international system is able to deal with financial markets instability and volatility. What is required is the strengthening of the existing multilateral institutions and the enforcement of international criteria for financial system surveillance and regulation. Once international flows are brought under surveillance through the multilateral system, it will become easy to track them while their adverse effects would be prevented from creating systemic and contagion problems. Above all, it is important that adequate capacity be built to properly track international capital flows. In this direction, adequate support should be given to the developing and emerging market economies by the industrialised economies and the re-energised multilateral system.

References

Bekaert, Geert (1995) "Market Integration and Investment Barriers in Emerging Equity Markets" The World Bank Economic Review, Volume 9, No. 1. pp 75-107.

Davis, D. R and D. E. Weinstein (1998) "Economic Geography and Regional Production Structure: An Empirical Investigation" Federal Reserve Bank of New York, Staff Reports, No. 40, May.

Fisher, Bernhard (1998) "Globalisation and the Competitiveness of Regional Blocs" Intereconomics, Review of International Trade and Development, Hamburg Institute of Economic Research (HWWA) Volume 33, July/August, pp. 164-170.

Guitian, Manuel (1998) "The Challenges of Managing Global Capital Flows" Finance and Development, June, pp. 14-17.

Huw Pill and M. Pradham (1997) "Financial Liberalisation in Africa and Asia" Finance and Development, June, pp. 7-10.

International Monetary Fund (1996) "Global Financial Markets: Moving up the Learning Curve", International Capital Markets, September.

International Monetary Fund (1997) "Globalisation, Opportunities and Challenges" World Economic Outlook, May.

International Monetary Fund (1998) "Proceedings of the Annual Meetings of the IMF and the World Bank" IMF Survey, Vol. 27, No. 2, November, 337-352.

International Monetary Fund (1998) "Globalisation of Finance and Financial Risks", International Capital Markets, IMF, Sept.,

Koedijk, K. G. and Mack Ott (1987) "Risk Aversion, Efficient Markets and the Forward Exchange Rate" Review, Federal Reserve Bank of St. Louis, Vol. 69, No. 10, December.

Kwanashie, Mike (1998) "The Concept and Process of Globalisation" CBN Economic and Financial Review, Vol. 36, No. 4, December. 30

Matthew, Higgins (1997) "Demography, National Savings and International Capital Flows", Federal Reserve Bank of New York, Staff Report, No. 34, December.

Obaseki, P. J. (1999) "Policies and Strategies for Dealing with the Problems of Globalisation" in Proceedings of the One-Day Seminar of the Nigerian Economic society on Globalisation and Economic Development in Nigeria.

Ojo, M. O. and P. J. Obaseki (1998) "Challenges of Globalisation for Macroeconomic Policy and Management in Nigeria" CBN Economic and Financial Review, Vol. 36, No. 4, December.

Ott Mack and T.M.W. Veugelers (1986) "Forward Exchange Rates in Efficient Markets: The Effects of News and Changes in Monetary Policy Regimes" Review, Federal Reserve Bank of St. Louis, Vol. 68, No. 6, June/July, pp. 1-15.

Taylor, M. P. and L. Sarno (1997) "Capital Flows to Developing Countries: Long and Short-Term Determinants", The World Bank Economic Review, Vol. 11, No. 3, pp. 451-470.

The World Bank (1997) " Private Capital Flows to Developing Countries ,

The Road to Financial Integration", A World Bank Policy Research Report, Oxford University Press.

UNCTAD (1997) "International Monetary and Financial Issues for the 1990s" Research Papers for the Group of Twenty Four, Vol. VII I, New York and Geneva.

APPENDIX

A Survey of Cross-border Portfolio Investment in Nigeria

It has not been easy to isolate the quantum of cross-border capital transactions between Nigerian residents and the rest of the world, especially on the assets side. Recent attempt by the Central Bank of Nigeria in the first quarter of 1999 to measure the stock of cross-border portfolio investment assets of Nigerian residents in a survey of portfolio investment in foreign equities and long-term debt securities, gave an indication of the nature of transactions but in terms of numbers, the outcome was low. The survey was designed in line with the provisions of the 'Survey Guide' prepared by the International Monetary Fund's Task Force on Co-ordinated Portfolio Investment Survey. Essentially, the survey sought to capture information on investment by Nigerian residents in equity and long-term debt securities issued by unrelated non-residents. Data from the survey was expected to assist in the improvement of Nigeria's Balance of Payments statistics as well as facilitate the compilation of the country's International Investment Position (IIP). The collection method adopted was the mixed custodian/end-investor survey on an aggregate basis. The decision to adopt this approach was based on the outcome of preliminary consultations with a cross-section of stakeholder institutions, such as banks, insurance companies and stockbrokers.

The Survey results revealed that most institutional investors do not have own-portfolios or act as custodians to investors in foreign securities issued by unrelated non-residents. Only 2 banks and an insurance company held equity securities of International Organizations worth US$ 1.0 million and US$ 1.1 million, as at end-December, 1997 and 1998, ii respectively. The major reason attributed for this development, was the non-eligibility of such transactions for foreign exchange allocation. Also, until 1995, when the Exchange Control Act of 1962 and the Nigerian Enterprises Promotion Decree of 1989 were abrogated, ours was largely a closed market and we did not have cross-border listing, which would have enabled a foreign company listed on its home Exchange to be concurrently listed on the Nigerian Stock Exchange (NSE). Such a situation would have promoted transactions in foreign securities. Nevertheless, it is generally believed that the above results understate the stock of foreign securities held by Nigerian residents – a phenomenon which could only be unravelled through exchange of bilateral data or by looking at the portfolio investment liabilities of other compilers with geographic details.

However, in the course of our survey we identified the Nigerian International Debt Fund (NIDF) established to pool together, capital of sophisticated investors in order to invest in Nigerian Government Dollar-denominated debt instruments, including but not limited to Par Bonds and Central Bank of Nigeria Promissory Notes. The Fund is intended to allow Nigerian investors access to the returns currently enjoyed by many international investors who hold and trade in these instruments. The Fund has a fixed life of 24 years and Investment Notes (which are i n registered units of US$ 100 each) are transferable but irredeemable for the life of the Fund. So far, the Fund has invested only in Nigerian Par Bonds and the Net Assets Value of the Fund stood at₦ 859.6 million or US$ 11.3 million and ₦ 964.9 million or US$ 10.7 million at the end of December, 1997 and 1998, respectively.

Again, available data indicate that the value of foreign portfolio investment transactions on the Nigerian Stock Exchange which stood at US$ 28.1 million in 1996 plummeted to $ 9.4 million in 1997 before reaching an all time high of US$ 50.5 million in 1998, thus, reflecting the effect of the guided deregulation policy adopted by Government in 1995. These portfolio investment liabilities, otherwise known as inward investment, were mainly owned by non-residents in Europe, the United States of America and Hong Kong.

It is believed that with the abolition of the dual exchange rate regime and further liberalization of the Nigerian economy, more cross-border transactions in portfolio investment will take place between Nigerian residents and the rest of the world. Also, the cross-border listing of the NSE when realized, would greatly facilitate these transactions and their measurement.

Abstract

The paper examined the implications of financial markets Globalization for domestic macroeconomic management. It identified problems with tracking capital flows and made recommendations for ameliorating the problems with financial integration. The paper observed that the integration of the world economies and financial markets is a process that has come to stay, as it is being increasingly embraced by all players in the global economy. Countries that apply sound macroeconomic and sectoral policies have benefited while those that prefer isolationist policies have been marginalized. Financial markets Globalization is the outcome of the reduction in transport and communication costs, capital account opening, financial market deregulation, privatization of state-owned enterprises and the implementation of structural adjustment policies by the emerging market economies. The arguments favouring Globalization include its potentials for raising global welfare through increased efficiency arising from the inflow of foreign capital and competition. The adverse effects on the other hand, include the rapid and destabilizing outflow of capital from an economy once market sentiments turn adverse, indicating that the economy is losing credit-worthiness. The trend in capital flows globally showed that flows to the developing countries have been dominated by private capital flows since 1989. Private capital flows have also overtaken official capital flows in aggregate capital flows to developing countries . Given the increasing importance of private capital flows in the context of the rapid Globalization of the world financial markets, private sources of capital need to be identified and their transmission mechanism understood to be able to prescribe useful recommendations to track them. This is because, the inability to properly track private capital flows compounds the problem of macroeconomic management. The main conclusion of the paper are that the volatility of financial capital flows has made it difficult to implement independent monetary policy successfully. Furthermore, the inability to effectively distinguish between stabilizing and destabilizing short-term capital flows has made monetary targeting more difficult. The paper made a number of recommendations and concluded that as a prelude to a co-ordinated approach, appropriate methods should be established to define and present external trade and financial data to make comparative analysis easier and reduce the possibilities of misinterpretation. It was also recommended that items under errors and omissions in balance of payments statements should be identified and properly classified while national financial regulators should collaborate to reduce the problem of information asymmetry and the incidence of systemic problems in the financial system. Above all, the international monetary and financial system should be strengthened to deal with financial markets instability through the enforcement of international criteria for financial system surveillance and regulation.

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Implementation of the new international guidelines for the measurement of financial derivatives in the balance of payments and the international investment position

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1. Introduction

The field of financial statistics is changing rapidly. There is hardly a better example for this than the proliferation of the use of financial derivatives and the development of guidelines for the measurement of transactions in them. The measurement of financial derivatives was first addressed in the 1993 edition of *System of National Accounts* (SNA 1993) and the fifth edition of the *Balance of Payments Manual* (BPM5). The guidelines in these texts were however not comprehensive. The guidance in both was primarily directed at the treatment of options and futures. As the knowledge on financial derivatives with compilers grew and clarification on instruments other than options and futures was needed, the IMF continued its exploration of the issue. This led to the publication in November of 1997, of the IMF paper *The Statistical Measurement of Financial Derivatives* (SMFD).

In the summer of 1998, after extensive discussions on the proposed guidelines in the SMFD paper, the IMF began to rewrite the relevant parts of BPM5. In the meantime, many countries, including the Netherlands, attempted to implement the new guidelines for the balance of payments and the international investment position and discovered a number of practical difficulties, two of which will be discussed here. The IMF has taken these considerations into account and has noted them in the first draft of the new sections of the BPM (August 1998). As a consequence, the draft guidelines now talks of 'preferred treatment'.

2. The exercise of option contracts

One of the conceptually most pleasing but also one of the most difficult parts of the new guidelines concerns the recording of options. The new BPM5 chapter on financial derivatives prescribes that (§19) when the underlying instrument is delivered, the transaction should be recorded under portfolio investment at the market price while the difference between the strike price and the market price should be recorded under financial derivatives. This guideline is completely consistent with the basic principle underlying many valuation issues in BPM5 that transactions need to be valued at market price, where such a price exists. The following example, which illustrates the above mentioned transaction, is taken from the SMFD paper (p. 20).

A warrant (long term option, usually issued by a credit institution/bank) giving the holder the right to purchase 100 foreign shares at a price of 50, is exercised. At the time, the actual market price of the share is 75. In most cases, the holder of the option has the choice to have the underlying instrument delivered against the strike price or to receive the 'profit' in cash. The transaction has to be recorded as presented in table 1 if the holder chooses the first option. When the holder chooses the second option (payment is cash) only a transaction in financial derivatives has to be recorded. Information on the settlement in cash of financial derivative contracts is usually available. However, the delivery of the instrument against the strike price is usually recorded as a normal security settlement. Information is then no longer available on the original option contract, making the recording of the 'profit' on the instrument under derivatives impossible. We have found that in the case of the Netherlands, where the balance of payments is based on data from a closed settlement system, it is virtually impossible to incorporate the necessary information into the reporting system as it exists.

Table 1.

	Credit	Debit
Financial derivatives: – Assets	2,500	
Equity – Assets		7,500
Currency and deposits – Assets	5,000	

In the past few years, the solutions to many problems have been explored through the use of reporting security-by-security. With the current volume of transactions, automated processing of information from reporting institutions would be a prerequisite. This in turn leads one to think about reporting by ISIN or comparable security identification codes. Such a system could also provide a solution for the problem at hand. Imagine a system in which transactions in securities are reported as follows: ISIN code, number of securities, transaction date and currency and amount settled. Together with information on the market price of the security on the transaction date (for instance stored in a database along with other information by ISIN code), this would allow the balance of payments compiler to follow the new guideline. The reporting burden would not have to be increased dramatically, although the information requirements for processing would be substantial.

3. The recording of interest rate swaps

The second problem concerns the recording of interest payments under swap contracts. The new guidelines state that, as for all other items of the financial account, a distinction has to be made between transactions in assets and in liabilities. For most instruments this can be derived from the type of transaction and/or the settlement (a payment is a reduction in liabilities, a receipt a reduction in assets). For swaps, in which interest is exchanged repeatedly for a specified length of time, the relationship between settlement and the asset/liability distinction breaks down (see also §19).

Discussions with reporting institutions convinced us that the distinction between transactions in assets and liabilities is possible in principle but would require enormous amounts of computing time. At each exchange of interest, the net asset/liability position of the swap contract would have to be determined by calculating the net present value of each leg. Unfortunately, there are no obvious solutions to this problem. Swap contracts, as over-the-counter instruments, are by definition not standardized. No additional information available to the compiler will therefore help in determining the nature of the transaction. A simple comparison of different scenario's regarding present and future interest rates for a two year fixed for floating interest rate swap shows that the possibility for error, when adopting the simplification on the basis of payment/receipt, is substantial. However, no other solution has been found up to now.

4. Conclusion

The establishment of the new guidelines for the recording of transactions in financial derivatives marks a very significant change in economic statistics. However, the experience of a number of countries has shown that the collection of data for their implementation is not always feasible. Some of the problems involved are solvable in principle, others await further study.

References

CEC, IMF, OECD, UN, World Bank (1993). System of National Accounts 1993, Brussels/ Luxembourg, New York, Paris, Washington, D.C.

IMF (1993). Balance of Payments Manual, fifth edition, Washington D.C.

IMF (November 1997) The Statistical Measurement of Financial Derivatives, Washington D.C.

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CONTRIBUTED PAPERS

The Role of the Central Bank of Barbados in the Field of Statistics on the Barbados Economy

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1. Introduction

It can not be gain said that sta tis tics pro vides the tools of de ci sion mak ing in every field of so ci ety, be it ag ri cul ture, medi cine, natu ral or so cial sci ence. For in stance, to achieve the ul ti mate goal of im prov ing the gen eral wel fare of so ci ety, econo mists and other so cial sci en tists strive to un der-stand how re sources are al lo cated and dis trib uted in a way that en sures a meas ure of eq uity. This re quires knowl edge and un der stand ing of a wide range of in for ma tion upon which most de ci s ions of how re sources are al lo cated and dis trib uted are made.

Like most cen tral banks, the Cen tral Bank of Bar ba dos has a regu la tory func tion in re spect of the fi nan cial sys tem and a leg is la tive man date to un der take con tinu ous eco nomic re search. To this end, the Cen tral Bank of Bar ba dos has as sem bled and main tains, on a cur rent ba sis, eco nomic data with a pri mary fo cus on, fi nan cial, fis cal, for eign trade and real sec tor vari ables. The B arbados Sta tis ti cal Serv ice has the le gal author ity to col lect sta tis tics in Bar ba dos but be cause of in ade-quate hu man and fi nan cial re sources it has been un able to pro vide cer tain types of data and has even stopped dis semi nat ing some types of socio- economic data. The Bank there fore finds it self fill ing the breach by get ting in volved in the dis semi na tion of not only bank ing and fi nan c ial data but also non- financial and other socio- economic in for ma tion.

The Bank is also a ma jor user of sta tis tics to the ex tent that it con ducts re search on all fac ets of the econ omy. In that re gard, the Bank is con stantly look ing for ave nues to im prove data availabil-ity, cov er age and qual ity. This ar ti cle out lines the Bank's role in col lect ing, proc ess i ng and dis-semi nat ing socio- economic in for ma tion in Bar ba dos. The pa per also touches on the main chal-lenges the Bank faces and the pro ce dures to deal with these chal lenges.

2. Data Collection and Processing

The Cen tral Bank of Bar ba dos col lects and pro cesses in for ma tion from both pri mary and sec on-dary sources. Most of the in for ma tion on the op era tions of fi nan cial in sti tu tions is obtained as pri-mary data from these in sti tu tions. These are col lected through a set of sched ules which de tail the na ture of the ag gre gates, how they are to be cate go rized and the pe rio dic ity re quired. The Bank pub lishes the con soli dated in for ma tion. Natu rally the ac cu racy of the con soli dated re p orts de-pends on the ac cu racy of the re ports of in di vid ual banks. The in teg rity and con sis tency of the data so col lected is veri fied by check ing the weekly re ports against the monthly re ports which banks are also re quired to file with the Cen tral Bank. Pos si ble er rors are usu ally re solved through tele-phone con tacts with the banks con cerned but when er rors per sist, they are dealt with through oc ca-sional meet ings with the staff of in sti tu tions who have re spon si bil ity for fill ing out these forms.

Sec on dary data, as al ready proc essed data are usu ally col lected monthly and quar terly from key Gov ern ment de part ments such as the Min is try of Fi nance and the Ac count ant Gen er al's Of-fice. How ever, the bulk of sec on dary data reach us from the Bar ba dos Sta tis ti cal Serv ices (BSS).

The Bank's role in these types of data is generally that of a disseminator since much of the data is already processed. For instance the Central Bank now has responsibility for publishing regularly information on trade, tourism, prices and employment which were originally published by the BSS. This type of data also requires some processing since much of the information is recorded manually and then tabulated in the preferred formats before publication.

The processing of data has gone through a number of phases. Initially the source data were tabulated with calculators before typing. The typed data were stored on typewriters with electronic memory (e.g. IBM Mag Card) and then updated monthly before publication. With the acquisition of a Central Processing Terminal (CPT) in the early 1980s, which allowed data to be stored on large floppy disks, the production of the Bank's statistical publications was facilitated a great deal as the tedium of manually manipulating data was reduced [see Wood and Saunders (1997)].

The introduction of personal computers in the Bank in the late 1980s allowed a gradual shift from the manual processing of data to a fully automated process. Initially the data was processed on *Lotus 1-2-3 spreadsheets* whose printouts were used to update the required tables before publication. Since there were no direct links between the spreadsheets and the word-processing files used to produce the tables, the information from the spreadsheets was re-typed each period.

The acquisition of the Advanced Retrieval Econometric and Modelling System (AREMOS) software in the late 1980s allowed for a full system-wide database to be created. This database stores all the financial data collected by the Bank's Statistical Unit and it enables the tables in the Bank's publications to be updated, processed and printed without any re-keying. Data can be manipulated to generate aggregated monthly, quarterly and annual data as well as be grouped according to economic sectors, or in any format necessary for economic analysis. It is ultimately intended to have all economic and statistical data supplied to, as well as those created by the Bank, to be stored in the database from which users can tap directly for whatever analysis is required.

One main goal is to develop systems that would enable the database to be made available to all users in the Bank while ensuring data integrity and security. It is also planned to reduce data re-keying to the minimum by setting up a system of electronic data interface (EDI) that makes it possible to have data transferred electronically from external and internal suppliers into a data sub-directory. Already some commercial banks and Government departments supply data to the statistical section on diskettes.

3. Information Dissemination

The Bank disseminates its statistical information mainly through three publications. They are the monthly Economic and Financial Statistics (EFS), the Annual Statistical Digest (ASD) and the annual Balance of Payments (BOP) publication. The quarterly Economic Review (ER) and the Bank's Annual Report (AR) are not purely statistical publications but are also good sources of information, carrying data that usually support the analytical orientation of these publications.

The EFS at present carries a total of sixty-five (65) tables of which forty-one (41) (63.1%) are tables on the financial sector, including four tables on assets and liabilities position of the monetary authorities, 10 (15%) on foreign trade, 9 (13.8%) on public finance and 5 (7.7%) on general statistics of the real sector. The ASD carries all the information in the EFS but provides data of longer periodicity (quarterly and annually) and longer time series of past data. It also carries basic macroeconomic data on other Caribbean Community (CARICOM) countries. Like the EFS, the ASD is dominated by information on the financial sector, although not as overwhelming as in the EFS. There are 64 (48.4%) tables in the financial sector, 19 (14.4%) each on government operations and general statistics on the real sector and 15 (11.4%) each on foreign trade and data on CARICOM countries.

As expected, the Balance of Payments publication contains detailed information on Barbados transactions with the rest of the world. This is based on primary data collected through annual surveys, managed entirely by the Central Bank. Since 1995, Barbados' balance of payments accounts have been cast according to the underlying principles of the fifth edition of IMF Balance of Payments Manual which provides for a greater degree of harmonization and integration between the balance of payments and the revised System of National Accounts (SNA).

The dissemination of information to the public through formal publications is supplemented with other instruments such as the press releases that accompany the Governor's quarterly press conference on the performance of the Barbados economy. The contents of the press releases are based on information from the Bank's *Economic Outlook*, an internal document which reports data on the short to medium term forecasts derived from the Bank's Quarterly Forecasting model.

In keeping with new trends in information technology, the Bank has set up a web site which carries general information on the Bank's operations, along with recent updates on the Barbados economy. A voice menu system also gives the general public access to recorded information via the telephone.

The Bank's library plays a major role in the information dissemination scheme by stocking all of the Bank's publications, along with a good collection of regional and international statistics. From the past five years or so statistical publications from international organizations such as the IMF and the World Bank have been available on CD-ROMS. With Internet access in the Bank presently limited to Heads of Departments, the Library serves as the main outlet for receiving and sending data electronically for the rest of the Bank's staff. The Library also manages the Bank's web site and is in the process of adding the management of the entire Bank's records to its functions.

4. Challenges

In the process of producing and disseminating economic information, the Central Bank of Barbados faces a number of challenges. Some of the key ones involve the problems of data quality and timeliness and the process of finding ways to improve overall data coverage.

4.1. Data Quality and Timeliness

Monetary accounts are derived from fairly reliable sources but their quality may be affected by incorrect classification of accounts. The schedules on which commercial banks report information are detailed enough to help detect incidences of misclassification, and by reconciling weekly with monthly data, the consistency of the monetary aggregates can be verified. Even so cases of misclassification come up every now and then and dealing with them occupy a great deal of staff time which tend to cause delays that ultimately affect the timeliness of the Bank's information dissemination process.

For instance the Central Bank of Barbados aims to publish consolidated information on commercial banks with a maximum lag of two months. However, the Bank is sometimes forced to delay the publication of these accounts beyond two months where inaccuracies arising from misclassifications cannot be resolved quickly. Also, information from non-bank financial intermediaries usually appear with three to four months lags because of general tardiness of some of these institutions.

Data obtained from secondary sources are usually reported as submitted, although some undergo some processing before publication. They are revised only after revisions are made by the sources concerned.

4.2. Data Availability

The scope of information collected and disseminated in the Central Bank of a developing country tends to be more extensive than one may find in the corresponding bank from a developed country. For instance, national income estimates are usually the preserve of national statistical agencies such as Statistics Canada for Canada and the Office of National Statistics for the United Kingdom. Such specialized agencies ensure that reliable indicators are available for key economic and social variables.

In Barbados, the Statistical Services Department does not produce estimates of Gross Domestic Product (GDP) at constant prices. That task has fallen on the Central Bank but it is not structured to undertake properly designed surveys to produce all the requisite output and input indicators for the GDP estimates. The Bank faces a number of formidable challenges, constantly searching for reliable indicators, especially for the services sector and also looking for ways to appropriately account for structural changes in the economy.

There are areas like agriculture and manufacturing, where volume indicators can easily serve as output indicators. In other areas like construction, wholesale and retail as well as business and other services, there are no volume indicators and consequently changes in input indicators are utilized to estimate real output. The challenge is to find output indicators that are not only highly correlated with the output under consideration but which bear a stable relationship with that output.

At present, real GDP estimates for Barbados have the year 1974 as the base. Following international convention, it is the usual practice to rebase most time series every five to ten years in order to adequately capture the effects of structural and technological changes in an economy over time. Moreover, frequent rebasing ensures that the base year prices do remain relevant for the purpose of valuing current flows of goods and services. The Central Bank is unable to rebase real GDP from

the 1974 base because of the unavailability of reliable estimates of any of the post-1974 years that one could consider a year of relative economic stability.

The Bank is therefore collaborating with the BSS to expedite the necessary surveys that would allow 1994 to be used as the base year and to put mechanisms in place to have the base year changed every 5 to 10 years, as is the usual practice. The Bank is also collaborating with a private sector agency to initiate a quarterly survey of business intentions. The results should facilitate the production of a series of leading economic indicators which should help to improve GDP estimates and enhance the forecasting capabilities of the Bank.

5. Conclusion

The debate concerning the best possible division of efforts in information production and dissemination between Central Bank and other public agencies of national statistics is likely to continue for a while yet. As long as key information for monitoring the economic health of their countries are not available in the quality and periodicity required, central banks in developing countries would necessarily be involved in producing a great deal more information than would otherwise be deemed necessary. This paper has outlined the main procedures through which the Central Bank of Barbados collects, processes and disseminates statistics on the Barbados economy. The challenge is to further develop systems and procedures that will enable the Bank to improve upon the standards of data coverage quality and timeliness.

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References

Saunders, Muriel and Wood, Celeste, Central Bank's Data Sources and Resources: The Challenges, Codrington et al , *Central Banking in Barbados: Reflections and Challenges*, 1997, pp. 205 – 212

Forde, Penelope**,** Challenges and Problems in Forecasting Caribbean Economies: Some Data Issues, in *Problems and Challenges in Modelling and Forecasting in Caribbean Economies*, Edited by Nicholls, Leon and Watson, Caribbean Centre for Monetary Studies, 1996, pp. 99-121

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The Central Bank's function in the field of Statistics: the experience of the Czech Republic during the transition period

Petr Vojtisek – Czech National Bank

1. Introduction

The Czech National Bank, the Ministry of Finance and the Czech Statistical Office are the main institutions conducting statistical activities in the Czech Republic. The central bank is fully responsible for banking statistics and plays the major role in compiling the balance of payments. The statistical office provides trade balance data, but the central bank is responsible for other current account items, the entire capital and financial accounts, and for drawing up the balance of payments as a whole. The central bank also carries out some additional original statistical activities in the field of economic development. Close co-operation between the statistical office and the central bank is crucial in order for data to be collected efficiently with low costs for the units providing them.

2. Data collection

a) What data

The primary responsibility of the central bank is to collect banking data for monetary statistics and banking supervision and data for the balance of payments. The monetary statistics differ in nature in some respects from the balance of payments statistics.

The monetary statistics are based on the following principles:

- the reporting system is based on accounting data
- all banks are obliged to report data
- data are collected from the headquarters of banks

The balance of payments statistics come from the following sources:

- foreign trade data from the statistical office (based on customs declarations)
- bank reporting of payments and receipts by transaction code
- direct reporting from the business sector (foreign direct investment) and the capital market (portfolio investment),
- reporting obligations under the Foreign Exchange Act (selected items e.g. credits to/from non-residents),
- ad hoc statistical surveys (e.g. cross-border movement),
- data from central institutions (e.g. foreign aid, employment of non-residents).

The role and responsibilities of the central bank are quite clear in the case of monetary statistics and in the case of compilation of the balance of payments as a whole. In both of the central bank's main statistical activities – banking statistics and balance of payments statistics – a raft of changes and improvements have been made to their volume and structure to bring them closer to international standards. Almost all areas of the banking statistics have been broadened, the new financial instruments which have appeared in our country have been included in the reporting system, a register of firms has been established for balance of payments purposes, etc.

Nevertheless, further steps need to be taken. In the banking statistics, for instance, the following measures are necessary: an updating of the sectoral breakdown, the inclusion of financial derivatives in the balance sheet in market prices, a regional breakdown, etc. One specific issue is the inclusion of relevant institutions in the monetary statistics. The terms "monetary statistics" and

"banking statistics" still have the same meaning, as the monetary statistics include only banks. Although the definition of "bank" in the Czech Republic is quite broad, it does not encompass certain institutions in the sense of monetary financial institutions as defined by the EU. This concerns cooperative banks and investment funds. In the balance of payments area, the following improvements are needed: a country breakdown of the current account, a more detailed breakdown of services, coverage of reinvested profits and direct credit from owners to foreign direct investment.

Possible areas for discussion are the activities of the central bank in monitoring economic development and the division of responsibility for items of the balance of payments. In both areas, mutual co-operation and agreement between the statistical office and the central bank is necessary. The central bank is responsible for the balance of payments and is the only institution collecting and publishing these data (excluding foreign trade data). Since registers are crucial for collecting data, especially from non-banking institutions, the authorities mentioned above have agreed to exchange their registers.

In the area of monitoring economic developments, the central bank conducts its own surveys, one for measuring the current and prospective situation in the economy as a leading indicator, and the second for measuring inflation expectations. The latter was introduced when inflation targeting was accepted as the monetary policy scheme. Both surveys are conducted through the branches of the central bank and serve primarily internally for the monetary policy decision-making process.

b) Legislative background

The statistical activities of the central bank are based on legal power incorporated into several legislative acts. The banking statistics have full legal backing, as the reporting obligation of banks to the central bank is incorporated into the Banking Act and the central bank is allowed to require such data. As regards collection of data from monetary financial institutions other than banks, which is a requirement of EMU, the central bank has sufficient backing in the CNB Act. The central bank is also allowed to collect data from non-bank institutions for balance of payments purposes under the existing Foreign Exchange Act. Without the Foreign Exchange Act, however, the legal grounding incorporated into the CNB Act would be inadequate and would not provide the same level of backing as for the banking statistics; some additional legal support would be necessary. Other statistical activities are all based on the voluntary principle.

c) Data collection

Statistics has always been one of the central bank's activities, but during the nineties this area has undergone enormous development, especially as regards automation. The system for data collection and processing at the central bank has been heavily influenced by the development of information technology. Until the early nineties, data were collected in paper form and stored as statements received. In 1992, data from the banks were transferred electronically for the first time. The original system used at that time has since been replaced. The present one consists of four subsystems: the "Metainformation System", the "Electronic Data Interchange", the "Information Service" and the "Statistics-Accounting Database".

The Metainformation System defines the data and their interrelationships as well as the fundamental data required on reporting entities and the subject, dates, periodicity and method of reporting. It contains basic information on what data are available, and when, where and in what structures they are stored, as well as on their current pre-processing status. This system also supports the preparation process for individual reporting methodologies, generates these methodologies for reporting entities, prepares transport structures for the reports, and in future will create basic output structures from the database.

Electronic interchange of data is effected within the structures of UN/EDIFACT standards. This means of communication makes it easier for reporting banks to create applications. The reports are secured by encryption against misuse and confirmed by digital signature for sender identification and prevention of modification of the report during transmission; they are also secured against the possibility of acceptance of the report being denied.

The Information Service at the central bank controls automated acceptance of reports, the procedure for their processing and banks' fulfilment of their reporting obligation. Within these fields of activity, it also effects, among other things, the formal and logical checking of reported data and the checking of appropriate storage of these data in the database, and is responsible for dispatching obligatory reports and reminders to reporting entities. In the opposite direction, i.e. towards the

central bank, this service provides information about the processing status of data received and the reporting fulfilment status of each bank.

The data received from banks are now stored in the Statistics- Accounting Data base. Data collected in the past are stored in different data bases because of spontaneous development in the early nineties. Even the most comprehensive and highly developed Statistics- Accounting Data base is only a primary data base for storing data and is not fully suited to analytical work. An additional data base has therefore been created in which both the original data and data from the statistical office (e.g. prices) are stored in a structure enabling the required data to be selected for analytical work or in time series form. The data bases of international institutions are stored in a common server accessible to the whole bank.

This data collection method is valid only for banks. The central bank is allowed to prescribe for banks software which is compatible with the central bank's software in order to enable automated data exchange. This system facilitates smooth current data collection. Costs appear only when there is a change in methodology.

In collecting data from non- bank institutions, a different approach is used, since the central bank cannot impose any requirements regarding software. In this case, paper form or e-mail is used in combination with an internal programme for performing calculations.

3. Data presentation

The role of the central bank in data presentation has been gaining significance in recent years, for three reasons:

- analytical departments in the central bank require more detailed and convenient data
- the central bank follows a transparent approach, especially now inflation targeting has been accepted as the monetary policy scheme
- the Czech Republic has to meet its obligations towards international institutions

There are several types of publications issued by the central bank that include statistical annexes or that are purely statistical:

a) *Inflation Report*
From the start of 1998, the former quarterly reports on monetary and economic development were replaced with quarterly inflation reports. The statistical annexes were modified to focus on the inflation target and explain monetary policy. Nevertheless, since inflation targeting is a multi- criteria approach, the Inflation Report contains a wide set of information.

b) *Annual Report*
The Annual Report analyses monetary and economic developments and is not so centred on the central bank's inflation target. The statistical annexes follow the text part of the report. The report also contains selected aggregated data on the banking sector.

b) *Balance of Payments*
This semi- annual report produced completely within the Statistical Department describes developments in the external sector.

d) *Banking supervision*
This annual publication contains a detailed report on banking sector developments followed by aggregated statistical data on the banking sector

e) *Monthly Bulletin*
A four- page bulletin commenting on the latest current monetary and economic developments, with figures presented on the first page.

f) *Statistical publications*
These publications are the full responsibility of the statistical department and present monetary data (monetary and credit aggregates, their breakdown, interest rates, exchange rates, etc.), balance of payments data (the balance of payments itself, in debtedness, international reserves, etc.), stock market data, surveys of incomes and expenditures of households.

All publications are distributed in printed form and most are put on the central bank web site at http://www.cnb.cz/. Statistical data appear on the web site in three places: as part of the publications in the "Archives" section, as part of the banking sector publications in the "Banking Sector" section, and separately in the "Monetary Indicators" section at http://www.cnb.cz/en/menuk.htm. Here, for example, the monetary survey, monetary base, balance of payments, international investment position, international indebtedness, central bank key rates and exchange rates are presented. The structure of the CNB web site is set to undergo changes in connection with the IMF requirements concerning the SDDS.

4. Organisational structure

The developments in the field of statistics have been reflected in the organizational structure of the central bank. At the beginning of the transition period, the central bank's statistical activities were spread across several departments. The natural solution was to concentrate them. This was done in several steps and the whole process was completed last year. The last and biggest change was to move the Balance of Payments Division from the Monetary Department to the Statistics Department. Methodology, data collection, storage and presentation are now concentrated in the Statistics Department. This department is also responsible for reporting to international institutions. The CNB sends data to IMF, OECD, BIS and EUROSTAT. The Czech Republic joined the SDDS on 1 January 1999.

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Enhancement of Statistics provided by the Research and Statistics Department of the Bank of Japan

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The Bank of Japan collects and compiles various statistics for the purpose of researching financial and economic conditions. Among these statistics, the Research and Statistics Department (hereafter, the RSD) compiles and releases monetary statistics (Money Stock, Flow of Funds Accounts, etc.), price statistics (Wholesale Price Indexes, Corporate Service Price Indexes, etc.), and corporate statistics (Short-term Economic Survey of Enterprises in Japan "Tankan"). Based on the understandings that "statistics are public goods," we are making every effort to provide "reliable statistics" as the statistics compilation section of the central bank.

The statistics compilation section of the RSD has released several explanations about the revisions and enhancements made to statistics. In this statement, we present the basic stance of the RSD in terms of collecting, compiling and releasing the statistics and summarize the revisions and enhancements of the statistics.

1. Collecting, compiling and releasing statistics

We are currently faced with a growing number of issues as statistics providers. The financial and economic structure has changed substantially and new information communications methods have been developed and spread quickly. The environment surrounding monetary and economic statistics has also transformed rapidly. Under these circumstances, demands are increasing, mainly from statistics users, to expand and improve statistics as well as to enhance the convenience of using the statistics. In addition, respondents are strongly requesting a reduction in the reporting burden and protection of the privacy of what they report.[1]

Accordingly, the basic stance of the RSD in terms of collecting, compiling and releasing the statistics is as follows.

- Provide accurate statistics: The recent financial and economic situation is changing rapidly. In light of this, it has become extremely essential to provide accurate statistics that trace the conditions of the economy precisely.
- Enhance the convenience for users: We release the statistics timely so that the users can grasp the economic situation at an early stage. In line with this, we are endeavoring to provide statistics in various ways such as through our Internet web site, which provides access to a wide range of users.
- Efficiency of collecting and compiling statistics: As the statistics compilation section, we scrap-and-build the statistics and statistical books reflecting the changes in the financial and economic conditions without delay. In addition, we are also advocating an on-line system to collect statistics. These procedures are important in order to attain efficiency in collecting and compiling statistics, such as reducing the reporting burden on respondents.
- Tighten security: As for security measures of confidential material (figures before release, information on respondents), we are making the utmost efforts by restricting the number of staff members involved in compiling the statistics and limiting the access of people from outside the section.
- Increase the transparency: The reliability of the statistics is enhanced by disclosing the entire process of collecting, compiling and releasing statistics, and the way in which the statistics are

1): *These points are already mentioned in the New Strategies for Government Statistical Services for the Coming Decade—Report of the Statistics Council (Statistics Council; released in March 1995). The doukou-haaku-soukika-iinkai (committee to trace economic developments at an earlier stage), which is a private study group led by the Director General of the Economic Planning Agency, has asked for an improvement in statistics to grasp economic developments at an earlier stage (keiki-doukou-no-soukihaakutou-ni-kansuru-konngo-no-kadai, future directions on grasping economic developments at an earlier stage). In addition, the Keidanren (Federation of Economic Organizations) has made a proposal regarding government statistics to reduce the burden of respondents and improve users' convenience (Statement on Current Issues and Future Directions for Japanese Government Statistics, February 1999).*

compiled. Thus, we are clarifying the rules on releasing statistics, and disclosing the survey and estimating methods of statistics.

- Release statistics on a neutral basis: As the statistics compilation section of the central bank, it is important to take a neutral stance despite policy decisions. So we do not add policy decisions and interpretations on releasing statistics.

"Providing statistics reflecting the financial and economic conditions accurately," and "enhancing the convenience of users" may contradict the guidelines of "lessening the reporting burden of respondents," and "efficiency of statistics compilation." The RSD, however, revises and enhances statistics while dealing with this contradiction.

2. Enhancement of statistics

The RSD has been making various efforts to enhance the statistics. The following sections explain these efforts in detail regarding collecting, compiling, and releasing the statistics, along with the revisions and enhancements made to statistics until today.

(1) Providing accurate statistics

(Provide accurate statistics reflecting the changes in the financial and economic structure)

It is extremely essential to provide statistics that trace the condition of the economy accurately, especially under the recent rapid change in the financial and economic situation.

As for monetary statistics, various statistics such as Money Stock Statistics[1] are revised at all times such as changing the range of financial institutions, the financial statistics survey sheets, and the survey items in order to reflect the financial structure precisely. In addition, the Flow of Funds Accounts Statistics, which provide a comprehensive grasp of the financial structure and activities in Japan, was revised substantially for the first time in 40 years to incorporate the changes in the financial situation[2]. Furthermore, we have started compiling and releasing the "Deposits of Japanese Residents at Overseas Branches of Private Financial Institutions" along with the revisions of the Foreign Exchange and Foreign Trade Law (April 1998).

As for price indexes statistics, the present problems with the statistics will be addressed at the next rebasing. Corporate Service Price Indexes (hereafter, the CSPI) will be revised in terms of the grouping and selection of services when the base period will change from 1990 to 1995 at the end of this year.[3] As for Wholesale Price Indexes (hereafter, the WPI) and the Input-Output Price Indexes of Manufacturing Industry by Sector (hereafter, the IOPI), plans are being made for substantial revisions such as changing the title of the indexes (the WPI) and a fundamental revision of the compiling method (the IOPI)[4] at the next revision.

The *Short-term Economic Survey of Enterprises in Japan (Tankan)* has been reviewed to trace the precise business conditions of Japanese enterprises. From the March 1999 survey, the *All Enterprises Tankan*, a sample survey, the population of which is based on the *Establishment and Enterprise Census of Japan* (Management and Co-ordination Agency), has been revised to enhance the statistical accuracy. In terms of enterprises by scale, we used to compare the *Principal Enterprises Tankan* and the *Small firms of the All Enterprises Tankan*. From the March 1999 survey, however, we will compare the data by scale (large, medium, and small enterprises) of the *All Enterprises Tankan*. (Consequently, the *Principal Enterprises Tankan* is regarded only as a reference index.) Moreover, business plans of enterprises tend to be decided later than before. Thus, in

1) *As for statistics on Money Stock, the number of respondents has been increased (Japanese branches of foreign banks, foreign capital trust banks) from the figures of April 1998. In line with banks starting the issuance of CPs, figures from April 1998 include CPs issued by financial institutions as a classification of broadly-defined liquidity (the seasonally adjusted year-to-year growth rate was switched to the new basis from April 1999). For further details, please refer to the Revision of the Definitions of Money Stock Components (released on April 16, 1999; to be published in the Bank of Japan Quarterly Bulletin, August 1999 issue).*

2) *Please refer to the Revision of Japan's Flow of Funds Accounts Statistics (released on June 18, 1999; to be published in the Bank of Japan Quarterly Bulletin, August 1999 issue) and Guide to Japan's Flow of Funds Accounts (released on June 18, 1999, available in Japanese, English version to be released soon) for details on the revision of the Flow of Funds Account.*

3) *The revision of the grouping and selection of services of the CSPI will put emphasis on the emergence of new services and the varying of existing services due to the easing of restrictions and the technological innovations that have progressed rapidly in recent years.*

4) *Please refer to the Present Condition and Revision Plan of the Wholesale Price Indexes (released on March 26, 1999, available only in Japanese) for details on the revisions of the WPI and the IOPI. The next rebasing for the WPI will be conducted during 2002, and that for the IOPI will be conducted during 2000.*

order to enhance the accuracy of the statistics by incorporating these decisions, the *Tankan* has changed the period of collecting and releasing the figures (before the March 1997 survey, surveys were conducted in February, May, August, and November, whereas these are now conducted in March, June, September, and December).

(Improvements from the viewpoint of statistical theory)

From the statistical point of view, it is vital to enhance the statistical accuracy in order to provide statistics that reflect economic conditions accurately.

In the sample design of the *All Enterprises Tankan,* from the March 1999 survey the statistical accuracy has been enhanced further[1]. This is because detailed information on population enterprises has become obtainable (the number of employees by enterprise), making it possible to conduct a close statistical examination while keeping the number of sample enterprises as few as possible. The WPI adopts the Laspeyres index, which is the weighted arithmetic mean based on the fixed weight derived from the base period. This index has the problem that "when there is an alternative among different products, a demand shift normally occurs from the more expensive product to the less expensive product, and this change in the weight composition is not reflected at all." Therefore, figures from April 1998 are also compiled for weighted geometric mean indexes[2], taking the demand shift into consideration, and these figures are released as reference indexes.

The RSD has been adopting the latest seasonal adjustment program X12-ARIMA since 1996, and uses this when compiling statistics. X12-ARIMA is conducted by using the statistical method of "ex ante adjustments," which estimates and excludes the outlier and the calendar factors in the data prior to the actual seasonal adjustments. It is also includes an "ex post diagnosis" that checks whether the seasonal factors are excluded or not after the actual seasonal adjustment. It is likely that the seasonally adjusted series is more stable than that of X11.

(2) Enhancing the convenience of users

(Attaining an earlier release of the statistics)

It is our priority to release accurate statistics timely. In the past few years, we have been trying to release statistics earlier by revising the entire workflow from collecting and releasing the statistics through the following four measures. (1) Moving up the date of collecting the data with the understanding of respondents; (2) transforming the method of collecting statistics from paper format to an on-line basis[3]; (3) revising the method of compiling statistics comprehensively[4]; (4) basically releasing the data on the next business day (8:50 a.m.) after the statistics are compiled, and not providing any analyses or explanations regarding the statistics within the Bank prior to release.

Statistical books are also published much earlier due to efforts made to compile the books faster. The date of publication for the *Financial and Economic Statistics Monthly*[5] is five business days earlier from the April 1999 issue. Hereafter, it is basically published during the month (the *Monthly* will continue to be released the following month for May and November when figures are reported later compared to the usual months and possibly for February and September due to calendar factors). In addition, the *Tankan (The Comprehensive Data Set of the Survey)* is published two weeks earlier from the March 1999 *Tankan*, and the *Price Indexes Monthly* 8 to 9 days earlier from the April 1999 issue.

1) *As for the sample design of the All Enterprises Tankan, please refer to the Methodology of the Sampling and Aggregation of the All Enterprises Tankan (released on May 31, 1999, available in Japanese. English version to be published soon). Details on the revisions of the Tankan from March 1999 are available in the Revisions of the Short-term Economic Survey of Enterprises in Japan (Tankan, an abbreviation of Tanki Keizai Kansoku Chousa), (released on December 24, 1998; published in the Bank of Japan Quarterly Bulletin, February 1999 issue).*

2) *For details on the weighted geometric mean indexes, please refer to the Release of a Reference Wholesale Price Index Using a Geometric Mean Formula, (published in the Bank of Japan Quarterly Bulletin, August 1998 issue).*

3) *The figure checking procedure was reduced significantly by inputting a function to check figures in the on-line software, when switching to collecting figures on-line.*

4) *As for the Flow of Funds Accounts Statistics, instead of waiting for the release of the final figures of primary statistics, it has become possible to release figures three months earlier from the fourth quarter of 1997 by releasing figures on a preliminary basis.*

5) *The Economic Statistics Monthly has changed its name into Financial and Economic Statistics Monthly from the April 1999 issue as the data published are mainly financial related. As for the data published, the financial-related data are increasing further while the real economy related data, for which the frequency of usage is low, are discontinued. For details, please refer to the Revision of the Economic Statistics Monthly (released on March 29, 1999).*

(Various methods of providing the statistics)

We are making efforts to provide statistics in various ways such as in electronic data format to enhance the convenience of users. We provide the statistics through the following 7 methods.

- publishing released materials on the Internet web site (from November 1996)
- explaining and distributing the released materials to the press
- distributing released materials at the Public Relations Department and at the information service corner
- providing released materials via fax services (from July 1995)
- publishing the statistics in the *Financial and Economic Statistics Monthly*, *Price Indexes Monthly*, and the *Tankan (The Comprehensive Data Set of the Survey)*
- providing data via CD-ROM (publication from the 1997 edition)
- providing data through magnetic tapes

As for the Internet web site, we are planning to use this "as a way of providing the released materials to a wide range of users equally" and will advocate this as a means of releasing material.[1] From this viewpoint, we are currently preparing to expand a download corner within the Internet web site for users by the end of the fiscal year. Users will be able to download a long-term time-series data of 25,000 series (statistics compiled at the Bank of Japan including those published in the *Financial and Economic Statistics Monthly*, *Price Indexes Monthly*, and *Tankan e Comprehensive Data Set of the Survey*).[2]

(1) Enhancing the efficiency of statistics compilation and the process of collecting statistics

(Discontinuation and rationalization of statistics/statistical books, and revisions of survey items)

In line with the changes in the financial and economic structure, it has become increasingly important to collect data that traces the economic conditions without delay. At the same time, it has also become imperative to discontinue or simplify the statistics and statistical books that can be replaced with other statistics. In light of this, we have discontinued the compilation of some statistics and statistical books, and reduced the frequency of compiling certain statistics (refer to appendix 2). Furthermore, we are also advocating the change and discontinuation of survey items so as to conform to the changes in the financial and economic conditions.

Not only the needs of users but also the reporting burden of respondents and the burden of collecting and compiling the statistics are considered when reorganizing the statistics, statistical books, and survey items. The general rule is, of course, to promptly collect and release statistics judged to be necessary in order to grasp the economic conditions. In this case, we are trying to balance the cost of compiling the statistics and the benefits obtained from tracing the economic conditions.

(Collecting data from financial institutions via an on-line system)

We have started collecting figures from financial institutions on-line from spring 1998 in addition to the reports submitted in paper format (we are taking the utmost care in terms of security, so an original router secured via access passwords has been connected to the financial institutions along with the introduction of the on-line system). As a result, we collect the Deposits, Loans and Discounts Outstanding and related figures from about 80 per cent of domestically licensed banks (143 banks out of 172 banks), and all shinkin banks through the Zenshinren bank via the on-line system.

We will collect Deposits, Loans and Discounts Outstanding and related figures on-line from nearly 90 per cent of domestic banks by autumn 1999. Prefectural monetary statistics began to be collected through the on-line system from the June-end figures, which will be published in August 1999. Through this procedure, the RSD will basically finish the expansion of the on-line system in terms of collecting figures from financial institutions.

If we try to collect figures from enterprises for the *Tankan* and price indexes statistics, we can only use open network systems such as the Internet web site as there are too many respondents. For the time being, the on-line system will not be used owing to the many problems that still need to be solved in terms of maintaining confidentiality. In the future, we would like to adopt such a system along with the improvements in code technology.

1) *The Internet web site of the Bank of Japan includes the Reports and Statistics corner (http://www.boj.or.jp/en/siryo/siryo.htm), and the download corne (http://www.boj.or.jp/en/down/down.htm).*

2) *Reflecting this preparation, figures published in the Financial and Economic Statistics Monthly will be released earlier (eg. Deposits, Loans and Discounts Outstanding of financial institutions).*

(2) Tightening security

As for confidential information (survey results before release, figures of individual respondents[1]), we are taking the utmost care so that the materials do not leak out from the section where the statistics are compiled. There is a statistics compilation rule for each group. This rule restricts the number of staff members involved in statistics compilation and limits the access of people from outside the section.

Under the statistics compilation rule, people in charge of handling statistic is chosen for each statistic. Then the staff member in charge locks the statistics (in paper format) in a safe, and secures it via access passwords in an electronic media format for the staff members allowed access to prior-release figures and material. The rule also restricts the access of outsiders into the statistics compiling section.

(3) Enhancing the transparency in terms of collecting, compiling, and releasing the statistics

(Stance on releasing the collected and compiled figures)

Collected figures, excluding those under tight security such as individual information of respondents, are basically released after some kind of aggregation. Under this rule, we do not collect (we will discontinue collecting those that are already collected) unnecessary figures for compiling and releasing statistics so as to reduce the reporting burden of respondents, and compile statistics efficiently.

(Rules on releasing statistics)

In order to enhance the transparency, we have clarified the schedule for releasing statistics.

The release schedule for statistics and statistical books compiled at the RSD are released through the Internet web site and announced to the press. Schedules for the next six months are released from the middle to the end of March, June, September, and December (for April to September, July to December, October to the following March, and the following March to June respectively). The release dates of major statistics used to be announced four weeks prior to the release.

All major statistics are released at 8:50 a.m. from November 1996 just before the financial, currency exchange, and stock markets open.[2]

(Retroactive corrections of released data)

In cases when an error is found in the released data, we compile and release the corrected figures promptly. Corrected figures are released via the Internet web site and distributed to the press.

(Disclosure of survey and estimating methods of the statistics)

In order to clarify the process of compiling statistics, we release information on statistics compiled at the RSD (purpose of survey, survey items, coverage, survey method, aggregating method, estimating method, etc.)

As for the *Tankan*, the *Methodology of the Sampling and Aggregation of the All Enterprises Tankan* was released on May 31, 1999 (available in Japanese, English version to be published soon). This explains the sampling design method and the aggregating method of the *All Enterprises Tankan*. From the March 1999 survey, the actual figures of the *All Enterprises Tankan* (population estimates) and the number of valid responses for each item are released at each survey. The WPI also releases the actual price research ing method and the index compiling method, along with a notice on usage (*Present Condition and Revision Plan of the Wholesale Price Indexes*, released on March 26, 1999; available only in Japanese).

The Flow of Funds Accounts Statistics released figures on a new basis from the 1999 March-end figures (released on July 1, 1999). This new basis is explained, like that of *Tankan*, in the *Guide to Japan's Flow of Funds Accounts* (released on June 18, 1999; available in Japanese, Eng-

1) *In order to protect the privacy of respondents, the RSD is taking the utmost care so that users cannot identify the respondent just by the figures.*

2) *The release time of major statistics has been moved up consecutively from 11:00 a.m. in August 1996 to 8:50 a.m. in November 1996 (Before August 1996, the release time was 2:00p.m. for the Tankan, 5:45p.m. for Money Stock, and either 4:00p.m. or 5:45p.m. for price indexes statistics.)*

lish version to be published soon). Detailed material regarding estimating methods will also be released in the future.

(Incorporating public comments into the revisions)

The RSD releases summaries of the revision of statistics beforehand. Additionally, we call for public comments according to the scale and importance of the revision. The transparency of the revisions of statistics will be maintained through this procedure.

From the March 1999 *Tankan*, statistics are released on the new basis. As for this revision, after the release of the summary of the revision at the end of December 1998 (this was released straight after the December 1999 *Tankan*), information regarding the new basis statistics was announced before the March 1999 *Tankan* was released.[1] This is to avoid confusion among users due to the revision of the statistics. Summaries of the major revisions to the Flow of Funds Accounts[2] and price indexes statistics[3] were released beforehand. Public comments from economists and statistics users concerning the revision of the statistics are also taken into consideration.

(4) Neutral stance on releasing surveys

As the statistics compilation section of the central bank, a neutral stance is imperative regardless of policy judgements when releasing statistics. Therefore, we only accept questions (including questions at press conferences) related directly to the statistics themselves (questions such as since when such a growth rate occurred or if there are any changes in the statistics caused by irregular factors). We do not add any policy judgements or interpretations regarding the released statistics.

This may give the impression of being impolite, but "interpretations of the statistics should be made by the market at first" which results in various interpretations on the statistics. This will also enhance the quality of Japan's markets.

Interpretations of newly released statistics and judgements on the financial and economic situation are presented to the public through the *Monthly Report of Recent Economic and Financial Developments* and at press conferences by the Governor based on decisions determined at the Monetary Policy Meetings of the Policy Board. This is the most transparent way to express the judgements of the Bank regarding the interpretations on the statistics against the background of financial and economic conditions.

(Outlook)

The financial and economic structure of Japan and information technologies are likely to change further. In these circumstances, there are many outstanding issues regarding statistics compiled at the RSD. These include a further enhancement and expansion of monetary statistics, changes in the organizational structure of enterprises and financial institutions (establishing holding companies and splitting companies up), and in accounting standards (the change from individual settlement to consolidated settlement), as well as connecting responding enterprises on-line for the *Tankan* and price indexes statistics.

The RSD has indicated its basic stance in section 1 of this paper (1. Collecting, compiling and releasing the statistics) in order to enhance the statistics. Under this stance, we will revise the statistics by incorporating the changes in the economic and financial environment in advance. We will also present summaries of the revisions beforehand, and reflect the needs of users as much as possible by inviting public comments.

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1) *A sample pattern of the new release form of the Tankan was released in mid-February, and the data comparison between the pre- and post-revision of the Tankan was released in mid-March.*

2) *The summary of the revision of the Flow of Funds Accounts statistics was released in the Bank of Japan Quarterly Bulletin, August 1997 issue. The final draft, incorporating the results obtained from public comments, was also released in the Bank of Japan Quarterly Bulletin, November 1998 issue.*

3) *Guidelines for the WPI, and the IOPI were released in the above Present Situation and Revision of the Wholesale Price Indexes, including the present problems with the statistics and the rebasing, which will be conducted in line with the revisions. The RSD is inviting public comments regarding these statistics as well.*

An overview of Nigeria's central bank statistics within the National Statistical Information System

Sani I. Doguwa – Central Bank of Nigeria

1. Introduction

Efforts have been put in place to ensure quality in the Nigerian statistical information, through the establishment of the National Statistical and Information System (NSIS). The NSIS sole objective is to co-ordinate national statistical production with the Federal Office of Statistics (FOS) as the over all co-ordinating agency. In the Nigerian situation, the NSIS which has evolved over time comprises the agencies with legal backing for the collection and processing of official statistics, such as the Federal Office of Statistics, the Central Bank of Nigeria, the Nigerian National Petroleum Corporation, the National Population Commission, the National Data Bank, the Federal Ministry of Finance and the Federal and state ministries of planning, research and statistics.

The Central Bank of Nigeria occupies a unique position in the NSIS by functioning simultaneously as a producer and a user of basic economic and financial statistics. The Central Bank enabling laws empowers the Bank not only to request for information on matters affecting the Nigerian economy, but also to process and to disseminate the processed information to the public. The apex bank compiles and publishes statistical data on the Nigerian economy. The laws further stipulate that proper books of accounts, with respect to all transactions, shall be kept by all deposit money banks who are required to render their returns to the Central Bank of Nigeria in the forms prescribed by the Bank. Within the context of the laws, Akanji (1997) noted that the statistical functions of the Central Bank of Nigeria, among other things, are quite enormous.

The objective of this paper is to discuss the statistical role of Central Bank of Nigeria within the context of the National Statistical Information System. For ease of exposition therefore, the paper is structured as follows: section two examines the survey activities of the Bank in its efforts to bridge the data gaps existing in the four macroeconomic accounts. The traditional data processing role of the Bank in money and banking statistics is discussed in section three. Section four highlights the collaborative efforts of the Bank with other agencies, with the view to improving data quality and frequency. The computerization of the Bank's operations and data processing and analysis are discussed in section five. The dissemination of the data by the Bank is discussed in section six, while section seven summarizes and concludes the paper.

2. Survey activities of the Bank

The Bank is involved in socio-economic and financial research for policy proposals to the Nigerian Government. Even though the Federal Office of Statistics is statutorily required to generate socio-economic data in Nigeria, the Bank noticed the dearth in data availability for its research activities. The gaps created over the years encouraged the Bank to go into production of socio-economic data. Thus, data collection became an important function of the Bank, as it requires timely and good quality data on national income and product accounts, external, monetary and public sectors for its advisory role to the government.

The Bank stands in a unique position as a user as well as a producer of statistics. It produces financial sector data and uses socio-economic data for policy analysis. Specifically, the Bank utilizes the data for: ensuring monetary and price stability, optimal economic growth and maintenance of domestic and international equilibria; and monitoring and supervision of the financial system to ensure compliance with and adherence to rules and regulations and support of monetary policy objectives. In order to facilitate its duties therefore, and to make up for inadequacies, particularly in terms of paucity of socio-economic data as well as timeliness, the Bank embarks on collection, processing and analysis of these data for its operations.

It is pertinent to note that sources and methods of capture of Nigeria's socio-economic data vary. The Bank applies pre-requisite scientific and relevant survey methodology to determine the specific method of data capture. Depending on the desired coverage, the Bank undertakes either censuses or sample surveys. Collection of data from administrative sources is also recognized. The

particular method utilized depends on a number of factors including the scope and purpose of the study, funds available for the exercise and time availability.

Primary data generated through surveys are collected directly from respondents by special enquiry for particular purposes. Some specific periodic surveys conducted by the Bank include:

(i) Price surveys of selected consumer items
(ii) Business surveys
(iii) Agricultural production surveys
(iv) Foreign private investment surveys
(v) Wage surveys for currency indentation

The Bank also undertakes ad- hoc surveys exercises on its own, and in collaboration with FOS as well as other parastatals, institutions, government and non- governmental organizations. Other primary data are generated through statutory deposit money banks and other financial institutions returns rendered to the Bank in a periodic basis. The data type generated from these returns include the money and banking statistics, inter- bank placement statistics, financial ratios, and some external sector statistics.

Secondary data are also compiled by the Bank from other institutions that are statutorily charged with the responsibility of generating these data. For example, national accounts statistics, foreign trade statistics, unemployment rates, composite consumer price indices, industrial production data and data on principal agricultural commodities are sourced from the Federal Office of Statistics. The Federal Ministry of Finance, the State Ministries of Finance and Local Governments provide the Bank with data on fiscal operations of government such as current revenue, recurrent and capital expenditure as well as domestic and external debt. Other ministries, government parastatals and institutions provide data to the Bank on population, health, education, rural development, railway services, communication, electricity, etc.

The Bank undertakes mostly personal and direct contact methods of questionnaire distribution. This is in recognition of the Nigerian postal services, which do not appear to be very reliable. The use of high calibre staff by the Bank has helped in reducing to the barest minimum the rate of rebuffing and intimidation, by respondents and hence improving substantially the response rates of the surveys. Akanji (1997) noted that most of the survey respondents are qualified professionals in their various fields and are well versed in economic issues. Often, they engage in discussion with the Bank staff and sometimes demand clarification on matters in government policy pronouncements since the respondents see the Bank as the foremost economic adviser to the government.

3. Central Banking Statistics

3.1 Money and Banking Statistics

The compilation of internationally comparable money and banking statistics poses many problems, both conceptual and practical. The nature of the financial system and instruments and the role they play can differ markedly from country to country. These statistics are constructed in accordance with a variety of methodologies, reflecting differences in individual countries' banking traditions, regulatory views, laws and accounting practices. However, there are important similarities in the form of monetary analysis that have evolved among countries over time. The International Financial Statistics (IFS) framework exploits these similarities in order to recast the financial data available from national sources into a form that permits analysis and international comparison. The Bank adapts the IFS framework in compiling its money and banking statistics, following the IMF money and banking statistics mission visit to Nigeria in 1995.

The money and banking statistics make possible the study of the relationship between movements in the money stock and the monetary system's other liabilities and assets. For instance, in the narrow money analysis, the monetary authorities can determine the supply of money. Firstly, this could be achieved by the authorities' purchases or sales of assets, which can determine movements in reserve money. Secondly, the authorities' ability to influence the activities of other money creating banks, through policy instruments that affect the relationship between bank reserves and deposit [Doguwa (1994)]. The money and banking statistics also provide partial data for the analysis of intersector finance. Even though the monetary accounts are presented in terms of outstanding balances of assets and liabilities, as is appropriate for monetary and liquidity analysis, they do provide the only up- to- date source of information on inter- sector finance that is available for essentially every country.

The supervision of the financial system requires the Bank to determine the appropriate levels of liquidity for the domestic economy as well as for deposit money banks and to influence the development of financial institutions' assets and liabilities accordingly. For the Bank to achieve its ultimate goals, policy makers normally identify proximate targets that have stable and strong relationship with the ultimate goals. The most commonly identified proximate targets are M1 and M2, money supply narrowly and broadly defined, and aggregate domestic credit. Thus, the Bank sets monetary and credit targets on the growth of M1, M2 and aggregate credit to the economy amongst others, at the beginning of every fiscal year in accordance with the year's monetary and fiscal policies. Accordingly, the money and banking statistics are normally used to monitor the targeted growth of the relevant policy variables.

3.2 The Bank's Supervisory Role

One of the main objectives of the Bank is the overall supervision of the Nigeria's financial system to ensure adherence to rules and the support of the monetary policy objectives. Clearly the deposit money banks must be prepared to take risks if they are to serve the financial needs of the economy, but these risks must be tempered by the public's interest for a sound and stable banking system, since the potential costs of widespread instability in banking extend far beyond the banks directly concerned. The Bank depends in part on the results of on-site bank examinations to provide information about the condition of individual deposit institutions and the banking system as a whole. The Bank, therefore, examines the deposit money banks about once every two years, but more or less frequently depending upon their condition.

Based on the statutory returns the deposit money banks render to the Central Bank of Nigeria on a monthly basis, financial statistics such as aggregate credit to the domestic economy, loans-to-deposit ratio, capital adequacy ratio, liquidity ratio and net foreign assets are computed [Akanji and Doguwa (1994)]. These statistics are used to monitor compliance with policy targets and appraise the banks' aggregate performance. However, of recent, the banks in Nigeria had experienced varying degrees of distress. The increase in the rate of distress of banks in the early 1990s has refocused attention on efforts to identify problem banks and to predict failures with sufficient lead time for the Bank to institute remedial action to prevent these banks from going into insolvency.

Many causes of the problem of distress have been advanced in the Central Bank of Nigeria and Nigeria Deposit Insurance Corporation joint study [CBN-NDIC(1995)] of distress in the Nigeria's financial system. These include operational ineffectiveness, political instability and overall macroeconomic instability. Doguwa (1996) developed early warning models which could be helpful to the Bank in identifying problem banks. The models are based on the logit-analytic technique and the use of financial ratios derived from the monthly returns of the banks.

3.3 Balance of Payments Statistics

Trends in Nigeria's balance of payments are analysed and evaluated with a view to articulating policies relating to visible trade, invisible transactions, and the capital account. On the basis of data on foreign exchange inflow, the Bank is able to prepare an annual foreign exchange budget. Equally, data on the sectoral allocation of foreign exchange, the volume and value of external trade permit the monitoring of foreign exchange inflows. Similarly, the Bank maintains data on Nigeria's credits, debt and debt rescheduling which serves as the basis for managing the stock of, Nigeria's external debt. Also, the violation of the country's trade and foreign exchange regulations through failure to adhere to deadlines given for the submission of shipping documents could cause debarment from enjoying foreign exchange. Such an embargo would normally remain in force until compliance was ensured.

4. The Bank's Collaborative Activities

The Bank is involved in collaborative activities with other agencies in order to improve the existing statistics in the following areas: national accounts statistics, wholesale/producer price indices, external trade statistics and money and banking statistics.

4.1 National Accounts Statistics

The National Accounts statistics comprising the gross domestic product (GDP) and its alternative measures such as national income and gross domestic expenditure as well as the subsector al breakdown, constitute the most effective indicators for economic planning and performance evaluation. The Bank and Federal Office of Statistics collaboration is therefore aimed at improving the quality and timeliness of Nigeria's national accounts statistics and development of quarterly GDP series. During the year, 1994, the two institutions resolved that rather than embarking on a fault finding mission and making excuses over the problem, they should pool resources together to tackle the problem. The collaborative efforts has already started yielding fruits.

The importance of data of high frequency for short-term economic policy analysis, evaluation, short-run planning and forecasting, as well as monitoring the impact of policy actions cannot be overemphasized. In Nigeria as in most developing countries, however, there has been a general lack of quarterly national accounts data. While data are at present, available at intervals ranging from monthly to quarterly basis for such economic indicators as industrial output, inflation, monetary and financial aggregates, and so on, the GDP in Nigeria is compiled only on annual basis by the Federal Office of Statistics. The Bank therefore collaborates with the FOS to generate the quarterly GDP series, which are of immense benefits in monitoring, evaluating and redesigning developmental policies, particularly as they affect the flow of the financial sector to the stocks of the real sector, given the dynamics of a vibrant economy such as Nigeria's.

4.2. Wholesale/Producer Price Index

The producer/wholesale price index (WPI/PPI) defined as a measure of changes in prices received at the primary market by producers/wholesalers from whoever makes the first commercial transaction, is very useful for research and planning purposes. This is because such insights into price movements cannot be clearly gleaned from the consumer price index. As would be expected, the WPI/PPI is the most reliable measure of changes in production costs and provides better insight to understanding the main factor(s) responsible for observed changes in prices. Unfortunately, WPI/PPI are yet to be developed in Nigeria, despite their obvious advantages. The Bank and Federal Office of Statistics therefore agreed to pool their resources to develop benchmark data on these very important indices. Subsequently, the FOS which has the primary responsibility for producing the data would be expected to update the series. The two institutions have already been working together at committee level to develop the conceptual framework and modalities for producing the indices. The work on this collaborative work is expected to be concluded soon.

4.3 External Trade Statistics

The external trade statistics which comprise Nigeria's balance of payments, the size/spread of trade relationship between Nigeria and its trading partners, Nigeria term's of trade with her foreign trading partners, and the size and potential of the Nigerian export/import markets, has been characterized by gaps and lags as well as controversies arising mainly from glaring inconsistencies observed in published trade data. For some time now, the Federal Office of Statistics which has the primary responsibility for developing Nigeria's trade statistics has been making use of the balance of payments statistics compiled by the Bank to fill the obvious data gaps which should have been compiled from customs bills of entry. Despite such co-operation, the inconsistencies in Nigeria's trade data have persisted, to the embarrassment of both institutions.

The Bank and FOS collaborations in the area of external trade statistics, therefore, is aimed at redressing the problems of data lags and gaps as well as inconsistency in published trade data. Towards this end, the two institutions set up a high calibre committee early in 1994 to explore ways of ensuring the timeliness and harmonization of trade statistics as well as improving the coverage of the statistics. The Committee in its report identified differences in sources data as the main cause of discrepancy, articulated the areas not yet covered and recommended ways of tackling the problems of inconsistency, incompleteness and delay in the release of the data under a joint effort by the two institutions. The committee would soon finalize its assignment.

4.4 Money and Banking Statistics

A technical mission from the Statistics Department of the International Monetary Fund visited Nigeria in March 1995 to provide the Bank with technical assistance in money and banking statistics. The mission analysed the Bank's procedure for compiling monetary accounts, which are used for

monetary purposes and found that the Bank applied a similar methodology as used by the Fund, with the exception that aggregated data is often misclassified. Reviewing the compilation procedure, the Fund identified some classification and valuation problems in the analytical balance sheet as presented by the Bank. The Fund also identified all the detailed information necessary to achieve a proper classification of the monetary accounts by sector, residency, instruments and currency. It also identified negative accounting entries as assets and recommended introducing in the Bank's analytical balance sheet, various categories by sector as is the case internationally.

Following from the recommendations of the 1995 Mission, the Bank established multidepartmental technical group on money and banking statistics to oversee the implementation of these recommendations. The technical group prepared an interim report which described in details the measures being undertaken to implement the recommendations. Based on the interim report, the IMF indicated that Nigeria's money and banking statistics which were earlier suspended from publication in the International Financial Statistics would be published in 1996. Since then, Nigeria's money and banking statistics have joined the international community and are now comparable to any other members data; for cross- country studies for instance.

5. Computerization activities of the Bank

From the onset, it should be noted that for several years, data processing activities in the Bank was characterized by purely manual operations aided by desk-top calculators. However, in 1983, computerization activities commenced, with the acquisition of DEC/PDP- 11/70 and one DEC PDP-11/24 main frame computers with many user terminals for the processing of data arising from its operations. As of that year, only five operations were computerized and they included, the consolidated Accounting System (CAS), Payroll system (PRS), Research Application System (RAS), Exchange Control (EXC), and Government Securities System(GSS). By 1987, more operations had been computerized including, the Foreign Exchange Market Bidding System (FEMBS) which replaced the EXC system, Foreign Exchange Market Monitoring System (FEMS), and the Magnetic Ink Character Recognition System (MICR).

The FEM Bidding system was designed principally to capture bid amounts from authorized dealers and allocate foreign exchange to various banks. Also, the Implementation of the treasury securities sub- system under the Government securities system was completed in 1987, while the implementation of the development stock sub- system took- off and was expected to be completed in 1988. Furthermore, the Bank acquired MICR machines during the year for the automation of cheque clearing activities, and assisting with the capturing of deposit slips and cheques,documentation, MICR encoded instruments transaction data, and the generation of computer diskettes to interface with the consolidated Accounting System.

The Import Duty Payment System (IDPS) a sub- system of the foreign Exchange Market' System (FEMS), was developed in 1989, to monitor the payment of import duties by importers. A treasury securities auction system was also developed and made operational in 1989. This system actually replaced the existing floatation sub- system of Government securities system and was intended to improve public participation in public debt activities. The Refinancing system, which was designed for management reporting on Nigeria's Promissory Note Holdings was also implemented.

The computerization of CBN branches and small and medium Enterprises (SME) Apex Unit operations was initiated in 1989, while work commenced on the Human Resources Management Information System (HRMS) to take care of payroll and Personnel Administration requirements. The preliminary work on an information system strategy (ISS) study of the Bank also commenced in 1989. The objectives of the study were to determine the information needs of the Bank, including software and hardware, intra- branch and branch- Head Office communication, and securities to ensure confidentiality and integrity of information.

The consolidated Accounting System, was replaced in 1991 with Banking Operating System (BANKOS), which is an on- line interactive system. Also the Credit Risk Management System (CRMS) to capture, store, consolidate and disseminate credit information of over 10,000 bank customers to financial institution was completed and tested in 1993. Later in the same year, the Bank installed the Commonwealth Debt Recording and Management System for its Debt Management operations. In 1994, the CBN provided many computing facilities to staff and pursued more training courses in this areas in its desire to increase computer awareness and in- house expertise. Similarly efforts were made to extend automation to all the branches and currency centres. All interface with the Nigerian Interbank Settlement System for the inter- bank placement transactions was developed in 1996. The Banking Analysis System (BAS), a joint software development project be-

tween the Bank and the Nigeria Deposit Insurance Corporation was initiated in 1995. The system when completed, would be expected to provide the two institutions with necessary medium to monitor the performance and financial viability of deposit money banks. In 1996, the Open Market Operation which is an indirect monetary policy instrument was incorporated into the new Government Security System and became operational.

The computerization of Research functions in the Bank started around 1985 with the installation of two dumb terminals that hook on to the main frame computers, and two statistical packages, MINITAB and SPSS, which were used mainly for regression analysis. The processing of survey data, however, continued to be handled manually until 1989, when the situation changed with the acquisition and installation of two personal computers along with spread sheets and survey processing packages. By June 1990, processing of survey returns on the personal computers had started. As at June 1998, over 70 personal computers were purchased for the Research functions along with several statistical applications software packages for statistical computing and econometric analysis.

6. Data Dissemination Channels of the Bank

Inasmuch as data dissemination falls within the scope of activities of a National Statistical Information System, it is quite relevant to indicate some of the outlets through which the Bank disseminates vital statistical information to the public. The main dissemination channels are the monthly reports, the Economic and Financial Review Journal, the Statistical Bulletin, the Half Yearly Economic Report, Nigeria's Principal Economic and Financial Indicators, the CBN Half year Report and the CBN Annual Report. The Bank also provides substantial input to the National Data Bank. All the CBN publications are disseminated to the public free of charge.

6.1 Monthly Reports

The monthly Reports highlight the trend and developments in the domestic as well as external economies. The publication analyses developments in the economy in the review month with emphasis on bank credit, money supply, currency in circulation, foreign assets and price trends. This monthly publication could be regarded as the most current source of statistical information about the Nigerian economy with purely financial statistics and price movements which are primarily collected by the Bank and are more current than others obtained from secondary sources. Other statistical attachments provided in the report include: commercial and merchant banks consolidated statements of assets and liabilities, index of industrial production, aggregate loans and advances, holdings of treasury bills and certificates, the balance of payments, etc.

6.2 CBN Economic and Financial Review

The Economic and Financial Review Journal is another publication of the Bank which provides useful information and analysis on the economic and financial conditions through topical articles and well researched papers. It serves as the Bank's single largest publication of economic and financial research than the monthly report. It also serves as the medium for scholarly works of the Research Department on policy issues. The journal was restructured in 1990, with the statistical section expunged and developed into a bi annual Statistical Bulletin publication. This Bulletin contains quarterly and annual data covering the four macro- economic accounts and is widely circulated and cited by most research institutes in the country.

6.3 Annual Reports

The Annual Report and Statement of Accounts of the Bank is usually published annually. The report dwells on the Bank's activities during the accounting year in accordance with statutory requirements. As in the past, the Report also reviews the major developments in the Nigerian economy, as well as the international economic and financial situation during the year. Specifically, the report covers major macroeconomic indicators, development in the financial sector, developments in the real and external sectors, international economic and financial developments, fiscal operations and developments and the Bank's operations. Over 200 statistical tables and charts are included in the report.

6.4 Principal Economic and Financial Indicators

The principal Economic and Financial indicators is a handy booklet which summarizes several indicators collected by the Bank, and secondary statistics obtained from the Federal Office of Statistics and other Federal and State Statistical agencies. The figures are presented on annual basis starting from 1970. This booklet is up dated every year and is also widely circulated.

7. Summary and Conclusion

The Bank is involved in socio-economic and financial research for policy proposals to the government and as well as monitoring evaluation of such policies. For effective evaluation and monitoring of monetary, credit and foreign exchange policies which is within the purview of the Bank, socio-economic data which is the responsibility of an autonomous government agency and the financial data are paramount. Resulting from the apparent data gaps in socio-economic data over the years, the Bank had to collect, collate and compile these data sets from a wide variety of sources through administrative records and surveys. Depending on the desired average, the Bank undertakes either censuses or sample surveys. Primary data are either generated through periodic surveys or through statutory deposit money banks and other financial institutions returns rendered to the Bank on a periodic basis. Secondary data are also compiled by the Bank from other statutory agencies.

The Bank uses the International Financial Statistics framework to compile the financial data available from national sources into a form that permits analysis and international comparison. The supervision of the financial system requires the Bank to determine the appropriate levels of liquidity for the domestic economy as well as for the deposit money banks and to influence the development of financial institutions assets and liabilities. Accordingly, the Bank sets monetary and credit targets on the growth of monetary aggregates as well as growth in credit to the government and private sector. The money and banking statistics are required to monitor the targeted growth of the relevant policy variables periodically. Furthermore, financial data generated from deposit money banks returns are used to monitor compliance with policy targets and appraise the banks aggregate performance. In addition early warning models are normally applied to some financial ratios to appraise the health conditions of the deposit money banks. Balance of payment statistics are used by the Bank to articulate policies relating to external trade.

The Bank in collaboration with other agencies and the IMF, improved the data quality in national income and product account, wholesale/producer price indices, external trade and money and banking statistics. The Bank's effort to improve the data timeliness led to the computerization of its operations activities. For improved high accuracy of its survey processing activities which, prior to 1989, was done manually, led to the acquisition and installation of several personal computers along with customized survey processing packages. More statistical application software packages for statistical computing and econometric analysis were acquired by the Bank for incisive and rigorous economic data analysis.

The Bank's main dissemination channels of its statistical and research activities are the monthly report, the Economic and Financial Review Journal, the Statistical Bulletin, the Half year Economic Report, Nigeria's Principal Economic and Financial Indicators and the Bank's Annual Report. The monthly report highlights the trends in the domestic and external economies and is the most current source of statistical information especially in money and banking statistics and price movements. The Economic and Finance Journal contains articles of research mainly on policy issues both at the macro-economic and sectoral levels, in the hope that research would enhance policy choices. The Statistical Bulletin contains quarterly and annual data covering the four macroeconomic accounts and is widely circulated and referred to, by most research institutes in Nigeria. Apart from reviewing the major developments in the Nigerian economy, during the year, the Annual Report of the Bank contains over 200 statistical tables and charts on the Nigerian economy. The report is another veritable source of economic data by international financial institutions.

In conclusion, the paper has amply shown that the Bank plays a central role in the collection, compilation and processing of social-economic and financial data and therefore occupies an enviable position within the national statistical information system. Apart from generating the traditional central banking statistics, the Bank also delves into other areas in order to eliminate the data gaps in her entirety in those areas in pursuance of its statutory functions.

References

1. Akanji, O.O., 1997, Enhancing the Quality of African data: The Nigerian Experience. Paper Presented at the Workshop on Quality of African data, Organised by the African Economic Consortium, Nairobi-Kenya.

2. Akanji, O.O., 1995, External Trade Statistics Compilation and Uses. A Paper Presented at the Regional Workshop on External Trade Statistics, ECOWAS Centre for Computer, LomeTogo.

3. Akanji, O.O. and S.I. Doguwa, 1994, On the Processing and Analysis of Bank Returns. Training Courses of Authorised Dealers on Monthly Bank Returns Held at the CBN Training Centre, Lagos – Nigeria.

4. CBN-NDIC, 1995, Study of Distress in the Nigerian Financial Services Industry. A joint study of the Central Bank of Nigeria and Nigeria Deposit Insurance Corporation.

5. Doguwa, S.I., 1994, The Multiplier Approach to Money Supply Process in Nigeria. CBN Economic & Financial Review, Vol. 32, 400-418.

6. Doguwa, S.I., 1996, On Early Warning Models for the identification of Problem Banks in Nigeria. CBN Economic & Financial Review, Vol. 34, 462-487.

Abstract

This paper discusses the statistical role of Central Bank of Nigeria within the context of Nigeria's statistical and information system. For purposes of monitoring and evaluation of monetary, credit and foreign exchange policies, the Bank needs financial statistics as well as other socio-economic data which are outside its purview. However, resulting from the existing data gaps in Nigeria's socio-economic data over the years, the Bank has been collaborating with other government agencies to improve the data quality. The Bank's effort to improve the timeliness of data processing and dissemination led to the computerization of its operational and research activities, and providing different dissemination medium through the Bank's widely circulated publications.

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HOW TO MEASURE DEREGULATION?

INVITED PAPERS

How to Measure Price Deregulation in Central and Eastern European Countries

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I. Price Deformation in the Period of Central Planning in Central and Eastern European Countries

Na tion ali za tion of in dus try was launched in Czecho slo va kia im me di ately af ter the end of World War II and con tin ued at in creased speed af ter the com mu nist take- over in Feb ru ary 1948 so that by 1950 vir tu ally the whole na tional econ omy (in clud ing cor ner stores and per sonal serv ices) was brought un der state own er ship. Any sem blance of mar ket dis ap peared.

In Feb ru ary 1949, the Eco nomic Plan ning Act was adopted. The State Plan ning Of fice and the State Plan ning Com mis sion were set up, the State Sta tis ti cal Of fice (our dis tin guished pre cursor) was sub or di nated to the former and the Su preme Price Of fice, the regu la tory body in her ited from the war econ omy, was abol ished. The pow er ful State Plan ning Of fice was in structed from its in- cep tion (Feb ru ary 1949) among other things to plan prices, to is sue price pol icy im ple ment i ng di- rec tives and to co- ordinate price for ma tion.

Fol low ing the Eco nomic Plan ning Act and the Act on the First Five Year Plan, Regu la tion No. 235/49 on the Plan ning and Other For ma tion of Prices was is sued 25 Oc to ber 1949. The Regu la- tion stipu lated that prices should be formed as an in te gral part of all plan ning ac tivi ties, allowing sepa rate price crea tion only as an ex cep tion. All prices in the fu ture had to be fixed by Cabi net, the State Plan ning Of fice, Gov ern ment Agen cies or their sub or di nate bod ies.

The State Plan ning Of fice be came the co- ordinating author ity for price for ma tion. A gov ern- ment regu la tion es tab lished spe cial ized co- ordinating com mit tees by prod uct range whose task was to de cide, co- ordinate and re vise all prices. These fixed prices were pub lished cen trally and were obliga tory across the econ omy.

This led even tu ally to com plete price cen trali za tion in all price ar eas and was sup ple ment ed by firmly fixed whole sale and re tail mar gins. The cen trali za tion of price for ma tion was de termined by ide ol ogy, viz. a the ory of cen tral ized man age ment of the econ omy and so ci ety ap plied in all coun tries of the So viet bloc, by the ra tion ing sys tem in her ited from the war econ omy, by lo w ef fi- ciency in the econ omy and by what they called the law of the nec es sary over hang of de mand over supply.

The cen trally con trolled price for ma tion sys tem pro duced fixed planned prices and fixed price relations for different price areas (purchase prices, production prices, whole sale trade prices, prices of im ports and ex ports, re tail trade prices, prices of serv ices) as well as prod uct range seg- ments (prices of ag ri cul tural and food prod ucts, prices of other goods, prices of serv ices), i r re spec- tive of value, de mand and sup ply re la tions, re la tions of sea sonal and non- seasonal prices, relations of prices of fash ion able and non- fashionable prod ucts, etc.

The regu la tion of price re la tions was be ing jus ti fied by the ne ces sity of sus tained, planned growth in the econ omy, ef fi cient pro tec tion of the in ter nal mar ket, e.g. against abrupt fluc tuations of world prices or nega tive im pacts of in ter na tional com peti tors, and by the need to guar an tee eco- nomic and so cial se cu rity of the popu la tion.

Ul ti mately, the cen tral price con trol ex er cised by the state failed to meet the re quire ments for prices on which the price pol icy of the state was based. In deed,

- prices and price relations became neither rational nor any tool for a more effective development of the economy,
- prices and price relations did not shrink costs, neither in total nor per unit of production,

- state-controlled price policy did not encourage diversification of product range, development of innovation or improvement of production quality,
- prices and the price system failed to stimulate growth of labour productivity or scientific technological progress,
- the rigid and inflexible price policy only helped Czechoslovak society lag behind other countries and sink from the top rank of European countries to the very bottom.

2. Necessity of Price Deregulation in Central and Eastern European Countries as Part of their Transition to Market Economy

Transition from the centrally planned to a market economy called for the implementation of principal system changes. Their core consisted of the liberalization of prices and external trade, in addition to the privatization of public capital. A tax reform was also essential. All these measures have aimed at correcting the deformed price system of the centrally planned economy.

3. Consumer Price Deregulation in the Czech Republic: Actual Developments in 1990-1998

When arrangements for price liberalisation were made, state subsidies (the so-called negative turnover tax) to food products were removed as early as July 1990. However, a few commodities were kept under price control, so that the impact of price deregulation on the population would be weakened and spread in time. Short-term regulation was introduced of prices of some basic food products and of items relating to housing (rental, electricity, gas, water, heat, fuel), public transport, communications and health service. Price regulation was implemented in three ways:

a) via maximum prices fixed by the Ministry of Finance (MF),
b) via maximum prices fixed by local governments, and
c) via substance-based prices.

The first group includes primarily products of mostly monopolistic industries (electricity, gas, railway transport, communications) or services with a limited or underdeveloped market and/or a big impact on the social level of individuals (rental, health services). The maximum pricesof these items are increased every year in order gradually to approach their market level. Housing rental is a special case. In this case, price increases (called deregulation) are being carried out, asa rule, every July, depending on a formula based on inflation, municipality size and a so-called "decision coefficient" declared by the MF separately each time. Starting in 1999, the price index of construction work and materials is being used in place of the general CPI inflation indicator.

The second group includes products and services relating in a way to local conditions (municipal transport, parking charges, cremation). These prices are uniform within a locality only and their level depends on local policies.

The third group is classical price regulation: while prices of goods and services can be adjusted by enterprises individually, regulations stipulate how the prices shall be calculated. Substance-based prices are supposed thus to reflect only economically justified costs.

Every year the MF issues a notice showing the slowly diminishing list of controlled items. The scope of prices adjusted in this manner is reduced step by step or, as the case may be, some items are transferred to a lower price regulation category. The system of substance-based prices is gradually taking over from the group of maximum prices fixed by the MF or local governments for some significant items such as prices of heat, postal charges, water and sewage rates, prices of some health care procedures, bus fare, etc. Prices of automotive and solid fuels were recently excluded from price regulation altogether.

4. Price Deregulation as Measured Statistically and its Impact on CPI

Price deregulation in the economy is measured by the difference in any given period between the CPI and one of two separately developed measures called "core inflation" and "net inflation", respectively. In the practice of the Czech Republic price deregulation has been (except for 1993) by far the largest component of this difference (the other being changes in taxation and, possibly, subsidy reduction). A precise study of the phenomenon would, of course, require correction for these influences.

The Czech Sta tis ti cal Of fice (CSO) origi nally de vel oped and still pre fers "core in fla tion". In par al lel, how ever, the Czech Na tional Bank (CNB) de vel oped the other in di ca tor and started us ing it in their own prac tice as their in fla tion tar get. In or der to keep the two in step the CSO n ow produces both from the same raw data. Their dif fer ence is the re sult of im plied varia tion in their weight ing schemes.

First, the CSO uses "core in fla tion" to meas ure the ex tent of de regu la tion or, more gen er a lly, of ad min is tra tive meas ures in the area of prices by means of the in flu ence of these meas ures on CPI. Monthly in cre ments of CPI (monthly in fla tion), bro ken down by source of ag gre gate price level growth, are re leased every month. Sub se quent to cal cu lat ing the in flu ence of the movement of all "ad min is tra tive prices" on the to tal in cre ment in a given month, the time se ries (in di ces reduced by the in flu ence of ad min is tra tive prices) is sea son ally ad justed and pub lished as "core inflation". "Ad min is tra tive prices" are price rep re sen ta tives rep re sent ing all prices in the con sumer bas ket, whose level is af fected in an ad min is tra tive man ner (i.e. by con trolled or substance-based prices, vari ous charges and fees and in sur ance). The in flu ence of ad min is tra tive prices also includes the im pact of tax ad just ments (both VAT and con sumer tax) or the re duc tion or abol ish ment of sub si dies. Of the to tal number of 733 price rep re sen ta tives used in CPI cal cu la tions, 95 cur rently rep re sent ad min is tra tive prices. The con stant weight ing of the rep re sen ta tives (share in 1993 con sump tion) is 18.3%, but the Feb ru ary 1999 up dated weight ing is higher (21.6%). This is con nected with the al ready men tioned phi loso phy of the hith erto used de regu la tion steps which ac cel er ate in creases in con trolled prices. Plac ing in di vid ual rep re sen ta tives among administrative prices largely cor re sponds to the list pub lished in the no tice of the MF CR. This is why the number of ad min is tra tive prices di min ishes as time goes by (in 1995 they ac counted for 22.4% in constant weight ings). A prob lem can arise with the place ment of an item among ad min is tra tive prices, if the price rep re sen ta tive is too widely de fined. In the Czech Re pub lic, this is the case, for in stance, for serv ices re lated to the use of dwell ings – the ten ant pays a com pos ite fee for gar bage re moval, il lu mi na tion of com mon rooms in an apart ment build ing, op era tion of the lift, etc. As the pre vailing part of the con tents of this pay ment in cludes items un der price con trol, we place this price rep resen ta tive among ad min is tra tive prices, too.

Sec ond, simi lar in for ma tion to "core in fla tion" (i.e. in for ma tion on changes in price level caused by mar ket in flu ences) is meas ured by the so- called "net in fla tion" in vented by the CNB and pub lished by the CSO. Net in fla tion a sub- index of the CPI – i.e. an in dex cal cu lated from an in com plete con sumer bas ket for items (price rep re sen ta tives) with free, i.e. market- influenced prices. The list of ad min is tra tively af fected prices ex cluded from the cal cu la tion is iden ti cal to that for the calculation of core in fla tion. (The ef fect of tax changes is also ex cluded, this time, of course, with out ex clud ing the whole item.)

If ad just ment for sea sonal varia tions is ex cluded, or, put an other way, in com par ing price levels of two sub se quent years or of two cor re spond ing months in dif fer ent years, the in cre ment of total CPI caused by "net in fla tion" is equal to "core in fla tion". There fore, add ing to gether the "net in fla tion" in dex and its sup ple ment, the ad min is tra tive prices in dex, and re- weighting them us ing the up dated weight ing share of the items sepa rated in this man ner, the ag gre gate CPI is reached, and the in flu ence of the two sub- indices on the ag gre gate CPI cor re sponds to the sepa ra tion of items of the CPI used in com put ing "core in fla tion". Us ing the con cept of net in fla tion for sta tis tics is thus at best re dun dant.

The sepa rate meas ure ment of the im pact of ad min is tra tive and mar ket prices on price level trends in the CR sug gest that the im pact of price de regu la tion (ad min is tra tive meas ures) on to tal price level change was be com ing more dis tinct up to 1998. The big price leap in 1991 as com pared to the pre vi ous year (av er age an nual in fla tion 56.6%) fol low ing price lib er ali za tion is ba si cally a con se quence of ad min is tra tive meas ures. If we stick to the defi ni tion of "ad min is tra tive prices" men tioned above, it can be noted that the im pact of ad min is tra tive meas ures on ag gre gate in flation has grown since the early 90s, gradu ally from less than a quar ter (ex cept for 1993 when VAT was in tro duced) up to al most 60% in 1998 (see the ta ble be low).

Im pact of ad min is tra tive meas ures on CPI

Indicator	1991	1992	1993	1994	1995	1996	1997	1998
	Previous year = 100							
Aggregate CPI increment	56.6	11.1	20.8	10.0	9.1	8.8	8.6	10.7
Incl. impact of administrative measures (%points of the above)	9.0	3.3	13.6[1]	2.6	1.9	3.2	3.7	6.3

1) *Incl. the effect of introduction of VAT – estimate*

It is a frequent case that the CSO is asked to make calculations when administrative measures (or price deregulation) are only under preparation. Model calculations of possible effects of envisaged changes in price regulation on inflation rate are likely to affect real decision-making as to the extent and timing of deregulation processes. However, unlike previous governments, the current government failed to publish any plan for price deregulation in the future, which makes it difficult to draw up forecasts of future inflation trends.

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Measuring the Effects of Deregulation in the Banking Sector: Some First Results on the Share Portfolio

Rudi Acx – National Bank of Belgium

1. Introduction

The pro cess of de regu la tion is in es sence a ju di cial de ter mined de vel op ment. The most recent wave of de regu la tion in the Euro pean fi nan cial sec tor started dur ing the eight ies, and was trig gered and sus tained by sev eral Euro pean Di rec tives en vis ag ing a com peti tive fi nan cial sec tor through the crea tion of the nec es sary con di tions for a level play ing field. The de regu la tion takes dif fer ent forms. This con tri bu tion deals with one of them in the bank ing sec tor.

The ac cess to the mar ket which been en larged on both the sup ply and the de mand side of the mar ket. Com pa nies ac tive in one former seg ment of the mar ket are now al lowed to act in most of the re main ing seg ments of the fi nan cial sec tor, which led to despe cia li za tion. In coun tries where a net dis tinc tion ex ists be tween portfolio- companies and de posit tak ing com pa nies, as e.g. in Bel-gium, the lat ter type of com pa nies be came en ti tled to in crease and to di ver sify their share port fo lio. The paper presents, on empirical grounds, to what extend the Belgian credit institutions have adapted the size and com po si tion of their port fo lio in shares.

2. The Detention of Shares by Belgian Credit Institutions: Legislation and Datasources

The Bank ing Law of 1993 in tro duced a new ap proach to the hold ings of shares by the credit in s ti tu-tions es tab lished in Bel gium. New con di tions were de scribed un der which the credit in sti tu tions could hold dif fer ent kinds of shares in other com pa nies, whether it is as trad ing in stru ment, in vest-ment in stru ment or fixed fi nan cial as set (par tici pa tion) in stru ment. The law fore sees three cate go-ries:

- Shares which may remain in portfolio on a temporary base (up to 2 years). It concerns shares, which are intended to be offered to the public, or shares, which serve as a guaranty for outstanding unpaid claims.
- Shares which may be kept in portfolio without any restriction. It concerns shares issued by other credit institutions, insurance companies, investment firms, companies active in financial transactions and companies that render services to the credit institutions.
- Shares which can be part of the assets of the credit institutions but limited to a certain amount. It concerns shares in the capital of companies other than those mentioned in the previous part. Apart from quantitative constraints on the individual shares, this group of shares may not exceed 35% of the total own funds of the credit institution holding the shares.

The last cate gory con sti tutes the most im por tant change to the regu la tion. A com pari son is made be tween the situa tion at the end of 1993 and 1998. The analy sis is based on the de tailed full n omi-na tive de scrip tion of the port fo lio com po si tion, which must be com mu ni cated to the monetary and pru den tial con trol authori ties in Bel gium each quar ter of a year. On the base of these in for mation, in clud ing the ISIN codes of the shares, the Na tional Bank of Bel gium has es tab lished a da tabase in which, among other vari ables, the in sti tu tional sec tor is at trib uted to each in di vid ual share.

3. Composition of the Share Portfolio of the Banks

The to tal as sets of the banks es tab lished in Bel gium amount to around € 745 000 mil lion in 1998. In ter bank claims and claims on cli ents rep re sent nearly 66% of the to tal. Se cu ri ties on the gov ern-ment sec tor con sti tutes an other 20% The bal ance con sists of other se cu ri ties (7% – mainly long term), fixed as sets (2%) and mis cel la ne ous as sets (5%). The shares are lo cated in the items "Other se cu ri ties" and in the "Fixed fi nan cial as sets".

Table 1 – Composition of the share portfolio of the banks established in Belgium

Period	Belgium						Rest of the world			All countries		Total
	Financial Institutions (FI)				non FI	Total	non FI	FI	Total	FI (1)	non FI (1)	
Year	Insurance	Banks	Other FI	Total								
	Participation's in pct. of total share portfolio											
1993	100	81	63	72	87	74	40	68	67	69	69	67
1998	100	84	36	70	83	71	10	89	82	80	46	74
	Horizontal breakdown											
	Participations											
1993	2,6	9,0	12,1	23,7	4,3	28,0	1,1	68,1	69,2	91,8	5,4	100
1998	11,6	18,9	7,2	37,7	4,9	42,5	0,6	54,7	55,3	92,4	5,5	100
	Shares											
1993	0,0	4,3	14,3	18,6	1,3	19,9	3,5	64,7	68,2	83,3	4,8	100
1998	0,0	10,5	37,1	47,5	2,9	50,4	15,6	20,4	36,0	67,9	18,5	100
	Total											
1993	1,8	7,4	12,9	22,0	3,3	25,3	1,9	67,0	68,9	89,0	5,2	100
1998	8,6	16,8	14,9	40,2	4,4	44,6	4,5	45,9	50,3	86,1	8,8	100
	Evolution in %											
	Participations											
98/93	700	284	8	189	108	177	-3	46	45	83	84	82
	Shares											
98/93	0	209	227	223	181	220	470	-60	-33	3	391	26
	Total											
98/93	699	270	89	198	117	188	282	12	20	58	178	64

(1) Non adding up to 100% is due to shares which could, up to now, not be attributed an unambigious sector code.

The total value of the share portfolio of the credit institutions rose from €7 339 million in 1993 to € 12 004 million in 1998, an increase of 64% The credit institutions increased their participations by 82% representing three quarters of their total share portfolio, compared to two- thirds 6 years earlier. The bulk, around 92%, of the participations is oriented towards financial enterprises and has not undergone a substantial change over the period under review.

Contrary to the general idea of internationalization, the participations in financial enterprises were directed towards domestic financial institutions rather than to non- domestic financial enterprises. Within the domestic financial institutions, the insurance companies and the credit institutions were those with the largest attraction. This reflects of course the idea of bank insurance respectively the co- operation tendency without merging. Specific for the shares of Belgian insurance companies held by the credit institutions is the fact that they all concern participations and none, or nearly none, are kept in portfolio for investment or trading.

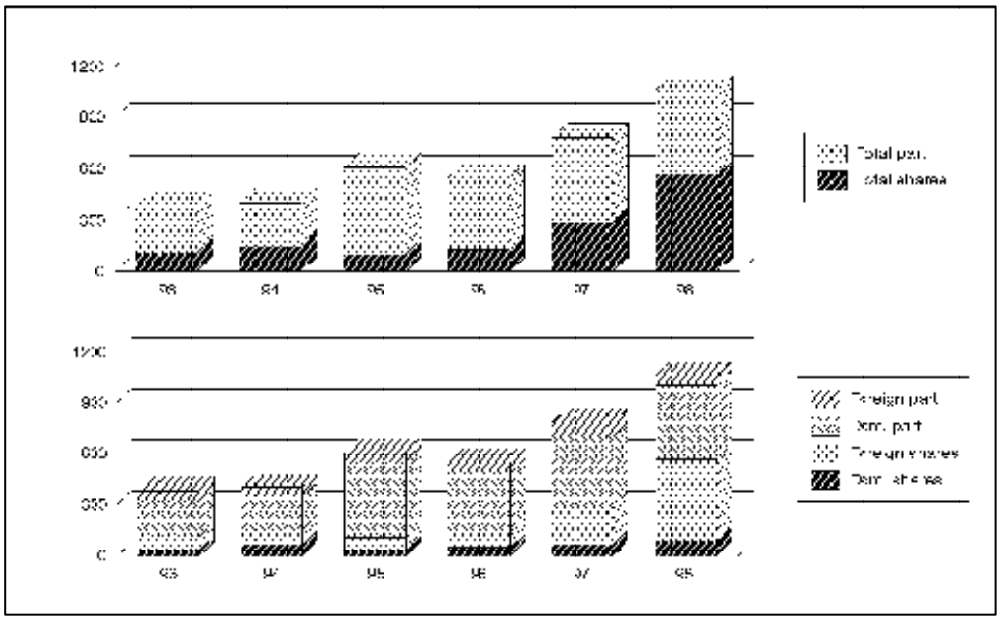
4. The shares of non-financial enterprises

Regarding the shares of non- financial enterprises, one can observe that the amounts invested in that kind of paper remain rather modest: €1058 million in 1998, against €525 million in 1993. This doubling of the value is higher than the increase of the total share portfolio over the period under review, but still represents only 9% of the total share portfolio in 1998, coming from 7% in 1993. In 1998 the total shares held from non- financial institutions were equally divided between domestic

ones and for eign non- financial en ter prises. In 1993 there was still a rela tive pref er ence for in vest-ment in shares from do mes tic non- financial en ter prises. The ob jec tive of the in vest ment in these companies is quite dif fer ent be tween the do mes tic and the for eign ones. Credit in sti tu tions in-creased sub stan tially their par tici pa tions in do mes tic non- financial com pa nies while their mod est par tici pa tions in for eign non- financial en ter prises have been re duced. For these last they pre fer to keep them as an in vest ment or for trad ing pur poses.

A more de tailed view on the in tertem po ral evo lu tion on this kind of shares in the port fo lio of the banks is pro vided in Fig ure 1.

Fig ure 1 – Break down of the shares held in non- financial en ter prises



Dur ing the pe riod 1993- 1997 the par tici pa tions con sti tuted the larger part in the port fo l io. Only in 1998 the part of the shares out weighted that one of the par tici pa tions. The par tici pa tions i n do mes-tic non- financial en ter prises re mained rather sta ble over the pe riod 1995- 1998, af ter an upward swing in 1994. They rep re sent the larg est part of the port fo lio dur ing the pe riod 1993- 1997. The rela tive im por tance of par tici pa tions in for eign en ter prises was sta ble at a low level over the whole pe riod un der re view, as did the part of shares, other than those kept as a par tici pa tion, inthe for eign non- fi nan cial en ter prises. The shares of for eign non- financial en ter prises held by the banks surged from 1997 on and form in 1998 the larg est part of the share port fo lio of the banks.

5. Conclusions

The in ter pre ta tion of the above- mentioned re sults is not that straight for ward. First of all, there is the prob lem of valua tion. In the case of in vest ment and trad ing the shares must be val ued against the mar ket (or a mar ket re lated) price, while the par tici pa tions can be val ued against the h istoric pur chase price. This leads even to an un der es ti mate of the part of par tici pa tions in the to tal share port fo lio of the credit in sti tu tions. Sec ondly, the on go ing merg ers do de struct out stand ing par tici-pa tions and thirdly ac qui si tions of credit in sti tu tions by the same hold ing com pany can lead to a drain of the cross- holdings of shares from the port fo lio of the con cerned credit in sti tu tion s to the com mon hold ing com pany. Both phe nom ena re duce the ous tand ings of shares held by credit in s ti-tu tions. For a cor rect as sess ment, cor rec tions tak ing ac count of these shifts are needed.

As a pre limi nary con clu sion on the re ac tion of the credit in sti tu tions to the ma jor change in the Bank ing law, one can state that the credit in sti tu tions did not ex ploit so far the pos si bi li ties of fered by the new law as the pro por tion of the shares is sued by non- financial en ter prises do rep re sent only roughly 3% of the own funds.

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The Deregulation of Interest Rates

Rudi Acx and Olivier Coene – National Bank of Belgium

1. Introduction

Retail interest rates in Belgium were set on a concertation base till far in the eighties, early nineties. Under the pressure of the European anti-cartel legislation this way of interest rate setting was not longer accepatable. For that reason, the concertation by the banks on the interest rate setting for time deposits was abandoned in 1987 and the one by the public credit institutions on medium term debt securities came gradually to an end in the beginning of the nineties. One may expect that through a market driver rate setting, the volatility of the retail interest rate will increase.

An important part of the money market in Belgian Franc consists of Treasury bills. The interest rate was set by the central bank until January 1991. Given the flexibility of the issues, there was no active secondary market in these bills. Since the introduction of the new monetary policy framework in January 1991 Treasury bills are issued through auctions. This paper investigates in its second part the in(dependence) and causality between the interest rate on Treasury bills and the interbank interest rate.

2. Volatility of interest rates in the retail market

Before presenting the results, the used methodological approach is explained.

2.1. Used methodology

To compute the volatility the so-called *classical logarithmic volatility* is used. This approach is the standard in the market and calculates the moving standard deviation (SD) of the logarithm of the ratio for two successive interest rates levels.

$$SD = \sqrt{\frac{1}{n-1}\sum_i (V_i - \overline{V})^2} \qquad (1)$$

where:

$$V = Ln\,(rate\,t\,/\,rate\,t-1)$$

$$\overline{V} = \frac{1}{n}\sum_i V_i$$

$$Volat = SD\sqrt{N} \qquad (2)$$

For the concerned financial instruments volatility was computed for both subperiods. To test the potential difference in average volatility in both periods the rough "test of difference between two populations" is applied. This test has a decision criterion formally implied by a z-distribution (5% level).

$$z = \frac{\overline{x}_1 - \overline{x}_2 - \delta}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}} \qquad (3)$$

where:
1,2 refers to period 1, resp. 2
δ test value (here zero)

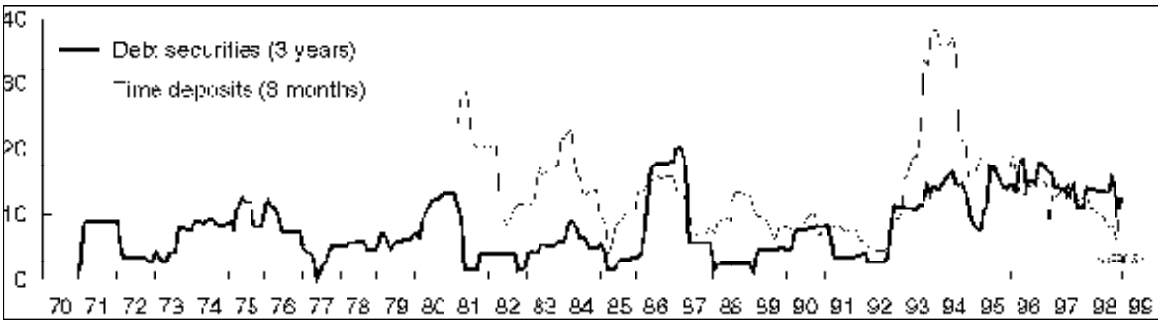
2.2. Results

For the time de pos its, the in ter est rate on 3 months de pos its was se lected and the two sub p e ri ods are Janu ary 1980- June 1987 re spec tively August 1987- February 1999. For debt se cu ri ties the rate on debt se cu ri ties with an origi nal ma tur ity of 3 years was re tained, while the sub pe ri ods are January 1971- June 1991 and July 1991- February 1999.

The av er age vola til ity of time de posit in ter est rate amounts to 14.9% in the first pe riod and to 13.4% dur ing the sec ond pe riod. For the debt se cu ri ties the re sults are 6.6% re spec tively11.8% For the time de pos its the null hy pothe sis is not re jected while for the debt se cu ri ties the null hypothe sis is re jected, sug gest ing a higher vola til ity since the pub lic credit in sti tu tions abol ished their concerted in ter est rate set ting.

For both rates the rela tive changes in the in ter est rate level is not dif fer ent be tween the t wo concerned pe ri ods.

Fig ure 1 – Evo lu tion of the in ter est rate vola til ity (monthly ob ser va tions)



As can be ob served in Fig ure 1, the vola til ity of the in ter est rate on time de pos its in the sec ond period is heav ily in flu enced by the ex change rate cri sis started in August 1993. When elimi nating this spe cial event the sec ond pe riod was re cal cu lated not tak ing into ac count this cri sis pe riod. The result from this al ter na tive sug gests a sig nifi cant higher vola til ity dur ing the first pe ri od.

3. The Causality between Benchmark Interest Rates in the Money Market

As for the analy sis of the vola til ity, the meth od ol ogy is first pre sented while af ter wards the re sults will be dis cussed.

3.1. Used methodology

Two fami lies of meth ods to track the cau sal ity are re tained to meas ure the grow ing ef fi ciency in the money mar kets. The *first one* is the so- called "*Granger cau sal ity model"* which tests the im provement be tween the re sults of an *unrestricted regression* tak ing into ac count the past val ues of the "causal" vari able and the past val ues of the "caused" vari able and the re sults of a *re stricted re gression* which uses only the past val ues of the "caused" vari able. A hy pothe sis test is then im plemented to de ter mine if the co ef fi cients of the "causal" vari ables in the un re stricted re gres sion are sig nifi cantly dif fer ent from zero. To for mally de cide the F- ratio dis tri bu tion is used at the level of 5%.

$$F = \frac{(ESS_U - ESS_R)/K}{RSS_U/(n1-k1)} \qquad (4)$$

where:

u, r = un- resp. re stricted equa tion
ESS stands for ex plained sum of square
RSS is the re sid ual sum of square
K is the maxi mum lag
n1 = n-K and n is the number of ob ser va tions
k1 is the number of pa rame ters es ti mated in the un re stricted re gres sion

The *second approach* of causal relation is the *cross correlation* function (CCF) and the process of *prewhitening* which rends meaningful this cross correlation. The transfer function (5) is the relation between an explicative leading time-series and a leaded time-series. To measure the structure of the relationship and to modelize the transfer function, the cross correlation function (8) is used; it provides the time profile of correlation between the two series. The two gross series have to be transformed: the "causal" series must be transformed into a white noise process (6), i.e. a series of innovations, where α is the transformed series; the caused series must be prewhitened (7) by the model of the "causal" series. The two transformed series are then cross-correlated. We stress on the fact that for the lag k the *cross correlation* (10) is proportional to the parameters of the final model (5).

$$y_t = \frac{w(B)B^b}{\delta(B)} x_t + \frac{\theta(B)}{\phi(B)} a_t \equiv y_t = \sum v_t x_t + n_t \quad (5)$$

$$\alpha_t = \theta_x^{-1}(B)\phi_x(B)x_t \quad (6)$$

$$e_t = \theta_x^{-1}(B)\phi_x(B)y_t \quad (7)$$

$$\rho_{\alpha e}(k) = \gamma_{\alpha e}(k) / \sigma_e \sigma_\alpha \quad (8)$$

$$\gamma_{\alpha e}(k) = E[\alpha_t e_{t+k}] \quad (9)$$

$$v_k = \rho_{\alpha e}(k) \cdot \frac{\sigma_e}{\sigma_\alpha} \quad (10)$$

where:
B is a back shift operator
w(B) stands for the unpatterned spikes and the decay start-up of the CCF
δ(B) stands for the decay pattern of the CCF
θ(B), ϕ(B) stands for the MA, resp. AR part of an ARIMA model

3.2. Results

The tests on causality were performed using daily interest rate data for the period October 1989-December 1998. For the first period, the one before 29 January 1991, only the rates on Treasury bills at the time of issue are available due to lack of an active secondary market. During the second period the same approach was kept to insure comparability between both periods. For the BIBOR all daily observations were incorporated. The exercise confronts for both types of investment, which do form quasi-perfect alternatives for most agents, the rate for the 3 months maturity.

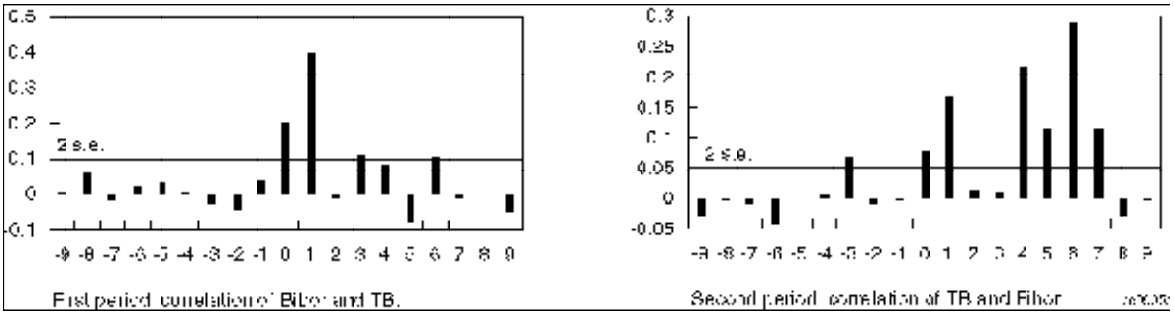
Following the Granger causality approach, the results suggest that during the first period the rate on Treasury bill influences the interbank deposit rate, while the reverse influence was not confirmed. During the period after the introduction of the new monetary policy framework, the Granger test suggests that both rates do influence mutually. For this second period the F-value in case of testing the causality from BIBOR to the Treasury bill interest rate is however much higher than in the case of the reverse direction.

Table 1 – Granger causality results

		F-test	5% limit	Heuristic
Period 1:	TB=f(BIBOR)	1,345	1,902	No influence
	BIBOR=f(TB)	13	1,902	Influence
Period 2:	TB=f(BIBOR)	94	1,883	Influence
	BIBOR=f(TB)	3,2	1,883	Influence

The results of the cross correlation function approach do confirm the outcome of the Granger test for the first period, suggesting a very quick – the same day and the following day – incorporation of the interest rate behaviour of the Treasury bill in the BIBOR. For the second period the cross correlation function shows a significant causality of the BIBOR to the Treasury bill interest rate. This confirms to a certain extent the, not statistical significant, Granger result.

Fig ure 2 – Cross cor re la tions



When test ing the cau sal ity be tween the BIBOR and the sec on dary mar ket in ter est rate on Treas ury bills for the sec ond pe riod, it seems that there is a si mul ta ne ous in flu ence be cause the significant cross cor re la tion of 0.73 is situ ated at lag zero. How ever there is a small – but sig nifi cant – cross cor re la tion at lag 1 sug gest ing cau sal ity from the Treas ury bill rate to the BIBOR.

These con flict ing re sults for the sec ond pe riod may be ex plained through the dif fer ent base data. When test ing on the Treas ury bill in ter est rate at is sue (which is an auc tion, Ameri can style) com peti tive bid ders will take ac count of past de vel op ments in form ing their ex pec ta tions about the out come of the auc tions. When test ing on data from the sec on dary mar ket that in sti tu tional as pect no longer plays a role. Com bin ing the sug gested cau sal ity in the sec ond pe riod based on the issues and the sug gested si mul ta ne ous ness of the sec on dary mar ket data makes the re sults of the first test men tioned spu ri ous.

4. Conclusion

The sta tis ti cal tests on vola til ity lead to mixed out comes. While for the debt se cu ri ties at 3 year the "con certed" in ter est rate set ting re sulted in less vola til ity than the mar ket driven set ting, this was not con firmed for the time de pos its at 3 month. The analy sis on cau sal ity be tween bench mark rates in the money mar ket con firms the lead ing char ac ter of the rate on Treas ury bills dur ing the period be fore the new mone tary pol icy frame work of 29 Janu ary 1991. Af ter the in tro duc tion of that new frame work the mar ket ef fi ciency has im proved but some evi dence is found that the rate on Treas- ury bills seems to domi nate. It is ob vi ous that this re la tion ship might have changed since stage three of the Euro pean Mone tary Un ion.

Résumé

Le pré sent ar ti cle a pour but de dévelop per quelques résul tats em piri ques con cer nant les conséquences de la dé ré gu la tion dans la fixa tion des taux d'inté rêts à la cli entèle et de la mise en place d'un nou veau mar ché des cer ti fi cats de trésore rie (CT) en Bel gique. Il ap paraît pour des in stru ments à court terme (dépôts à terme à 3 mois) que la dé ré gu la tion n'a pas en traîné une différence sta tis tique ment sig ni fi ca tive de vola til ité ; par con- tre, la vola til ité s'est ac crue pour des in stru ments à moyen terme comme les bons de caisse à 3 ans. Afin de cer ner les ef fets de la mise en place d'un nou veau mar ché des CT en 1991 la pré sence de cau sa l ité ("à la Granger" et selon le modèle de corré la tion croisée des sé ries chro nolo giques) en tre les taux des CT à trois mois et du BI BOR à trois mois a été testée. Il ap paraît pour la pre mière pé ri ode que les taux des CT avait une in flu ence sur le BI BOR, tan dis que dans la sec onde pé ri ode il ex iste une cer taine in ter a c tion, comme l'on pou vait s'y at ten dre.

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DISCUSSANT'S COMMENTS

Raymond Chaudron – De Nederlandsche Bank

"How to measure price deregulation in Central and Eastern European countries Globalization : Implications for International Standards in Statistics"

Many studies have shown the drive to improve efficiency and to lower production costs (so as to improve profitability) to be a very important mechanism in economic development. Experts, such as the IMF, have therefore consistently given the advice to countries in transition to liberalize prices as quickly as possible. The methodology developed at the Czech Statistical Office allows one to follow the economic importance of goods for which prices remain under administrative control. The "net" and "core" measures are useful tools for this although they do not measure the difference between state-regulated prices and those that would result in a competitive market. This would require an economic model of all relevant product markets and would probably lead to very hypothetical results.

An alternative to measuring price deregulation through the comparison of different consumer price indices would be to study the development of producer prices of products released from administrative control. As prices are left to be determined in the market, declining producer prices would give an indication of the ability of firms to pass on productivity gains into lower prices. Producer prices are particularly well suited for this as consumer prices often display a certain downward rigidity.

In general, the paper convincingly illustrates a strong need for extensive and reliable price statistics to monitor the deregulation process.

"Measuring the effects of deregulation in the Banking sector: some first results on the share portfolio"

During the last decade or so, competition in the European banking sector increased and disintermediation set in, leading to a decline in interest rate spreads. In response to these developments, banks have looked for alternative sources of income. Data from the OECD shows that the ratio of interest income to non-interest income has declined for banks in Belgium throughout the late 80s and early 90s. Between 1984 and 1987 this ratio stood at 4.4, while between 1992 and 1995, the ratio had fallen to 2.8 (OECD, Bank Profitability). One of the activities that banks have developed is that of intermediation in securities. In order to facilitate these activities, banks usually maintain a certain amount of securities on their books, so as to easily and quickly execute clients' orders. However, contrary to expectations, the data presented in the paper shows the increase of bank's share holdings to be only modest. The only remarkable rise was in the holdings of shares in foreign non-financial institutions.

While it seems clear that the interest of Belgian banks in shares is limited, conclusions about participations are much harder to draw. The author notes that, as in many other European countries, there has been a strong move towards the establishment of financial conglomerates, bringing together banks and insurance companies. The data presented in the paper indicates that Belgian banks have been involved in this for quite some time. However, the evidence is not conclusive, caused by problems in the valuation of participations and the transfer of shares to holdings. A more comprehensive study of participations between banks and insurance companies would necessitate the inclusion of these holding companies, although they are rarely banks and therefore fall outside the statistical population. This in itself illustrates the difficulty of maintaining meaningful statistics of the financial sector, where the boundaries between different subsectors have become increasingly blurred.

“The deregulation of interest rates”

The de regu la tion of in ter est rates is a very im por tant sub ject. It is re lated to one of the most im por-tant ten ets of free mar ket eco nom ics: the be lief that an ef fi cient mar ket for (money and) capi tal will bring to gether sav ings and in vest ment at equi lib rium in ter est rates which in turn de ter mi ne fu ture eco nomic growth. A con cer ta tion pro ce dure be tween banks on the level of these in ter est rates could lead to the es tab lish ment of a non- equilibrium in ter est rate, caus ing a dis tor tion in the money and capi tal mar kets and in turn af fect ing eco nomic growth. I would there fore like to con cen trate on the re sults from the study of the vola til ity of the three- month time de posit rate.

The à pri ori ex pected ef fect of col lu sion is rela tively straight for ward. One ex pects that col lu-sive ar range ments would on av er age lead to lower in ter est rates on time de pos its so as to al low the least com peti tive bank a cer tain profit mar gin. The pa per does not ex plic itly men tion an un der ly ing ex pla na tion for the hy pothe sis that in ter est rates on time de pos its would be come more vola tile af ter con cer ta tion was abol ished other than mar ket driven rate set ting. It would also be im por tant to know whether all banks still of fer one uni form rate, de ter mined not by con cer ta tion but per-haps through an other form of co- ordination. If not, an in ves ti ga tion of the range of in ter est rates of fered (where the av er age range over a cer tain pe riod of time is cal cu lated ac cord ing to equa tion (1)) would be an al ter na tive. Dur ing the pe riod of con cer ta tion, this meas ure would equal zero. With mar ket driven rate set ting, the mar ket could be come dif fer en ti ated and the in ter est rates there fore less uni form.

$$Range = \frac{1}{T} \sum_{T}^{t=1} (r_{\max,t} - r_{\min,t}) \qquad (1)$$

r = in ter est rate, t = unit of time

An other test would be to look at the mar gin be tween debit and credit rates. One ex pects that more cost ef fi cient banks would be able to of fer higher rates on time de pos its than oth ers, when the rates are set in a com peti tive mar ket. This would in turn mean that the mar gins would have de creased af-ter the abol ish ment of con cer ta tion. In sup port of this, a study of com peti tive ness in the Euro pean bank ing in dus try shows that the mar gin be tween net in ter est in come and that on non- bank deposits has de creased sig nifi cantly since the mid dle of the 80s (Euro pean Com mis sion, 1997, p. 11).

In con clu sion, the es tab lish ment of a com peti tive mar ket for house hold sav ings has not been proven, nor dis proved. More in ves ti ga tion could shed light on this ques tion.

References

European Commission, December 1997, European Economy, Supplement A, No. 12, Luxembourg.

Organisation for Economic Co-operation and Development. Bank Profitability (various issues), Paris, quoted in: J. M. Groeneveld, 1999. De kernactiviteiten van banken (The core activities of banks). Maandschrift Economie 63, 187-206.

Résumé

Le pre mier ar ti cle cri tiqué démontre le be soin des sta tis tiques des prix pour les pays en tran si tion en Europe de l’Est afin de sur veil ler le pro grès de dé ré gu la tion. La méthod olo gie usée per mets la dé ter mi na tion du poids économique des pro duits dont les prix sont con trôlés par l’E tat. Je pro pose ainsi d’ana l yser les prix à la pro duc tion après dé ré gu la tion afin de me surer les amé lio ra tions de pro duc tivité.

Les deux autres ar ti cles il lus trent les pro blèmes ren con trées dans les sta tis tiques des se cteurs fin an ciers bel-ges. L’ar ti cle sur la dé ten tion des ac tions par les ban ques in dique que la dif fu sion des f rontières sectorielles rend la col lec tion des données sig ni fi ca tives beau coup plus dif fi cile. Dans le der nier, les au teurs ne trou vent au cun preuve que le mar ché d’épar gne soit de venu plus compé ti tif après l’a bo li tion de la fixation com mune des taux d’inté rèts. Je pro pose quelques tech niques al ter na tives et je pré sente des in di cateurs in di rects fai-sant preuve du con traire.

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Fisher's Short Stories on Wealth 22-32

Arthur Vogt

22. The Future, not the Past, Rules Value

The present batch of Short Stories is devoted to the phenomenon of interest. These Stories were published between January and October 1928. A few years later, Fisher published his monography on the theory of interest (Fisher 1930). Its full title is "The Theory of Interest: as determined by impatience to spend income and opportunity to invest it". However, mostly only the first part of the title is quoted. The precision "...as determined by Impatience to spend income..." expresses the main idea of the present Story and of Story 27. The continuation of the title "... and opportunity to invest it" is treated in Story 31.

Fisher (1911) was entitled "The 'Impatience Theory' of Interest". But in (Fisher 1907) the expression "impatience theory" was not yet used. At that time, Fisher wrote of the "preference for present over future goods".

23. The Riddle of Interest

Fisher used the terms "the riddle of interest" or "the interest problem" to denote the process of the determination of the rate of interest.

There is a "special riddle of interest" treated and solved by Fisher in Story No. 52. I call it "the compound interest paradox": 1 cent placed at a fair rate in the year 1, yields an incredibly high sum until the year 2000.

Marx (1894:408-410), referring to Price, treats the compound interest paradox. Price (1772 :i.314) wrote:

> One penny put out at our Saviour's birth to five per cent compound interest, would, in the year 1791, have increased to a greater sum than would be contained in three hundred millions of earths, all solid gold. But, if put out to simple interest, it would in the same time have amounted to no more than seven shillings and sixpence. All governments that alienate funds destinated for reimbursements, choose to improve money in the last rather than the first of these ways...

Fisher's Short Stories on Wealth, 1926-1933

*Dr. **Arthur Vogt** has drawn our attention to a series of simple explanations of elementary principles of economics which Fisher wrote in an agreement with the Worker's Education Bureau. Fisher called them "Short Stories of Wealth". The bureau issued them monthly for publication in any union newspaper that desired to print them. They appeared in the "Brotherhood of Locomotive Firemen and Enginemen's Magazine", "Trade Union News", "Labor Herald" etc.*

The stories had never been reprinted and had not been included in "The Works of Irving Fisher" (General Editor W.J. Bates, Consulting Editor J. Tobin), which was published in 1997. However, the Stories are worth to be read up to the present day. Besides the scientific and historical interest they are of didactical use as they are models of explaining economic phenomena to the public. The IFC Bulletin decided to publish all these "Short Stories of Wealth"

In the comment to Story 24 the solution of Leibniz to this riddle is presented. In Story 52 readers will find Fisher's solution.

24. Is Interest-Taking Wrong?

In the present Story Fisher lists arguments why interest was forbidden in history. Fisher (1907:4) had mentioned another reason for rejection of interest (see also Fisher (1930:48)):

> An objection, formerly common, to the practice of taking interest was that interest is "unnatural". The word employed among the Greeks to signify interest or usury was τοκοζ, "offspring"; and Aristoteles declaimed against the taking of interest, on the ground that money could not have "offspring" – a curious instance of influence of terminology on thought.

It is noteworthy that Fisher, in a trade union journal, justified interest and low wages. Dorfman (1994:36) states that Böhm-Bawerk (to whom Fisher (1930) is dedicated) treated the competing claims of capital and labour on national production. Fisher, on the other hand, excluded class war in his capital and interest theory and treated each individual, capitalist or worker, alike in his theory. Fisher (1907:40):

> The capitalists of to-day are receiving compound interest on the labour of yesterday... But it does not follow that in this any injustice has been done to the labourer...

The universal genius Leibniz also treated the problem of interest. We owe to him the formula used today for compound interest. He defended it against the formulas by Hoffmann and by Carpzov, used in his times and even later. Bortkiewicz (1907:61) states that the exponential formula for compound interest had already been introduced by Stevin in 1584 and de Witt in 1671. The merit of Leibniz (1683a) was, in the true sense of the word, to introduce a "juridical-mathematical meditation" on the subject. That's why the exponential formula is called Leibnitz' interest formula (Vogt 1997,1998). It is the same with Fisher's price index. Walsh used it the first time in 1901, but when Fisher, in 1922, revealed its merit the index was called after him!

Leibniz (1683b) even solved the compound interest paradox mentioned in the introduction to Story 23. In order to protect debtors, he proposed to use his compound interest formula only for (backwards) discounting (German: abzinsen), but not for (forward) capitalizing (German: aufzinsen). [1] One might speak of a kind of economical hysteresis. (Cf. Georgescu (1971:126): "... bringing light to the nasty type of questions that besiege the Pareto-Fisher approach to consumer's behavior as soon as we think of the hysteresis effect"). Marx (1894:408) recollects that Price, in 1772, had said in jest: "You have to borrow money for simple interest and lend it for compound interest..."

25. Some Wrong Explanations of Interest

A wrong explanation of interest is that it depends directly on the productivity of capital. According to Fisher, it is the other way round: income creates the value of capital. Capital wealth is merely the means to the end called income." (Fisher 1930:61). For a perpetual annuity as in the example in this Story, capital is the present spot cash value of the discounted interests. Generally, capital is the expected value of future income – interests and capital to be returned. In actuarial science, this corresponds to the prospective approach, contrary to the retrospective one.

A practical application of that principle was used in the Swiss legislation on supervising life insurance (BPV 1938): "The mathematical value (of a bond in the balance sheet) is the present value at the time considered of the capital and the future interests calculated on the base of the remaining fixed time or the amortization plan." For a perpetual annuity, the increase of this mathematical value is equal to the interest according to formula (2) below.

Fisher (1907:340) defines

- the rate of interest in the price sense: The ratio between the annual rate of a perpetual annuity and the equivalent capital-value. (Fisher 1906:192)).
- the rate of interest in the premium sense: The excess above unity of the rate of exchange between the values of future and present goods taken in relation to the time interval between the two sets of goods (Fisher 1906:194)).

1) *1 am indebted to Professor Knobloch, Berlin, for a French translation of said Latin letter.*

As a numerical illustration, Fisher (1906:198) supposes that the rate is 4% (in the premium sense, we calI it the "nominal" sense) for the first year ($i_1 = 4\%$) and 3% for the second and for all succeeding years ($i=i_2=i_3=i_4=....=3\%$) . The rate of interest in the price sense then is 3.03% and in the premium sense 37.5%. Thus, a very slight change in the nominal rate of interest implies a great change in the premium rate of interest. Fisher (1906:362) calculates the said rates of 3.03% and 37.333...% in a didactical way, implicitly using formulas:

$$j_1^{price} = \frac{1}{1-\frac{i_1 - i}{1+i_1}} = i \cdot \frac{1+i_1}{1+i} \tag{1}$$

$$i_1^{premium} = i_1 + \frac{i_1 - i}{i} \tag{2}$$

The following relations exist. Fisher (1906:363) gives the general case, we just the special case $i_2=i_3=i_4=....=i$.

$$\sum_{t=1}^{\infty} \frac{1}{(1+ j_1^{price})^t} = \frac{1}{j_1^{price}} = \frac{1}{1+i_1} \cdot (1+ \sum_{t=1}^{\infty} \frac{1}{(1+i)^t}) \tag{3}$$

$$\frac{1}{(1+i_1^{premium})} \left(1+ \sum_{t=2}^{\infty} \frac{1}{(1+i)^t} \right) = \sum_{t=1}^{\infty} \frac{1}{(1+i_1)^t} \tag{4}$$

Equation (3) expresses that j_1^{price}=3.03% in perpetuity is equivalent to a rate of i_1=4% in the first year and i=3% in subsequent years. And equation (4) that $i^{premium}$=37.333% in the first year and i=3% in subsequent years is equivalent to i_1=4% in every year.

26. Real Interest and Money

Fisher states that to distinguish between real interest and money interest is more difficult than between real wages and money wages because in the first case we have two dates to consider. I do not agree: Also when treating real wages we have to consider a base date for the real dollar. Furthermore, Fisher (1922:3) states ("wages" in bold by ifc Bulletin):

> An *index number* of the prices of a *number* of commodities is an average of their price relatives. This definition has, for concreteness, been expressed in terms of *prices*. But in like manner, an index number can be calculated for **wages**, for quantities of goods imported or exported, and, in fact, for any subject matter involving divergent changes of a group of magnitudes.

This Story is an abbreviated version of the manuscript "The real rate of interest" of February 20, 1923. Fisher quotes in it the aphorism born of the inflation at the time of the French Revolution: "After the paper money machine comes the guillotine." He goes on:

> ... Any attempt to stabilize the money rate of interest will be pernicious. It will destabilize the real rate of interest and the price level as well. Any attempt to keep the money rate artificially low, in the interest of the borrower is even more pernicious. It will even more disastrously destabilize both the real rate of interest and the price level and while at first the borrower will gain and gain greatly, in short time he will lose even more greatly... the road to reasonable interest rates lies through a stable price level, a careful avoidance of inflation and deflation alike – the Scylla and Charybdis of the ship of business.

In Story 67, "Stabilizing the Dollar", and other coming Stories, Fisher will go beyond Anatomy and Physiology to Pathology and Therapeutics.

27. Impatience to Spend

Fisher writes that the impatience principle applies to practically all goods. Beside others, he mentions food. Food today is preferred to food next year. In the Bible (Genesis 47, 24) Joseph said to

the people: " .. .And it shall come to pass in the harvest that you shall give one-fifth to Pharao. Four-fifths be your own, as seed for the field and for your food..." Thus Joseph cautiously refrained from indicating how to distribute income, after tax, between consumption and investment...

28. The Personal Reasons for Impatience

The present Story is a shortened version of Fisher (1907:103-109 or 1930:80-88). It contains the same five personal reasons as Fisher (1907):

1. Foresight
2. Self-control
3. Habit
4. Expectation of Life

Fisher (1907) calls this reason "uncertainty of life of the recipient of ... income". The termination of life brings the termination of the income from labour and of enjoyment of all income. Fisher is interested in the latter fact.

5. Love for one's children

Fisher (1907) calls this reason "care for the welfare of posterity".The love for one's children reduces the interest rate because the impatience to spend is small in order that the children can spend more. Life insurance is one of the strongest means of reducing the rate of interest. However, Borch (1977), referring to Fisher (1930), writes:

> ... The real paradox ... may be that life insurance companies, whose very existence seems to be threatened by inflation, contribute to the inflation by selling term insurance to cover loans which may accelerate consumption.

Fisher (1910:377) warns:

> When these sentiments of love for one's children decay, as they did decay at the time of the decline and fall of the Roman Empire, and it becomes the fashion to exhaust wealth in self-indulgence and leave little or nothing to offspring, the rate of impatience and the rate of interest will be high. At such time the motto: "After us the deluge," indicates the feverish desire to squander in the present, at whatever cost to the future.

One can generalize the "own children" to the future generations, which leads to ecology. This subject will be treated in a pioneer way in Story 74.

In Fisher t1930) a sixth reason is added: fashion.

6. Fashion

According to Fisher, fashion is probably the most fitful of all causes: fashion acts, on the one hand, to stimulate men to save and become millionaires, and, on the other hand, to stimulate millionaires to live in an ostentatious manner (Fisher 1930). I would like to add a similar example from Switzerland: emergency provisions. In the fifties, it was fashionable for every household to have a large stock of food. Nowadays, this is not the case anymore, although the self-supporting degree of Switzerland concerning food has become much lower. To my mind, the high food stocks in the sixties and the low ones today are more influenced by fashion than by the different risk of food scarcity.

29. The Impersonal Factors in Impatience

This Story is a shortened version of Fisher (1907:94-102 or 1930:71-80). Fisher distinguishes the following properties of income influencing the interest rate:

1. Increasing or decreasing income
2. Large or small income
3. Certain or uncertain income

Fisher (1907) treats also

4. the composition of the income-stream.

When reading Fisher (1907:98-99), it seems to me that the composition is very important in price theory, price index theory (commodity basket) but not as much in interest theory.

The content of Stories 28 and 29 is summarized in tables in Fisher (1907:115) and in a simplified version as follows in Fisher (1930:96):

> We may represent, however, the relation between time preference and income by a schedule like the ordinary demand schedule and supply schedule, if we make a list of income streams of all possible sizes, shapes, and probabilities, specifying for each individual income all its characteristics – its size, time shape (that is, its relative magnitude

in successive time intervals), and the certainty or uncertainty of its various parts, to say nothing of its heterogeneous and varying composition. Having thus compiled a list of all possible income streams, it would only be necessary for us to assign to each of them the rate of impatience pertaining to it. Such a schedule would be too complicated and cumbersome to be carried out in detail; but the following will roughly indicate some of the main groups of which it would consist. In this schedule I have represented, by the three horizontal lines, three different classes of income – two extreme types and one mean type – so that the corresponding rates of time preference range themselves in a descending series of numbers. The three vertical columns show three different classes of individuals, two being of extreme types, and the third of a mixed or medium type. Thus, the numbers in the table grow smaller as we proceed toward the right and as we proceed downward, the smallest numbers of all being the lower right-hand corner. This represents a man whose rate of impatience is only 1 per cent, being low both because his income is large, decreasing and assured, and because his nature is farsighted, self-controlled, accustomed to save, and desirous to provide for heirs.

Time Preference of Different Individuals with Different Incomes

	Individuals who are		
	shortsighted, weak willed, accustomed to spend, without heirs	of a mixed or medium type	farsighted, self-controlled, accustomed to save, desirous to provide for heirs
Income small, increasing, precarious	20%	10%	5%
Income of a mixed or medium type	10%	5%	2%
Income large, decreasing, assured	5%	2%	1%

This schematic representation is, in the effort to be general, rather vague. We may be more specific if, instead of thinking of a man's income stream as uncertain and variable at every point, we think of it, for the moment, as certain throughout and as invariable, or frozen, at all points of time except two – the present time and one year hence.
Restricted by this highly artificial hypothesis, we can construct for the man an impatience and demand schedule and demand and supply schedules for loans and interest analogous to the ordinary utility schedule and demand or supply schedule for commodities and prices.

Fisher (1907, chapter xv; 1930, chapter xviii) presents facts that "harmonize with the theory" (1907) and facts that "although they ... do not prove the theory ... are not in conflict with it" (1930).

The second statement is remarkable as it was written before Popper's "Logik der Forschung" of 1935 often stated as origin of the falsification principle.

30. How Impatience Influences Interest

The summary of the present Story is that human impatience is crystallized into the rate of interest. One might compare this with the equalizing of supply and demand into the price, treated in the previous batch. Fisher (1930:104) treats this subject in the Section "Equalization of impatience". There, contrary to the (popular) Story, he did not assume a direct exchange between "you and me", but introduces two individuals entering the loan market from opposite sides. Chapter xxii, Section 1 of Fisher (1910) is entitled "Equalizing Marginal Rates of Impatience by Borrowing and Lending" and corresponds to the present Story, the next section in Fisher (1910) "Equalizing Marginal Rates of Impatience by Spending and Investing" corresponds to the next Story.

31. Opportunity for investment

Normally, there is a market, an exchange between people resulting in interest rates. But even for Robinson Crusoe living alone, there is an impatience to spend and an opportunity to invest. He can eat more corn this year and less next year. Or invest labour constructing an instrument this year and work less hours or consume more next year.

The equilibrium point between the spending extreme and the investment extreme "clears the market, equalizing Impatience rates and Opportunity rates at a common rate of interest". Inventions first rise and then lower interest rates. But new inventions "are almost sure to come along tending to raise" the interest rate again. Fisher expresses his technological optimism. Schnabel (1998:51f) shows that Fisher was right with his technological forecast but not with his optimistic judgement:

> It is also symptomatic of the close link between time and money that it is possible to become rich in a much shorter time than previously... The larger and more mobile the rivers of money flowing round the world, the shorter the time in which they can be utilised... The time horizon against which decisions are being taken is shortening all the time... The faster the rate of innovations, the higher the interest rates which in principle can be paid... Higher interest rates also mean that investments have to pay off as quickly as possible. Thus the system tends to promote short-term thinking... There are a lot of problems which you cannot solve in ten years, but easily in 25. In the under-developed parts of the world, which have no access to the highly developed global economy of today, borrowing costs are very high, with interest rates of perhaps 30% or 40%. But that means that problems which require a time framework of very much more than three years cannot be solved... Acceleration of innovations ... leads almost automatically to an overexploitation of nature.

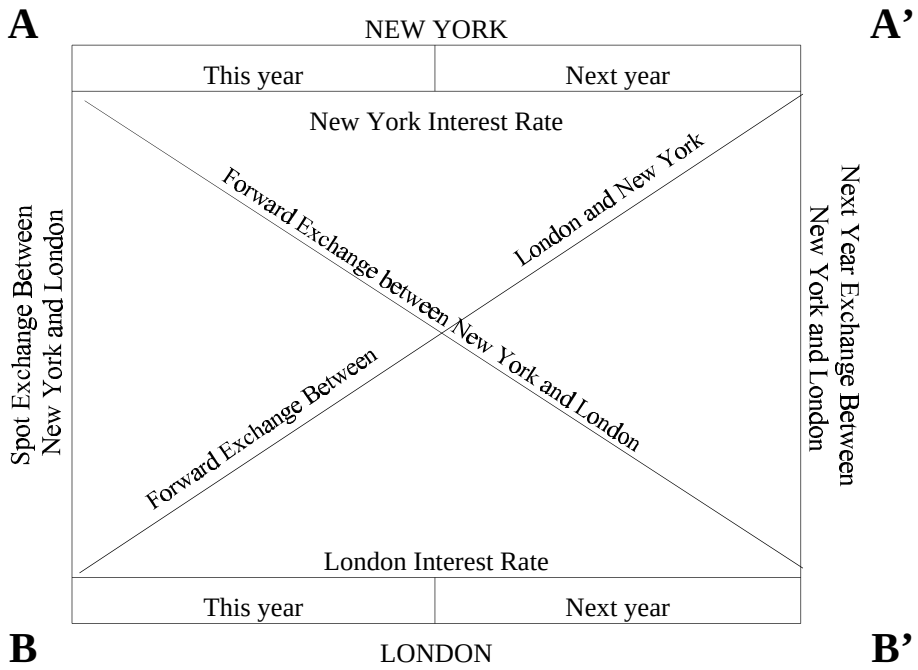
The 3rd and the last phrase of the above quotation yield: High interest rates lead to an overexploitation of nature.

By making the logical contraposition, the following statement can be deduced from reason 5 mentioned in Story 28: Care of the welfare of posteriority reduces the interest rate.

32. Before Leaving the Subject of Prices

Fisher compares the exchange rates for space (place) transfers to interest rates for time transfers. The following chart by Fisher (1930:69) illustrates the idea:

Chart – Interest rates between different years comparable with exchange rates between different places



> In this chart A and B represent present prices of enjoyable goods, and A' and B' prices of future enjoyable goods. A and A' refer to different years in the same place, say New York; B and B' are similar except that they relate to a different place, say London. All problems of local prices, exchange, and interest, act and react on each other in many ways. The problem of "time" foreign exchange, or forward foreign exchange, is indicated by the diagonals, and involves both interest and foreign exchange, i.e., both a time to time factor and a place to place factor combined in the same transaction. Both exchange and interest rates, as well as local prices, would be, theoretically, combined if, say, present New Year wheat were quoted in terms of future London coal.

At the beginning of his book Fisher (1930:3) wrote the most philosophical sentence:

> According to the modern theory of relativity the elementary reality is not matter, electricity, space, time life, or mind, but events.

The very first sentence reads: "INCOME is a series of events". – But that's another Story...

Bibliography

Borch, K., 1977, Optimal Life Insurance, Paper presented at the Fourth Seminar of Risk and Insurance Economics, Geneva, 26-28 May.

Bortkiewicz, L., 1907, Wie Leibniz die Diskontierungsformel begründet, Festgaben für Wilhelm Lexis, Verlag von Gustav Fischer in Jena, 1907.

BPV, 1938, Bundesratsbeschluss über die Bewertung der Wertpapiere in den Bilanzen der inländischen Lebensversicherungsgesellschaften, Bericht des Bundesamtes für Privatversicherung, 31-35.

Dorfman, R., 1994, Die Beziehung zwischen Fishers "The Rate of Interest" und Böhm-Bawerks "Positive Theorie des Kapitals", in commentary supplement to Facsimile of Fisher (1907).

Fisher, I., 1906, The Nature of Capital and Income. Macmillan Company, New York and London, Facsimile edition of 1991 by Verlag Wirtschaft und Finanzen, Düsseldorf, Vol. 2 in "The works of Irving Fisher", Pickering & Chatto, London 1997.

Fisher, I., 1907, The Rate of Interest, its Nature, its Determination and Relation to Economic Phenomena. The Macmillan Company, New York and London, Facsimile edition of 1994 by Verlag Wirtschaft und Finanzen, Düsseldorf. Vol. 3 in "The works of Irving Fisher", Pickering & Chatto, London 1997.

Fisher, I., 1910, Elementary Principles of Economics, Macmillan, New York.

Fisher, I., 1911, The "Impatience Theory" of Interest, Scientia, Bologna.

Fisher, 1., 1922, The Making of Index Numbers. A Study of Their Varieties, Tests, and Reliability. Reprint of 1967 by Augustus M. Kelley of the third edition of 1927, Vol. 7 in "The works of Irving Fisher", Pickering & Chatto, London 1997.

Fisher, I., 1923, manuscript "The real rate of interest" of February 20, 1923.

Fisher, I., 1930, The Theory of Interest: as determined by impatience to spend income and opportunity to invest it, August M. Kelley, New York, 1965, Vol. 9 in "The works of Irving Fisher", Pickering & Chatto, London 1997.

Fisher, I. N., 1956, My Father Irving Fisher, Comet Press, New York.

Georgescu, N., 1971, The entropy law and the economic process, Harvard University Press.

Leibniz, G. W., 1683a, Meditatio juridico-mathematica de interusurio simlice, Acta eruditorum, 425-432.

Leibniz, G. W., 1683b, Letter from Leibniz to Pfautz, end of August.

Marx, K., 1894, Das Kapital, 3. Band, Hamburg, the 1970 edition by Dietz Verlag Berlin was used.

Price, R., 1772, Observations on Reversionary Payments, London, the 7th edition of 1812 was used.

Schnabel, U., 1998, Time is Money, Vontobel-Foundation, Zürich.

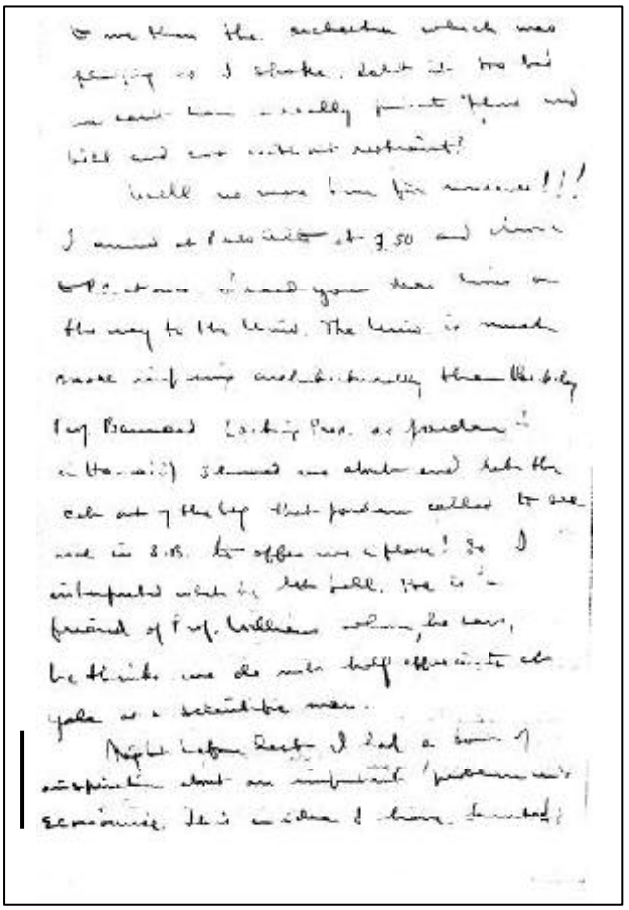
Vogt, A., 1997, Gottfried Wilhelm Leibniz, Pionier auch des Versicherungswesens, Beigebunden ein Dialog mit Leibniz über Sozialversicherung, Academy Paper AAE Nr. 6.

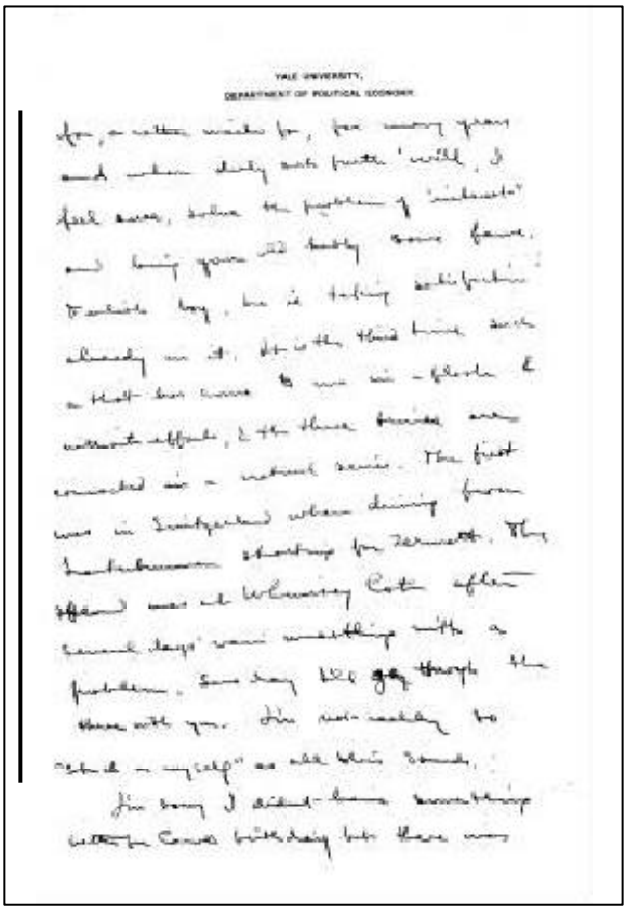
Vogt, A., 1998, Two New Formulae for Performance Measurement based on Irving Fisher's Price Index, IFC Bulletin, No. 2, 2-7.

Vogt, A. and J. Barta, 1997, The Making of Tests for Index Numbers, Mathematical Methods of Descriptive Statistics, published in Honour of the 50th anniversary of the death of Irving Fisher, Physica-Verlag, Heidelberg.

The three inspirations of the young Irving Fisher

Three sci en tific in spi ra tions hap pened to Fisher ac cord ing to a four page let ter of June 19, 1901 to his wife (see be low fac sim ile of the end of the sec ond page and the third page). This par tial tran-scrip tion reads:





Irving Fisher Pa pers, Manu scripts and Ar chives, Yale Uni ver sity Library

> *Night be fore last I had a sort of in spi ra tion about an im por tant prob lem in Eco nom ics. It is an idea I have hunted for, or rather waited for, for many years and when duly set forth will, I feel sure, solve the prob lem of "in ter est" and bring your old bobby some fame. Fool ish boy, he is tak ing sat is fac tion al ready in it. This is the third time such a thought has come to me in a flesh and with out ef fort, and the three times are con nected in a natu ral se ries. The first was in Swit-zer land when driv ing from Lau ter brun nen start ing for Zer matt. The sec ond was at Nar ra gan-sett Pier [1] af ter sev eral days' vain wres tling with a prob lem. Sun day I'll go through the theme with you. I'm not really so "struck on my self" as all this sounds.*

The first in spi ra tion sud denly oc curred to Fisher on a moun tain trip he made in Swit zer land in July 1894 while look ing at a wa ter ing trough, and its in flow and out flow: The ba sic dis tinc tion needed in or der to dis tin guish capi tal and in come was sub stan tially the same as the dis tinc tion b etween the wa ter in that trough and the flow into or out of it. Ac cord ing to To bin that was the very mo ment when the dis tinc tion be tween flows and funds (i.e. stocks) was in tro duced in the eco nomic sci ence, a dis tinc tion which was tra di tion ally made be fore by book keep ers! How ever, Fisher men tioned that al ready New comb showed clearly the dis tinc tion be tween flows and funds.

The third in spi ra tion con cern ing in ter est lead to the fa mous book "The Rate of in ter est" (Fisher 1907) treat ing the sub ject of the pres ent batch. Ac cord ing to our knowl edge this is the only written ref er ence Fisher made on his in spi ra tions.

Ar thur Vogt

1) *This name is stated by I.N. Fisher ("My Fa ther Irving Fisher", 1956) in a par tial tran scrip tion of the let ter. The name dif fers, how ever, from that in the let ter it self.*

Short Stories on Wealth

Irving Fisher

22 – The Future, not the Past, Rules Value [1]

THIS short story ends our study of prices and begins our study of the rate of interest and how interest depends on time. First of all I shall, in this story, show that it is the future prospects which always make the present value of anything.

When a man thinks of buying, let us say, an orange grove in Florida, he thinks of the future crops of oranges he will be getting. If he expects big crops he will, other things being equal, give more for the grove than if he expects small crops. He will also reckon on the future costs of planting, tending, fertilizing, picking and so on. If he expects big costs he will, other things being equal, give less for the grove than if he expects small costs. Both the benefits and the costs on which he reckons lie wholly in the future, although the past performance of the grove may be a guide as to how big or little these future crops and future costs are likely to be.

Many people imagine that the value of things depends directly on what they have already cost in the past. That is not true. The orange grove may have cost a million dollars in the past. Yet if most of the trees have died the grove may now be worth next to nothing. On the other hand, the grove may have cost next to nothing in the past and yet, if the prospects are good for a large future yield, it may be worth a million dollars.

Near where I live a man once foolishly built an expensive hotel on the top of a cliff. Almost nobody ever patronized it because the only way to reach it was to climb the cliff on foot. This hotel cost many thousands of dollars but was not worth kindling wood and was finally abandoned.

On the other hand, there is at Yale University a portrait of George Washington worth $250,000. The cost of painting that portrait must have been far less than this sum, perhaps only a few dollars.

I know a factory of stone, built in 1801. If that factory were sold today neither buyer nor seller would even think of setting the price at its original cost even if he could find out what that price was. Its value during the century and a quarter has changed up and down with absolutely no reference to what the cost was in 1801 but only with reference to what, at any time, its future services and costs, repairs, and so forth, would probably be.

In the Chicago wheat pit or the New York produce exchange the traders who haggle over the price of wheat never stop to think of what the wheat cost to produce. Its price is sometimes higher and sometimes lower than its cost of production. It sells according to supply and demand and the supply and demand are ruled by what the wheat is thought to be good for turned into future flour.

On the Stock Exchange the stocks representing shares in railways, factories or other wealth go up and down every day without any reference to original cost but always with reference to future expected earnings.

In other words, all our valuations look forward not backward.

No matter what the article may be the same principle applies. A house, an automobile, a radio set, a carpet, a suit of clothes, a can of tomatoes, a loaf of bread, or anything else is worth, not the labor going into it in the past, but the good expected to come out of it in the future.

No one can understand how market values are influenced unless he gets out of his mind the very common notion that the value of anything is simply what it has cost to produce.

Then, you are asking, does past cost of production have no influence at all on value?

It certainly does, but only indirectly and only as it affects the expectation of future benefits, or future costs, or both.

If the past cost of production of any kind of goods—orange groves, portraits, factories, wheat, and so forth—is more than the market price of those goods, their production will soon be reduced; this will reduce the supply. On the other hand, if the past cost is very much less than their market

1) *The Lather, Cleveland, Vol. XXVIII, No. 4, December 1927, pp. 20-21.*

price, their production will soon be increased; this will increase the supply. When farmers find that their wheat is not worth what it cost they will stop producing so much wheat. When they find that they can get much more than the cost they will produce more.

These indirect effects are often slow. When new methods of production reduced the cost of making radio sets the first effect was not to decrease the price of radio sets but to increase the profits of producers. For a while producers, small and large, made money rapidly because consumers still had so great a demand for the future benefits—concerts for instance—from these sets that they were willing to pay the old high prices. But soon there were so many producers trying to get rich that the market was glutted with radio sets. Producers had to reduce prices to get rid of their wares. Then it was that prices came nearer to the cost of production.

It is also true that the past record helps us guess what the future will be. As soon as big earnings of the United States Steel Corporation are announced the stock rises simply because these big earnings make the public confident that future dividends will also be big.

In these ways, in the long run, and for staple goods (that is, goods for which demand and supply are fairly steady) past cost is usually only slightly below market price.

But for novelties, such as radios, before they have become staple goods, for antiquities, like the portrait of George Washington, never to be reproduced, for lands and real estate, like the orange grove, and for all other very long lasting goods, like factories, ships, railways, pianos, books, especially after many years have elapsed, the price is seldom anywhere near the past cost.

Of course our expectations of the future are often wrong and if we have contracted to pay a price made under such a wrong expectation, we still have to pay that price even though we would no longer be willing to, if we could help it.

You may have "bought" a sewing machine on the installment plan and been sorry. You must continue paying installments, even if the machine has perhaps been thrown on the rubbish heap. But the price you agreed to did represent your expectations at the time you agreed to it.

Without exception, future expectations rule price.

23 – The Riddle of Interest [1]

IN the last story we saw that "the future rules the present." To be more exact, the price of any article of wealth or property depends on what future services it is expected to render (taking due account of future costs too). By this principle we fix the value of an orange grove, a hotel, a factory, a cargo of wheat, a bond of the Steel Corporation, a share of its stock, an automobile, a radio set, a carpet, a suit of clothes, a can of tomatoes, a loaf of bread, or anything else whatever.

And not only do the services and costs lie in the future, but their future values are always reduced, or "discounted", to obtain their present or spot cash value. Their combined net spot cash value is the value of that piece of wealth, or property.

So the value of the orange grove is the spot cash value of all its expected future crops of oranges less the spot cash value of all the expected future costs of planting, tending, fertilizing, picking, and so on. So the price you pay for a suit of clothes represents the present value to you of the future wear you expect to get out of it, less the present value to you of the future trouble and expense of cleaning and mending it. So the price of a bond represents the present value of its future coupons, as long as it runs, and of the final payment or "principal."

Such valuations are often very rough, but it is always true that what you pay for is future benefits less future costs and that you will pay less the further off any such future benefit is. We see then that every future value is "discounted" or translated into present value.

Future values are thus turned into present values by means of a rate of interest. Interest is the premium we are willing to pay to get spot cash in place of future cash. For instance, if we are willing to pay $5 in order to get $100 today, instead of getting it a year from now, then $5 is interest and the rate of interest is 5 per cent. So I get the $100 today, give back $100 a year hence, and then pay $5 besides for the privilege of thus getting the $100 a year sooner.

The rate of interest is involved in every price. The price of the orange grove, for instance, is found from its expected crops by deducting interest from the value of those crops.

The rate of interest is itself a sort of price, and by far the most important sort of price with which we have to deal in these stories. Most people have an idea that the rate of interest is of little concern

1) *The Lather, Cleveland, Vol. XXVIII, No. 5, January 1928, p. 23.*

to any one, except to money lenders or borrowers. This is partially true of explicit or contract interest. But there is implicit interest to be considered involved in every price. If we invest in a bond, the price that we pay carries with it the implication of a rate of interest we expect to realize on the investment. This implicit rate of interest, or the rate which we realize, is that rate of interest which, when used for discounting the income of the bond, will give the price at which we bought the bond. For instance, if a bond yielding $5 a year for 10 years, and then redeemable for $100, sells now for $102, we know that the rate of interest realized is not 5 per cent, as it would be if it sold at $100, or "par." It is less than 6 per cent—about 4.8 per cent. As we have seen, a man can not even buy a piano or an overcoat or a hat without, virtually discounting the value of the uses which he expects to make of that particular article. The rate of nterest, then, is not confined to money lenders and borrowers, but is something that touches the daily life of us all.

How, then, is this important thing the rate of interest determined? The problem of interest has been one of the most perplexing problems with which economic science has had to deal, and for two thousand years people have been trying to solve the riddle. In the next story the solution of this riddle will be begun.

24 – Is Interest-taking Wrong? [1]

WHY interest should be paid on a loan has always seemed something of a mystery.

Among the many mistaken ideas about it is the idea that all interest-taking is morally wrong. If I borrow of you $100 and afterward give every cent of it back, why should I have to give you anything more? Is not interest a kind of robbery?

Because of such a feeling against interest, the laws of Moses forbade interest-taking between Jews, and the laws of ancient Rome forbade it between Romans. So also, through the Middle Ages, for over a thousand years, the church fathers fought interest-taking. St. Thomas Aquinas claimed that interest extorted a price for the use of things already used up, as for instance grain or wine. He also said that it was a payment for time, and that time is a free gift of the Creator to which we all have a natural right.

Of course, there is justification for a part of the prejudice against interest-taking, for there are always "loan-sharks", people who take advantage of the necessities of the poor and charge exorbitant rates of interest. We may properly condemn such exorbitant interest and call it usury just as we condemn extortion by a grocer. But we need not condemn a lender for taking some interest any more than we condemn a grocer for charging some price, or profit. Nobody today complains (as some people did in the Middle Ages) that a shopkeeper ought to sell an article at the same price at which he bought it.

And today, even, the old prejudice against interest as morally wrong has also nearly disappeared. The only important prejudice left is among the followers of Karl Marx. He taught that interest was a robbery, the essence of the "exploitation" perpetrated by capital on labor. He said labor ought to get all that it produces. But he forgot the time element. It is perfectly true that the laborer, if paid in the present, deserves the entire present value of his product, and it is also true that, if paid in the future, he deserves the entire future value of his product. But it is not at all true that he deserves in the present the entire future value of his product! Yet that is really what Marx proposed.

If one man, called a capitalist, pays another man, called a laborer, for planting a tree which will bear fruit in years to come, the capitalist will not, and ought not to be expected to, pay the laborer today the full value of the fruits to come in later years. If the laborer is to have his pay today, and the capitalist is to wait many years for the fruits, it is both necessary and just that the laborer should be paid only the discounted value of these fruits. While the capitalist gets the advantage of a future product greater than the wages paid, the laborer gets the advantage of early payment. Both are impatient of the delay, but the capitalist can better afford to wait than the laborer.

It is this very fact that makes him a capitalist. If the laborer could himself afford to wait and the capitalist could not, the position of the men would be reversed, and the laborer would become the capitalist. The laboring men who built the railways across the continent could not afford to wait till they were finished to get the reward of their efforts. Had they been able to do so, they might have owned the railways instead of the capitalists; and would, in that case, have become capitalists themselves.

1) *The Lather, Cleveland, Vol. XXVIII, No. 6, February 1928, pp. 16-17.*

A Marxian laboring man once did some work for me. We fell into a discussion, during which he informed me that interest-taking was all wrong, that any lender ought to be content with the return only of his principal without any interest whatever. Thereupon I asked him if he were willing to lend me, without interest, for twenty years, the $25 which I owed him; in other words, to wait twenty years for his pay. To this he answered very simply that, being a poor man, he could not afford to wait. I then offered to pay him, in case he would wait twenty years, not only the $25, but the interest upon it, but he said he would rather have his $25 at once than even $100 twenty years later.

That is, he did not think it as fair for him to have to wait so long even if he would get $75 interest! Then I asked him if he thought it would be fair to have to wait a year or even a month and only get his $25. Of course he didn't! He finally agreed that it would be fair to wait a month if I would then pay him not $25 but $1 besides. That $1 of course would be interest and would be 4 per cent a month on the $25. He began to see that it is fair that a man who has to wait for his money should get some extra pay for the waiting. That pay is interest.

25 – Some Wrong Explanations of Interest [1]

Introduction

TWO years ago Professor Fisher, one of the most eminent American economists, began for the Workers' Education Bureau of America a notable series of articles titled "Short Stories on Wealth." These articles dealt with such subjects as: Capital and Income Accounts, The Relation between Capital and Income, The Nature of Money and Credit, The Purchasing Power of the Dollar, Inflation and Deflation. Upon the completion of this series the popular request for a second series was so pronounced that he began such a series and included in it such subjects as: Supply and Demand, Monopoly Price, Competition, Value and Interest.

By special arrangement with the Bureau, Professor Fisher begins this month a new or third series. His first article in the new series begins with a discussion of the solution of the Riddle of Interest which has been one of the most perplexing problems with which economic science has had to deal.—Editor's Note.

IN spite of centuries of prejudice against it, interest-taking kept right on; and, since it could not be abolished, people began to accept it as necessary and legitimate, but still asked why it existed and how it could be explained.

Of the early explanations, one of the most common is that interest is the "price paid for money" end so is high when money is scarce and low when money is abundant.

This is a wrong explanation. The mistake consists in forgetting that plentiful money ultimately raises the demand for loans just as much as it raises the supply, and therefore has just as much tendency to raise interest as it has to lower it. Suppose, for instance, that a piano dealer wishes to stock up his store with pianos (the price of pianos, being $200 apiece), and that he wishes to have a stock of 50 pianos in his salesroom. To accomplish this he evidently will have to borrow $10,000. He goes to the bank and borrows it. Now, let us suppose that some years later money has become twice as abundant in relation to the demands of trade. A piano dealer then might reason that the bank will have more money to lend and so interest will be lower. It is true that the supply of loans will be greater, but the demand will also be greater. This is because, with more money in circulation, prices will rise, and that, therefore, in order to buy 50 pianos, the dealer will need, say $20,000 instead of $10,000. The consequence is that, in the end, doubling the amount of money will not affect the rate of interest at all.

This conclusion is not based merely on theory. As a matter of statistical fact, the rate of interest does not go up when money is scarce and down when money is abundant. It is true that when bank reserves get an undue part of the increased money, the bank rate of interest will be low. This lower

1) *The Lather, Cleveland, Vol. XXVIII, No. 7, March l928, pp. 28-29. This Story was the first of a series orinally numbered B 1 to B 12.*

bank rate will encourage borrowing and after adjustments to the larger money supply have been made, the interest rate may be as before.

Another wrong explanation of interest is that it depends directly on "the productivity of capital." According to this idea a business man will pay $5,000 a year for a loan of $100,000 because the $100,000 invested in a factory, farm, orchard or other productive capital will "produce" $5,000 worth of product.

This looks simple, but it really begs the question. We have already seen that if an apple orchard is worth $100,000. It is worth it because it yields $5,000 worth of apples a year. It does not yield $5,000 because it is worth $100,000. The $100, 000 is simply the present spot cash value of the $5,000 a year when discounted; and to discount it involves interest. So we have not really explained interest but assumed it. Instead of a capital value $100,000 creating the income of $5,000 a year, it is the income of $5,000 a year which creates the capital value of $100,000. Capital value is simply income capitalized, or discounted.

We can see this clearly if we suppose the orchard is somehow made to yield double its original crop. Would the rate of interest then be doubled? Certainly not; for the orchard whose yield of apples should double and its value increase from $5,000 to $10,000 would itself correspondingly increase in value. Its value would increase to $200,000 instead of $100,000, the rate of interest remaining five per cent.

We see, then, that interest is not due directly to productivity any more than it is due to the money supply.

26 – Real Interest and Money [1]

HAVING seen through some of the wrong ideas about interest, we are ready to understand the right ones. First of all, we must distinguish between "real" interest and "money" interest just as we distinguish between "real" wages and "money" wages. The distinction is a little more difficult to grasp in the case of interest than in the case of wages. For, in the case of interest, we have two dates to consider: the date when the loan is made, and the date when it is paid.

If, at both these dates, the dollar has the same purchasing power, the real rate of interest will be the same as the money rate of interest. But, if between the two dates the dollar changes in its purchasing power, the real rate of interest will not be the same as the money rate. Since, as a matter of fact the dollar does change, the real rate is often high when the money rate is low, and the reverse.

To illustrate, suppose the money rate of interest is 6 per cent per annum and that prices in general are rising 6 per cent per annum. Then the real rate of interest is nothing at all! A farmer who borrows $100 and a year later pays back $106, is in terms of money, paying back 6 per cent more than he borrowed. But he is not paying more in terms of grain, cattle and other commodities. In fact if grain and cattle have risen in price by 6 per cent the $106 he pays really represents exactly the same grain and cattle as did the $100 when borrowed.

In this example prices have risen 6 per cent or the dollar has fallen about 6 per cent. In the same way if the money rate is 6 per cent per annum, but prices in general rise 1 per cent, the real rate is not 6 per cent, but 5 per cent. Again, if prices fall 1 per cent the real rate is not 6 per cent, but 7 per cent.

In other words, if the purchasing power of money rises at a certain rate the real rate of interest is increased by that amount over the apparent rate in terms of money, and the reverse.

It follows that the rate of interest is seldom what it seems to be; it is thrown out of gear by every change in the price level, that is to say, by every change in the purchasing power of the dollar.

Now, if everybody knew in advance what to expect in the way of changes in the purchasing power of money, then the money rate of interest might be adjusted accordingly.

If, for instance we knew absolutely, that next year's prices were going to be 2 per cent higher than this year's prices, that is, that the purchasing power of the dollar would be about 2 per cent lower, the rate of interest in terms of money might be raised by 2 per cent to compensate. So, also, if we knew absolutely that all prices would be 3 per cent less a year hence, the money rate of interest might be, on that account, lowered by 3 per cent to make up.

This sort of adjustment does, as a matter of fact, actually occur, to some extent. It is said that a few years ago when the German mark was falling rapidly, J.P. Morgan was asked to make a loan in terms of German marks. He offered to do so at 100 per cent per annum. The offer was refused as the

1) *The Lather, Cleveland, Vol. XXVIII, No. 8, April 1928, pp. 34-35.*

rate seemed exorbitant, but afterward it was found that, had the loan been made, Mr. Morgan would have had no real interest at all because the depreciation of the mark was so rapid. That is, even the apparently high 100 per cent interest in terms of money turned out to be less than nothing at all in terms of goods. A study of the periods of rising and falling prices in the United States, England, Germany, France, China, Japan and India shows that, in general, the money rate of interest does tend to be high while prices are rising and tends to be low while prices are falling.

For example, in the period 1853-57 the market rate of interest in London averaged 5.3 per cent while, in the period 1891-95, it averaged only 1.6 per cent. Yet really it was lower in the first period, 1853-57, than in the second, 1891-95; for price statistics show that in the former period money was depreciating in purchasing power at the rate of 2.4 per cent per annum. So the real rate of interest was not 5.3 per cent, but only 2.9 per cent (that is, 5.3 less 2.4). On the other hand, in the period 1891-95, money was appreciating in purchasing power at the rate of 3.8 per cent per annum, so that the real rate of interest was not 1.6 per cent but 5.4 per cent (that is, 3.8 plus 1.6)!

To take a more recent example, we find that in one part of 1917 the real rate of interest reached at one time minus 60 per cent per annum. It was this unhealthy condition which lured so many to ruin in 1921. In that year the real rate of interest reached plus 60 per cent per annum.

No sane man wants interest to swing back and forth between minus 60 per cent and plus 60 per cent! Yet such big jumps will occur whenever we have big changes in the purchasing power of the dollar. Only when the dollar stays stable will the real rate and the money rate of interest be the same.

27 – Impatience to Spend [1]

WE have seen that there is a difference between real interest and money interest whenever the value of money varies. Let us now suppose that the value of money does not vary, that is, that the level of prices remains the same year after year so that if money interest is, say 5 per cent, then real interest will be 5 per cent, too. There will then not be two rates to bother us but only one.

What, now, is the fundamental basis of interest? There are two: human impatience to spend, and opportunity to invest. Only the impatience principle will be described in this short story.

The essence of interest in the mind of man is his impatience, the eagerness to get his gratifications earlier than he can, the reluctance to wait, the preference for present over future goods. It is a fundamental attribute of human nature; and as long as it exists, there will be a rate of interest. As long as people prefer a dinner today to a dinner a year from now, there will always be interest. We cannot get rid of it.

Interest is, as it were, human impatience crystallized into a market rate. My rate of impatience is my preference for getting a dollar today, over getting it a year from today. It is a sort of premium that a man is willing to pay to get money or goods at once instead of having to wait. If, for instance, in order to get $1.00 today he is willing to promise to pay $1.05 next year, then his rate of impatience is 5 per cent. In other words, the $1.00 spot cash is worth so much to us that in order to get it we are willing to pay 5 per cent more than that $1.00 next year.

The principle applies to practically all goods. A man will prefer to have a radio today rather than a radio next year; an automobile today rather than an automobile in the future; a house today rather than a house a year from now; a piece of land today rather than a piece of land a year later; food today rather than next year, and so on for a suit of clothes, or stocks of bonds, or anything else.

When present capital is preferred to future capital, this preference is really a preference for the income of the first capital as compared with the income of the second. The reason why we would rather get a fruit tree today rather than a similar fruit tree a year from now is that the first tree would bear fruit earlier than the second. The reason we would rather get immediate occupancy of a house than have to wait for it is that the shelter of the house will begin earlier. In short, capital available early is preferred to capital of like kind available at a more remote time, simply because the income of the first is available earlier than the income of the second.

Impatience for goods of any kind resolves itself into impatience to spend income—i.e., preference for immediate income over remote income. In all cases we fix our eye on some enjoyment, and want to get it as soon as possible. So we see that all our preferences for present over future goods resolve themselves into preference for present over future satisfactions.

This impatience is the secret of installment buying and, in installment buying the buyer of

1) *The Lather, Cleveland, Vol. XXVIII, No. 9, May 1928, p. 34.*

course pays interest for the privilege of getting and enjoying his radio, or automobile earlier than otherwise.

The problem of explaining the rate of interest, then, is largely one of explaining the extra price which people are willing to pay to get their enjoyments now instead of having to wait for them.

Ws shall go on with this explanation in the next story.

28 – The Personal Reasons for Impatience [1]

WE have seen that one of the two great factors in fixing the rate of interest is human impatience, or wanting to get money as soon as possible. The more impatient people are, the higher will be the rate of interest; the more patient people are, the lower will be the rate of interest.

We next want to know what causes this impatience. It depends chiefly on two things, the character of the person and the character of his income. In this story we shall speak only of the first of these two.

Everybody knows that, other things being equal, different people are very different as to impatience. Suppose two men having the same income, same size of family and the same circumstances in general. Yet one of them may be very impatient, and the other very patient. The first man might be willing to promise as much as $150 next year for the sake of getting today $I00 cash down. The other would not think of such a thing; he might not be willing to pay for such $100 today more than $103 next year.

The differences in impatience are due to differences in five personal characteristics: (1) foresight, (2) self-control, (3) habit, (4) expectation of life, (5) love for their children. We shall take a look at each of these five.

(1) Foresight. People who don't look ahead don't usually provide for future needs. They see only the need of the hour. They spend freely to get enjoyments at once, reckless as to the future. (...)[2] Among such people impatience to gratify their appetites immediately is powerful because their minds lack any vivid picture of their future needs.(...)[3]

(2) Self-control. This trait is distinct from foresight though the two usually go together. There are some people who can look ahead clearly enough, but whose wills are so weak they can't resist the temptation to buy candy and expensive clothes even when they know they can't afford them and that later they will suffer hunger or cold for such improvidence. Others, on the contrary, have no difficulty in controlling themselves in the face of all temptations.

(3) Habit. We do what we are used to. We often see a rich man's son who has been brought up with expensive habits, but who later finds himself with a smaller income than his father provided him with in his youth. Such a man is likely to be more impatient to gratify immediate desires than a man with the same income who has climbed up the economic ladder instead of climbing down. I once knew such a man who would pay 20 per cent interest on a "chattel" mortgage on his furniture.

(4) Expectation of life. This will make a difference to a man's impatience. A man who looks forward to a long life will, other things equal, be more patient than a man who sees he may die soon. The man in danger of dying wants to spend while the spending is good. Sailors and soldiers are notorious spendthrifts. "Eat, drink and be merry, for tomorrow we die."

(5) Love for one's children. Perhaps the strongest influence tending to reduce the rate of interest is love for one's children and the wish to provide for their future good. When this wish is lacking, when people don't care what happens to their children, or have no children to provide for, there will be, other things equal, a high degree of impatience and a high rate of interest. A noted gambler, who had led a wild and a selfish life, once said, when life insurance was first explained to him, "I have seen many schemes for making money, but this is the first time I have ever seen a scheme where you had to die before you could rake in the pile." That man did not care for money which would come in after his death. But there are many who do care. This care leads them to insure their lives in order that they may leave money to their families. Life insurance, by training people to look out for their children, is one of the strongest means of reducing the rate of interest.

We see then that people may differ in many ways which affect the rate of interest. We may sum

1) *The Lather, Cleveland, Vol. XXVIII, No. 10, June 1928, pp. 33-34.*

2) *Slightly abbreviated, in view of changed appreciation of some terms.*

3) *See previous note.*

it up by contrasting two extreme kinds of people. One kind of man is short-sighted, or weak willed, or has the habits of a spendthrift, or looks forward to a short or uncertain life, or is selfish and does not care what will happen to his children. Such a man is, other things equal, very impatient. The other kind of man has foresight, self-control, thrift, a confident hold on life, and love for his children. Such a man is, other things equal, less impatient. The more people there are of the first, or impatient kind, the higher will be the rate of interest; and the more of the second kind the lower will be the interest rate.

29 – The Impersonal Factors in Impatience [1]

NOT only is impatience—one basis of interest—different between different persons; it is also different for the same person from one time to another, according to the sort of income he has. His impatience will depend on:

(1) Its change—whether it is increasing or decreasing in size.

(2) The size of his income—whether it is large or small.

(3) Its risk—whether it is certain or uncertain.

Whether a man's income is going up or going down will make a great difference to his degree of impatience. When a wage earner is promised a raise next month or next year he is impatient to get it. He wants to spend more of the increase before it comes. His eagerness to get more money at once, or, in other words, his reluctance to wait for it is so great that he may be willing to pay a huge rate of interest for getting hold of money ahead of time. Or he may buy a radio set, or a car, on installments so as to begin his enjoyment at once but pay for it later when he will have more money, even though it will cost him far more in the end. The extra cost is disguised interest, the price he pays to avoid waiting.

On the other hand, a wage earner who finds he will soon be out of a job, so that his income may cease entirely or dwindle, will not be so likely to spend. He will be more likely to save.

In short, when our income is going up we are, other things equal, more impatient than when it is going down. The result is that interest is high in a fast-developing country, as in America in pioneer days, or in fast recovering countries, as in Europe today.

Next consider the size of a man's income. Other things equal, if a man's income is small he is more impatient than if it is large. Poverty makes all income precious, both immediate and remote. But it increases the want for immediate income even more than of income remote in the future. Present income is necessary even for future income. One break in the thread of life is sufficient to destroy all future enjoyment: "A man must live."

And so we find that wherever there is poverty, as in China or India, the rate of interest is likely to be high.

Lastly we come to risk. This affects the rate of interest in many different ways. A risky loan bears a high rate of interest.

A risk of losing one's life also tends to make the degree of impatience and rate of interest high. Sailors and soldiers don't usually save for a future which may never come, but are likely to be spendthrifts.

When a man has a risky income (it the risk applies about as much to one time as another) he is likely to be more impatient than if his income is assured. A risky income is, in effect, a low income. That is one reason why a fixed stipulated salary and fixed wages are often preferred to the higher earnings of those who work for themselves and take risks, and why an investor prefers a bond yielding a low but, he believes, a sure income to stock yielding a larger but less certain income.

An income which gets more and more risky in the future is like an income which gets smaller and smaller in the future. Consequently there is a tendency, as far as this influence goes, toward a low degree of impatience, a tendency "to lay up for a rainy day."

1) *The Lather, CIeveland, Vol. XXVIII, No. 11, July 1928, p. 43.*

30 – How impatience influences interest [1]

WE have seen that the degree of a person's impatience to get income as soon as possible is different under different circumstances and so will tend to have different effects on the rate of interest. What are these effects?

In this short story I shall assume, for simplicity, a perfect loan market, one in which every person's income is assured and in which everybody is free to borrow or lend to any extent desired. In such an ideal market a man can trade present income against future income without being hindered by risk or the need of putting up security.

You are more impatient than I, perhaps by nature, perhaps because you expect a "raise" in income next year while I expect a fall. Being more impatient than I, for whatever reason, you may want to borrow of me and I may be willing to lend to you, at say six per cent interest.

That would mean that your degree of impatience is more than six per cent and mine less than six per cent. But the loan would tend to bring your impatience down and mine up, toward the six per cent. And the larger the loan, the more this effect. Suppose at first the loan is only $100. Every additional $100 you borrow makes your impatience less and every additional $100 I lend makes my impatience more. It you borrowed a second $100 your impatience would be still less; if a third, still less; and so on until, say, the fifth hundred is reached, when your degree of impatience, let us suppose, is reduced to six per cent. There would then be no object in going any further. So you would stop at $500. A sixth hundred you would not want as much as you want $106 next year.

In such an ideal and imaginary loan market, therefore, in which every individual could freely borrow or lend, the degrees of impatience for all the different individuals would become exactly equal to each other and to the date of interest.

If all the borrowers taken together wanted to borrow more than all the lenders taken together wanted to lend this would merely mean that six per cent was not the right figure. The rate, would rise, and there would be less borrowing and more lending, until the right rate, say seven per cent, was reached. On the other hand, if the six per cent rate was too high, it would fall.

Practically, of course, because of risk, there is no such complete equalization of impatience. Nevertheless there is a strong tendency through the loan market toward such equalization. The result is that human impatience is, as it were, crystallized into a common rate of interest.

31 – Opportunity for Investment [2]

WE have seen that the rate of interest depends on human impatience to get it now rather than invest it for the future. It is the preference, which everyone has, for a dollar in hand over a dollar he has to wait for.

But besides the Principle of Impatience to spend we find a Principle of Opportunity to invest, to get more enjoyment by deferring them. In modern business the Opportunity Principle has a great influence on the rate of interest.

A man borrows and pays interest on his loan sometimes for reasons of personal misfortune and sometimes for reasons of business gain.

A loan may be made because illness has reduced the family income and increased expenses, in other words, because sickness has made a big hole in the real, or enjoyed, income of the family—the good things of life for which he spends his money income. The loan helps fill up that hole; the borrower hopes to repay it later when there is no such hole.

A business loan also fills up a hole in enjoyed income; but this hole, unlike that made by illness, is made by the business man himself on purpose. He makes that hole in his spending-money by taking money and investing it; and he does this because he has found an attractive opportunity to invest. It seems to him worth while to make the hole, that is to sacrifice present income, because he expects to get back so much more in the future. But he would not make this hole at all, unless he knew he could fill it up again, in part at least, by borrowing.

1) *The Lather, Cleveland, Vol. XXVIII, No. l2, August 1929, p. 32.*

2) *The Lather, Cleveland, Vol. XXIX, No. 1, September 1928, p. 39.*

Wherever and whenever the Opportunities for investment promise rich returns the rate of interest will tend to be high because the demand for loans will be great and borrowers can pay a high rate because their future returns are large in proportion to the present sacrifices they have to make for them.

The essence of spending is present enjoyment rather than future; and the essence of investment or saving is future enjoyment rather than present.

Investing or saving thus means spending less today in order to be able to spend more later. If we strip any investment of all its disguises, such as money transactions, or "interactions," we find it always consists of present labor exerted or present abstinence from enjoyment to bring about future enjoyment or future saving of labor. Robinson Crusoe abstains from eating up all his grain and sows a bushel of it in order to reap and eat many more bushels later. Or, finding it takes much labor to catch fish without a boat, he puts in one hundred days' labor building a boat in the hope thereafter of saving himself several hundred days' labor.

It is all a question of the time and amount of enjoyments. Shall we get an enjoyment now or later? Shall we spend or invest?

Our impatience to spend tempts us to hasten the enjoyment even if it shrinks by being hastened. Our Opportunities to invest tempt us to defer the enjoyment, because it will expand by being deferred.

If the pendulum swings too far toward the investment extreme and away from spending, it is brought back by the strengthening of Impatience and the weakening of Opportunity. Impatience is strengthened for the reason explained in a former short story—that "hope deferred maketh the heart sick." Opportunity is weakened because of the "law of diminishing returns."

If the pendulum swings too far toward the spending extreme and away from investment it is brought back by the weakening of Impatience and strengthening of Opportunity, for reasons opposite to those in the last paragraph.

Between these extremes is an equilibrium point which clears the market, equalizing Impatience rates and Opportunity rates at a common rate of interest.

New inventions are constantly opening up new Opportunities to invest. A century ago the railways began to open up great Opportunities for investment which have lasted to the present day.

Then came electrical inventions, the telegraph and telephone, in which those lucky enough to be first in the field got wonderful returns. Then came the automobile and radio, and now is coming aviation.

In each case at first, when the returns to be yielded are still unknown, there is a chance of big gains and yet a risk of big losses. But as soon as the actual possibilities become known and proved, the situation changes. If the results prove disappointing, investment decreases. If the results are encouraging, investment increases. Each successive addition to the investment is apt to find a lower return than the one before until a point is reached where the rate of return on sacrifice, taking account of risks, is merely equal to the rate of interest.

Ultimately the effect of any great invention is the opposite of the first effect; the rate of interest tends to be lowered. The greater general prosperity caused, that is, the larger income-stream, tends to lower the rate of impatience, and so to lower the rate of interest.

But as fast as one invention finishes its work in this way, tending in the end to lower the rate of interest, others are almost sure to come along tending to raise it so that the net effort from time to time may be in either direction.

32 – Before Leaving the Subject of Prices [1]

IN the present short story I shall merely summarize the subject of prices just finished. In the next short story I shall begin the subject of the distribution of wealth. I shall hereafter try to make each short story understandable by itself whether or not the reader has seen any of the preceding stories.

We have found that the last sort of price studied, the rate of interest, is the result of the operation o! two great principles—the principle of subjective impatience to secure enjoyment without delay and the principle of objective opportunity to secure greater enjoyment by delay.

That is, impatience and opportunity lie back at the supply and demand of this year's and next year's income which fix the rate of interest just as in general supply and demand fix every price.

1) *The Lather, Cleveland, Vol. XXIX, No. 2, October 1928, pp. 32-33.*

For the rate of interest is simply one special, and vitally important, kind of price. As. we have seen, it enters into every other price. It enters into the determination of the price of wealth, property and benefits. The price of any article of wealth or property is equal to the discounted value of its expected future benefits or services and all discounting requires a rate of discount or interest.

The influence of the rate of interest on the prices of the benefits themselves depends on whether the benefits are "interactions" or final satisfactions. The value of interactions is derived from the succeeding future benefits to which they lead. For instance, take as the interaction the benefits to a farmer of his land in affording pasture for sheep. The value of these benefits will depend upon the discounted value of the benefits from the flock in producing wool. The value of the wool output to the woolen manufacturer is in turn influenced by the discounted value of the output of woolen cloth to which it contributes. In the next stage, the value of the production of woolen cloth will depend upon the discounted value of the income from the production of woolen clothing. Finally, the value of the last named will depend upon the expected income which the clothing will bring to its wearers—in other words, upon the use of the clothes.

A full study, then, of the theory of prices involves (1) a study of the laws which determine the prices of final benefits on which the prices of the earlier interactions depend; (2) a study of the prices of these earlier interactions, as dependent, through the rate of interest, on the final benefits; (3) a study of the price of capital-instruments and capital-property as dependent, through the rate of interest, upon the prices of their benefits. The first study, which seeks merely to determine the laws regulating the price of final benefits, is relatively independent of the rate of interest. The others involve and depend upon the rate of interest.

In the last analysis the only elements leading to exchanges are future satisfactions and efforts. These may be embodied in wealth, property or services and any of these three may be more or less near in time to the present, so that interest enters. By means of the rate of interest any future satisfactions or effort is discounted, and thus translated into terms of present value. By the rate of interest we capitalize income and form our capital accounts.

Interest, then, is the universal, time-price, linking impending and remote satisfactions, or efforts, or both.

The study of the rate of interest, therefore, helps to round out and complete our study of prices. Thus we see that the rate of interest is a sort of time price for translating the dollars of one time into the dollars of another time, just as the rate of foreign exchange is a sort of place price for translating, say, francs in Paris into dollars in New York.

The two are usually combined. When a man in New York buys in dollars the right to a million francs in Paris three months hence the price he pays involves two sorts of translating. It translates in place, francs on one side of the Atlantic and dollars on the other—and it translates in time, the money of three of months hence into spot cash.

Most prices are even more complicated. The price of pig iron in London, for instance, may involve the rate of exchange on America, the rate of interest by which the price of pig iron discounts the services of the steel rails and other products into which it will be made as well as all other factors affecting both the supply and demand of pig iron and the supply and demand of dollars.

The price of the pig iron might fall, say, because of a rise in the general purchasing power of money, because of deflation or because of improvements in the methods of producing pig iron.

But if we trace back all these or other causes to their utmost limits, they will all resolve themselves into changes in the want for one more unit of pig iron, and the ultimate benefits to which it leads, and in the want for one more unit of money.

EDITOR'S NOTE: Each of these "Short Stories on Wealth" is a complete story in itself. You will find it of interest even if you have not read the stories which have preceded this one. Those who are interested in some of the earlier stories may hear Professor Fisher himself deliver his series on weekly addresses on this subject each Monday evening from 7 to 7:15 (daylight saving time) over Station WEAF. The following stations are linked with WEAF for Processor Fisher's addresses: WFI, WGR, WGY, WFAI.[1]

1) *If any reader of IFC Bulletin would be able to provide any registrations of these emissions, he is asked to inform the editor of IFC Bulletin. According to Fisher (1956:225), there was also a weekly emission of the Stories in Chinese commencing in August 1930 in Ta Ku Pao.*