Tilburg University

The Japanese financial system and monetary policy

Eijffinger, S.C.W.; van Rixtel, A.

Publication date:
1994

[Link to publication in Tilburg University Research Portal](#)

Citation for published version (APA):

Eijffinger, S. C. W., & van Rixtel, A. (1994). *The Japanese financial system and monetary policy: A descriptive review*. (Reprint series / CentER for Economic Research; Vol. 141). Unknown Publisher.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

CBM
882R

entER

for
Economic Research

1994-141
8823
1994
NR.141

REPRINT

The Japanese Financial System
and Monetary Policy:
a Descriptive Review

by
Sylvester Eijffinger and
Adrian van Rixtel

Reprinted from Japan and the
World Economy, Vol. 4, No. 4, 1992

Reprint Series
no. 141

CENTER FOR ECONOMIC RESEARCH

Board

Harry Barkema
Helmut Bester
Eric van Damme, Chairman
Frank van der Duyn Schouten
Jeffrey James

Management

Jeffrey James (Director of Graduate Studies)
Arie Kapteyn (Scientific Director)
Marie-Louise Kemperman (Managing Director)

Scientific Council

Anton Barten	Université Catholique de Louvain
Eduard Bomhoff	Erasmus University Rotterdam
Willem Buiter	Yale University
Jacques Drèze	Université Catholique de Louvain
Jack Kleijnen	Tilburg University
Theo van de Klundert	Tilburg University
Jean-Jacques Laffont	Université des Sciences Sociales de Toulouse
Merton Miller	University of Chicago
Piet Moerland	Tilburg University
Philippe Naert	Nijenrode University
Pieter Ruys	Tilburg University

Residential Fellows

Hans Bloemen	CentER
Lans Bovenberg	CentER, Erasmus University Rotterdam
Hans Carlsson	Gothenburg University and Lund University
Jay Pil Choi	Columbia University
Jan Magnus	CentER, LSE
Andrew Mountford	CentER
Bezalel Peleg	Hebrew University of Jerusalem
Mark Steel	CentER/Department of Econometrics, Tilburg University
Frank Verboven	CentER
Oscar Volij	Hebrew University of Jerusalem
Karl-Erik Wärneryd	Stockholm School of Economics

Address : P.O. Box 90153, 5000 LE Tilburg, The Netherlands
Phone : +31 13 663102
Telex : 52426 kub nl
Telefax : +31 13 663066
E-mail : center@kub.nl

ISSN 0924-7874

**The Japanese Financial System
and Monetary Policy:
a Descriptive Review**

by
**Sylvester Eijffinger and
Adrian van Rixtel**

Reprinted from Japan and the
World Economy, Vol. 4, No. 4, 1992

**Reprint Series
no. 141**

The Japanese financial system and monetary policy: a descriptive review

Sylvester Eijffinger *

Department of Economics, Tilburg University, Tilburg, Netherlands

Adrian van Rixtel *

Department of Economics, Tinbergen Institute, Free University Amsterdam, Amsterdam, Netherlands

Received December 1990, final version received December 1991

Abstract: This paper traces the evolution of financial systems in Japan since the 1970's. It describes the progress of financial reform and the objectives as well as the instruments of monetary policy of the Bank of Japan which are also analyzed.

Keywords: Financial system; Monetary policy; Central banking

Introduction

Until the eighties Japan was mainly concerned with high economic growth promoted by considerable exports to the United States and Western Europe. After the rapid appreciation of the yen, following the Plaza agreement of September 1985, Japan's economic growth was mainly supported by the expansion of domestic demand. The Japanese companies and financial institutions could finance the required investments from the voluminous household savings and could also accumulate substantial reserves. These reserves enabled Japanese companies and financial institutions to extend strongly

Correspondence to: Dr. Sylvester C.W. Eijffinger, Associate Professor of Economics, Department of Economics, Tilburg University, P.O. Box 90153, 5000 LE Tilburg, Netherlands. Tel.: 31-13-662411 or 314242-16159, Fax: 31-13-663042.

* Sylvester Eijffinger and Adrian van Rixtel are, respectively, at the Department of Economics of Tilburg University, and Tinbergen Institute, Department of Economics, Free University Amsterdam. They were Visiting Scholar and Visiting Researcher at the International Department and the Institute for Monetary and Economic Studies of the Bank of Japan during 1989 and 1990, respectively. The authors want to thank two anonymous referees for their valuable comments. Of course, the usual disclaimer applies. Furthermore, the views expressed in this paper are those of the authors and should not be attributed to the Bank of Japan.

Fig. 1. A classification of major Japanese financial institutions (as of the end of April 1991). Source: The Bank of Japan, Federation of Bankers Associations of Japan (1991).

their direct foreign investments. Furthermore, after the rise of Japanese industry, the second half of the eighties were characterized by the advance of Japanese banking and securities business. The financial institutions were primarily focused on domestic developments, but during recent years they became more conscious of their dominance in the global financial system. Measured by the size of assets, no less than nine of the ten biggest banks in the world were of Japanese origin. Furthermore, the big four Japanese securities companies all belong to the world top ten. Moreover, the monetary policy by the Bank of Japan increasingly affects the international monetary system. On the one hand the domestic credit expansion in Japan influences the global money supply, on the other, Japanese exchange and money market management plays a prominent part in the process of international monetary coordination within the Group of Three (G3) and the Group of Seven (G7).

In this article we will discuss the evolution of the financial system in Japan since the 1970's and its consequences for the monetary policy implemented by the Bank of Japan.

First, we describe the progress of the process of financial reform in Japan which took off in the late seventies and early eighties.

Second, the objectives, indicators and instruments of monetary policy by the Bank of Japan are analyzed with special reference to the transmission mechanism of monetary policy (fig. 1).

Financial reform

Until the end of the sixties the pace of financial reform was slow in Japan. From 1973 this changed by the transition to floating exchange rates and the rise of inflation rates throughout the world. Furthermore, the first oil crisis marking the end of the high growth period resulted in large issues of Japanese government bonds to finance public debt. The shift to lower economic growth and higher levels of public debt, combined with the increasing accumulation of financial assets by individuals and the growth of internal reserves of Japanese companies, and high levels of monetary growth, raised the degree of interest rate sensitivity in the private non-financial sector. In addition, there was a development towards open money and capital markets, in particular Euro-currency markets. Furthermore, the shift to the floating exchange rate system stimulated the internationalization of money and finance and resulted in a substantial increase of international capital flows. Finally, the rapid progress of computer and information technology resulted in lower costs of financial innovations and higher profit opportunities for financial institutions.¹

¹ See Suzuki (1986), Suzuki and Yomo (1986), Suzuki (1987) and Suzuki (1989a). Cargill and Royama (1988), pp.93ff present a list of causes of financial reform, based on three categories: real sector, monetary and noneconomic forces that initiated financial reform.

With respect to the process of financial reform from a Japanese perspective, five strongly interrelated sub-processes can be distinguished:

- financial innovation,
- financial liberalization,
- financial globalization,
- financial concentration, and
- restoring of financial reputation.

First, since the mid-seventies the Japanese financial system has experienced many financial innovations, i.e. the introduction of new financial products, techniques and markets. Examples are, respectively, the introduction of such different financial products as certificates of deposit (CDs) and financial derivatives (options and futures), the use of new techniques of asset and liability management, and the establishment of new markets, e.g. the Japan off-shore market and the Tokyo International Financial Futures Exchange (TIFFE).

Secondly, the last 15 years have shown the abolishment or lessening of many financial regulations in Japan. This so-called process of financial liberalization has affected the regulatory framework regarding the structure and activities of financial institutions, interest rates, entry into financial markets, international capital movements and creation of new financial instruments.

A third aspect of financial reform is formed by the process of financial globalization. The process of financial globalization "...indicates a further strengthening of the ties among national financial markets so that they have actually changed into a unified financial system on a worldwide scale" [Suzuki (1989), p.158]. The lifting of exchange and international capital controls and limitations on entry by foreign financial institutions into domestic markets, the growth of off-shore markets, the development of 24-hour global trading, the increased use of national currencies outside the country of issue and of new internationally traded financial products have all contributed to the globalization of financial markets ².

Fourthly, in recent years the Japanese financial system has been characterized by an increasing number of mergers between financial institutions, resulting in a substantial higher level of concentration of financial institutions.

Fifthly and finally, as a result of the stock compensation and fake deposit scandals during the summer of 1991 the Japanese financial system will have to restore confidence among investors. This rebuilding of financial reputation will have consequences for the future structure of the Japanese financial system. With respect to financial innovations, the most important were the introduction of CDs in May 1979 and money market certificates (MMCs) in

² Blundell-Wignall and Browne (1991), p.5.

March 1985 by banks and the creation of so-called *chukoku funds* – i.e. portfolios containing medium-term government bonds – in January 1980 by securities companies³. The process of financial innovation and liberalization had its impact on the Japanese financial system. At first this meant a gradual relaxation and abolishment of interest rate regulations – i.e., interest rate ceilings – for large bank deposits. Hence, interest rates for deposits of three months to two years maturity with a minimum amount of one billion yen were fully liberalized in October 1985. Furthermore, this minimum for large time deposits was gradually reduced to 10 million yen in October 1990. The Ministry of Finance has already decided to deregulate fixed-term deposits of three million yen or more in the fall of 1991. Moreover, interest rates on time deposits of less than half a million yen are to be liberalized by the summer of 1992⁴. The liberalization of time deposits will probably be completed in 1993. The Ministry wants to liberalize interest rates on checkable bank deposits by the spring of 1994. A complete liberalization of interest rates had been hampered by the existence of attractive savings accounts with the non-profit-oriented Postal Savings System. However, study groups from the Ministry of Finance and the Ministry of Posts and Telecommunications have made recommendations to resolve these problems, and continuing negotiations between both ministries will ultimately end in some kind of compromise. Another aspect of liberalization was the reduction of the minimum amount for CDs to 50 million yen and for a new type of small MMCs (the so-called Super-MMCs, introduced in June 1989) to half a million yen from April 1991, and the abolishment of the maximum volume for issues of CDs and MMCs.

Furthermore, with respect to interest rate liberalization the introduction by Mitsubishi Bank in January 1989 of a new short-term prime rate system has to be mentioned⁵. As a result of the process of financial innovation and liberalization, Japanese banks have to raise a growing proportion of their funding through the selling of liberalized financial instruments with (money) market related interest rates. The old short-term prime rate system was not flexible enough to reflect this shift to a market based funding structure. Under the new short-term prime rate system, interest rates are related to market developments and determined by the weighted average of funding costs. As regarding long-term prime rates, i.e. interest rates on loans with a maturity longer than one year to most preferred customers, Fuji Bank introduced a new system in April 1991. To cope with the inverted term structure of interest rates Fuji Bank has related its long-term prime rate to its

³ These financial innovations and their effects on monetary policy are extensively discussed in: Y. Suzuki & H. Yomo (ed.), *Financial Innovation and Monetary Policy: Asia and the West*, Tokyo, 1986, pp.45–78.

⁴ *The Nikkei Weekly*, July 6, 1991.

⁵ Kuroda (1989), p.10.

short-term prime rate by adding a certain spread. Reportedly, also other city banks will introduce this new formula in the near future ⁶. As a result, both short- and long-term prime rates will be related to money market developments. ⁷

As examples of new financial techniques, the increased use of funding instruments with market-related interest rates (liability management) and spread-based lending rates (asset management) and the introduction of securitization in the banking sector can be mentioned. ⁸ To help banks to improve their capital adequacy ratios against the background of the requirements of the Bank for International Settlements (BIS), the Ministry of Finance has besides permitting banks to issue subordinated loans, allowed the securitization of housing loans (October 1988), loans for municipal governments (July 1989) and corporate loans (March 1990). ⁹

With respect to the regulation of the structure and activities of financial institutions, it is clear that the functional segmentation of Japanese financial institutions has been blurred by financial innovation, liberalization and globalization. The segmentation between short-term and long-term financial activities and between banking and securities business is slowly but steadily losing importance. In various reports of the Financial System Research Council (affiliated with the Banking Bureau of the Ministry of Finance) and discussions by the Securities and Exchange Council (affiliated with the Securities Bureau), this desegmentation process is extensively discussed. ¹⁰ The second interim report by the Second Financial System Committee of the Financial System Research Council focused on two possible approaches, i.e. the establishment of separate subsidiaries for each field of operation and a multifunctional subsidiary. The Committee concluded that the separate subsidiary approach is the best strategy for commercial banks, long-term credit banks and trust banks to diversify into each others' markets. In its report of June 1991 commercial banks, trust banks and securities firms are allowed to set up subsidiaries to enter each others' business. Long-term credit banks will set up trust bank and securities subsidiaries. ¹¹

⁶ Japan Economic Journal, May 4, 1991.

⁷ Liberalization measures with respect to the interbank market will be discussed in the section of modern monetary policy.

⁸ According to Kanda (1990), p.1, securitization generally means the creation of marketable securities, for example when traditional asset-based lending by a bank is replaced by marketable securities, the payments of which are linked to the underlying assets.

⁹ According to the BIS regulations, Japanese banks involved in cross-border business are required to meet capital adequacy ratios of 8% by the end of fiscal year 1992 (end of March 1993). Japanese banks are permitted to include 45% of unrealized profits on their stock portfolios in total capital. However, the collapse of the Tokyo stock market has seriously deteriorated the capital adequacy ratios of Japanese banks.

¹⁰ See for example Federation of Bankers Associations of Japan (1988) and (1990).

¹¹ The Nikkei Weekly, June 15, 1991.

The internationalization of the Japanese financial system has developed rapidly, especially since the enactment of a new Foreign Exchange and Foreign Trade Control Law in December 1980 which provided freedom of international transactions unless explicitly prohibited (freedom in principle).¹² Under financial globalization Japanese financial markets have become more and more integrated with world markets, and both Japanese financial institutions and corporations can now freely choose among various national financial systems to conduct their transactions.¹³ The process of financial globalization with respect to the money market in Japan has been stimulated by two important reforms. First, the removal in June 1984 of the so-called swap limits or yen conversion limits, which restricted the amount of foreign currency that could be converted into yen by financial institutions, increased arbitrage between interbank markets and Euromarkets. Secondly, the internationalization of Japanese money markets has been stimulated by the abolition in April 1984 of the so-called real demand doctrine, which allowed forward exchange transactions only for trade (or real) finance.

Another aspect of financial reform in Japan is the process of financial concentration. Some mergers between various large banks have already been mentioned. Furthermore, smaller financial institutions have been hit by the ongoing reform of the financial system, with interest rate liberalization narrowing their margins and larger financial institutions taking away their traditional business. Hence, small financial institutions are mostly either merging, being acquired by bigger institutions (for example the announced take over by Tokai Bank of Sanwa Shinkin Bank) or converting their status to an ordinary bank (for example *sogo* banks and Yachiyo Shinkin Bank). Consequently, the number and diversity of financial institutions in Japan are decreasing.

Finally, the scandal-ridden Japanese financial system will have to restore its reputation amongst Japanese and international investors. Reformers want the establishment of a Japanese equivalent of the U.S. Securities and Exchange Commission (SEC) as an independent body from the Ministry of Finance and modifications in the regulatory legal framework. However, the specific consequences of the scandals for the structure of the financial system in the years to come are not clear yet.

Monetary policy

In this section, attention will be paid to the channels of transmission in the monetary policy process. In the transmission mechanism of monetary policy a

¹² However, according to Hollerman (1988) the new FEFTCL refers to freedom of exchange, foreign trade, and other external transactions, with necessary but minimum control, and does not contain the phrase freedom in principle. Hollerman even suggests that the new FEFTCL "...is a glorified legal authorization for more administrative guidance" [Hollerman (1988), p.26].

¹³ Kuroda (1989), p.1.

Fig. 2. The transmission mechanism of monetary policy.

number of monetary variables play an important role. These variables provide the central bank with the necessary information about the orientation and effectiveness of its monetary policy. Fig. 2 shows the transmission mechanism. The indicator is the starting point of the monetary policy process. This monetary variable is close to the central bank and is directly affected by the policy instruments. The relationship of the indicator with the goals of monetary policy, i.e. the final policy objectives, is according to Suzuki (1987) somewhat unstable. Therefore, the target is used as an intermediate objective. The target is farther from the control of the central bank and is not directly affected by the policy instruments, but its relationship with the goals of monetary policy is relatively stable.

The new monetary policy 1975–1981

During the first part of the seventies the collapse of the Bretton Woods system and the oil crisis had a great impact on the world economy. Economic growth in Japan slowed down and the government was forced to introduce an accommodating Keynesian oriented monetary and economic policy. As a result, the rate of inflation increased rapidly.

The crisis in the Japanese economy had great consequences for the economic and financial structures. The shift to lower growth reduced the corporate demand for credit and resulted in a sharp decline in the situation of overborrowing. The large-scale issues of government bonds, necessary to finance the accommodating monetary and economic policies, stimulated the development of the securities market and decreased the predominance of indirect finance, i.e. increased direct finance in Japan. The decline in the situations of overborrowing and indirect finance decreased the importance of credit in the monetary policy process.

The process of financial reform, which started around 1975, increased the flexibility of interest rates. This development decreased the effectiveness of the channel between interbank interest rates and broadly-based lending by banks of the traditional monetary policy.

Another problem for the effectiveness of the traditional monetary policy was caused by the large-scale issues of government bonds. The main part of these issues was absorbed by banks, i.e. money creating financial institutions. As a result, the money supply increased rapidly. It will be clear that the target of the traditional monetary policy, i.e. the broadly-based lending of

banks to the corporate sector, neglected the money creating effect of the government bond issues. It was mostly for this reason that the Bank of Japan introduced in 1978 a new target, namely the money supply: from July 1978 to the third quarter of 1979 the broad based money supply M_2 and from the third quarter of 1979 the monetary aggregate $M_2 + \text{CDs}$. The Bank of Japan started to publish its forecast of $M_2 + \text{CDs}$ in 1978. These forecasts have the status of projections and should not be regarded as targets in the context of a strict monetarist policy. Officials of the Bank of Japan have stressed this fact in several publications and mentioned the pragmatic attitude of the Bank towards control of the money supply.¹⁴

It has already been mentioned that the process of financial reform decreased the effectiveness of the influence of interbank interest rate changes on broadly-based lending of banks, and therefore also decreased the impact of changes in interbank interest rates on the money supply. Financial reform caused the creation of more open, relatively non-regulated financial markets with more flexible interest rates. As a result, two additional channels of transmission between interbank interest rates and money supply were established.

The first was the channel of financial disintermediation. Because open market interest rates were more flexible than bank deposit interest rates, which were still regulated, changes in interbank interest rates had a greater impact through interest rate arbitrage on open market interest rates. Depositholders were more inclined to invest funds on the open markets when a rise in interbank interest rates caused open market interest rates to rise. As a result, the funding position and consequently the amount of bank lending deteriorated. Of course, the supply of funds to the open market increased. These funds could be borrowed directly from the market by big corporations through the issue of securities or commercial paper to replace the decrease of bank credit (increase of direct finance). However, selling operations of the Bank of Japan absorbed these additional funds in the open market.¹⁵

The second channel included the effects of changes in interest rates on private expenditure. Interbank interest rate changes caused open market interest rates to change and eventually influenced even interest rates of broadly based lending by banks. Hence, the opportunity costs of expenditures by surplus sectors (i.e. the yields on open market investments) and the costs

¹⁴ For example, this pragmatic orientation has been stressed by Shimamoto (1982), p.82: "...Thus, the attitude of the Bank of Japan toward the money supply is, in a word, pragmatic." And also by Okabe (1990), p.16, p.18: "...the formula now employed in Japan is more aptly called a money-focused monetary policy rather than a monetary-targeting policy...., the Bank of Japan has, in fact, managed its monetary policy in a pragmatic fashion." In Suzuki (1985), p.9, the policy attitude of the Bank of Japan is described as follows: "..., is in my interpretation neither that of post-Keynesian "discretionary fine tuning" nor that of a "x% rule".... An appropriate term may be "eclectic gradualism"."

¹⁵ Suzuki (1989b), p.163.

of financing of expenditures by deficit sectors changed. These changes influenced the amount of private expenditures and eventually the level of national income, money demand and money supply.

The transmission process of the new monetary policy is presented in fig. 3. Seen against the background of the inflationary experiences in the first part of the seventies, the main goal of the new monetary policy became the achievement of price stability, reflected by the Consumer Price Index (CPI) in fig. 3. A secondary goal was the level of economic growth. The yen/U.S. dollar exchange rate was introduced as a secondary target to stress the importance of preventing import inflation.

The modern monetary policy 1981-present

The year 1981 was the turning point towards a new type of monetary policy, the so-called modern monetary policy. In May of that year the Bank of Japan started to sell financing bills on the open market to absorb liquidity surpluses. According to Suzuki (1987) "... This was the first time since the end of the Second World War that the Bank of Japan had engaged in an open-market operation in the true sense of the term" [Suzuki (1987), p.322]. Open market operations are the purchasing or selling of securities by the central bank on the open market from non-depository financial institutions and the non-financial private sector, and influence directly the money supply.

As we have seen, the already mentioned securities and bills operations (quasi-open market operations) are engaged between the Bank of Japan and money creating financial institutions, and in contrast to open market operations do not directly influence the money supply. However, the securities and bills operations do have indirect effects on the money supply.

First, buying or selling by the Bank of Japan of securities and bills in possession of money creating financial institutions increases or decreases the amount of reserves of these institutions. The money creating financial institutions will try to compensate the changes in their reserves on the interbank money markets. As a result, changing interbank interest rates will induce portfolio adjustments by these financial institutions and will consequently change the amount of their lending and eventually the size of the money supply. However, the process of liberalization of interest rates will make this channel less important.

Secondly, the above-mentioned changing of interbank interest rates will influence interest rates on the open markets and in the end the level of private investments, money demand and money supply. The Bank of Japan uses the securities and bills operations – more specific the outright purchase of government bonds from financial institutions – as an instrument to provide the Japanese economy with additional base money without directly disrupting the growth of the money supply.

Fig. 3. The new monetary policy 1975-1981.

Because of the underdeveloped state of the government bond market in previous decades, open market operations could be introduced only in 1981. The Dodge Line prohibited government deficit financing before 1965. After 1974 the return to a balanced budget financing policy was seriously debated.

The main reason to introduce open market operations by the Bank of Japan was the development of open, less regulated financial markets in Japan, such as the market for certificates of deposit (1979) and the Euroyen market and later on the introduction of markets for bankers acceptances (1985), money market certificates (1985) and commercial paper (1987) and the Tokyo offshore market (1986). The interest rates on these markets are relatively free. As a result, the share of the open markets in the total money market increased from 1984. This development continued until the autumn of 1988 when the volume of the interbank market, especially the bills market, shrunk as a result of increasing open market rates, compared with relatively stable interest rates in the interbank market. The decreasing volume of the interbank market reduced the influence of the Bank of Japan on the money market rate and compelled the Bank to deregulate the interbank market as from November 1988. The elements of this introduction of the so-called new monetary control regime can be summarized as follows.

First, the Bank liberalized the interest rate of (commercial) bills which was regulated till then (abolition of quotation). Secondly, the range of maturities for the collateralized call market and the bill market was adjusted in order to realize more fine tuning in the money markets.¹⁶ Thirdly, the quantitative restrictions and quotation system for the uncollateralized call market were abolished and the permitted maturity for this market was extended from overnight-three weeks to overnight-six months to reinforce the arbitrage between interbank and open markets. These swift and radical measures by the Bank of Japan resulted in more than a doubling of the interbank market volume during the period November 1988 to July 1989.

Moreover, the arbitrage between interbank and open markets strengthened in that period as appears from the narrowing difference of interbank and open market rates. See for this difference fig. 4.

The November reforms permitted the Bank of Japan to maintain the controllability of short-term interest rates in spite of the ongoing financial reform process.¹⁷ Before the reforms, interbank transactions with a maturity of less than one month had been mainly conducted in the call market, and not in the bills market. Therefore, for its bills operations the Bank of Japan had to rely on bills with maturities of two or three months. As a result,

¹⁶ The maturity for collateralized calls was changed from overnight to three weeks into overnight to six days and for bills from one to six months into one week to six months. Thus, the overlap in maturity between calls and bills was eliminated. In April 1989 the maturity for bills and uncollateralized money was extended to one year.

¹⁷ Batten et al. (1989), p.31.

market participants regarded especially the two-month bill discount rate as a policy target by mid-1988, and sometimes interpreted technical adjustments as being deliberate, or deliberate adjustments as being technical.¹⁸ Furthermore, according to Suzuki (1989b) the two- and three-month bills operations by the Bank of Japan revealed its interest rate view two or three months ahead. Under the new monetary control regime, the Bank concentrates on the shortest maturities (overnight call rates and one- to three-week bill discount rates),¹⁹ and leaves the rates of longer maturity instruments to move freely in accordance with market conditions and expectations.

With respect to open market interest rates, the Bank of Japan could influence them to a certain extent through the mechanism of interest rate arbitrage between interbank and open markets. However, the mechanism of interest rate arbitrage alone is not sufficient to control the interest rates on the open markets. Other factors, including differences in market expectations and different characteristics of various segments of the open markets, determine also open market interest rates. Furthermore, the declining share of the interbank markets in the total money market made it more difficult for the Bank of Japan to influence the interest rates on the open markets only by use of interest arbitrage. Therefore, the last decade saw the introduction of open market policy by the Bank of Japan as an instrument to exert direct influence on open markets. The Bank has used in its open market policy various instruments, such as sales of FBs with repurchase agreements (first in May 1981), CDs (not used anymore since February 1989), purchases of CPs with repurchase agreements (firstly May 1989) and purchases of TBs with resale agreements (first in January 1990). The Bank of Japan intends to extend the use of TBs as an open market instrument. For this purpose the market for TBs, which is still relatively small and underdeveloped, will have to expand and gain in importance. To facilitate the open market policy of the Bank of Japan, the Ministry of Finance has introduced in August 1989 three-month TBs, has promoted the development of a secondary market by increasing the number of TB issues from one to two when the monthly issue volume exceeds two trillion Yen and considers to expand the issue of TBs in the fiscal year through March 1992 to Yen 9 trillion.

The open market operations of the Bank of Japan have great consequences for the money supply. The money supply is influenced through three channels by these operations. In the first place, the existence of a direct mechanism has to be mentioned. For example, when the Bank of Japan sells for example TBs directly to the non-financial sector the money supply will decrease. When the Bank of Japan sells TBs to money creating financial

¹⁸ Batten et al. (1989), p.30, and Nakao and Horii (1991), p.20.

¹⁹ During the first nine months of 1990, emphasis of bills operations is on two week instruments. See Nakao and Horii (1991), table 6, p.39.

Fig. 4. The interbank and open market rates before and after the reform of the Japanese money market. Source: The Bank of Japan.

institutions, which received permission from the Bank to resell the bills to the non-financial sector, the money supply will also decrease. The consequence of this operation is a deteriorating reserve position of the financial institu-

tions concerned (decrease of deposit at Bank of Japan). As a result, these financial institutions will borrow funds on the interbank money market to make up their deficits. The resulting increase in interbank interest rates will lead through the mechanism of interest rate arbitrage to rising open market interest rates, i.e. rising costs of private expenditures. It will be clear that in the end the level of national income, money demand and money supply will tend to decrease. This indirect mechanism is the second channel between open market operations and money supply. In the third place, the open market operations have great consequences for the supply and demand relations on the secondary market of TBs and consequently for the interest rates on this market. Through the channel of interest rate arbitrage the other open market interest rates will be influenced and finally (the familiar effects of interest rate fluctuations on private expenditures) the money supply.

With respect to the transmission channels, the exceptional rise during the eighties of prices of assets such as equities and real estate strengthened the importance of wealth effects. Changes in interest rates influence the value of various assets and consequently the amount of private non-financial sector expenditures.

The process of financial reform, especially the liberalization of interest rates, has made the effects of interest rate changes on private expenditures (direct channel) and these effects on asset values and consequently on private expenditures (indirect channel) much more important. The new short-term and long-term prime rate systems and the increased use by banks of funding instruments with money market related interest rates have made the transmission of changes in money market interest rates to lending and borrowing behaviour of the non-financial sector more effective.²⁰ Thus, the transmission of monetary policy will increasingly take place through the effects of interbank and open market operations of the Bank of Japan on interest rates in all markets.²¹ The focusing of the Bank of Japan on market interest rates has been mentioned in Tamura (1991) and Nakao and Horii (1991). Furthermore, as a result of the financial reform process these officials of the Bank of Japan mention an increased number of caveats applying to the interpretation of the money supply since the mid-1980s.

Under the modern monetary policy market interest rates and as a consequence of financial globalization also exchange rates have gained importance. Despite the caveats regarding the interpretation of the money supply the Bank of Japan still emphasizes the stabilization of money growth in the medium term.²² Therefore, both the money supply and the (U.S.dollar/yen) exchange rate are used as targets by the Bank of Japan. The Japanese central

²⁰ Royama (1989/1990), p.8.

²¹ Suzuki (1989b), p.166.

²² Tamura (1991), p.9.

bank wants to achieve the goal of price stability on the one hand by controlling the growth of the money supply (the internal track) and on the other hand by keeping the yen sufficiently strong against the U.S. dollar to prevent import inflation (the external track). For example, according to Hutchison (1986) the Bank of Japan has not relied fully on the internal track but has also systematically focused on the external track.

The increasing emphasis of the Bank on interest rate management is also reflected in the official ending of the window guidance in June 1991. From now on, the Bank of Japan has to rely solely on indirect credit control.

Epilogue

In this article, we analyzed the development of the structure of the financial system and the implementation of monetary policy in Japan. First, the pre-reform financial system was discussed extensively. Secondly, a classification of financial institutions according to their business features and customers was given. Thirdly, we concentrated on the money markets because of their importance for monetary policy making in Japan. These markets were divided into the interbank and open money markets. Fourthly, regarding the process of financial reform five strongly interrelated subprocesses were distinguished: financial innovation, financial liberalization, financial globalization, financial concentration and restoring of financial reputation. Fifthly, an analysis of the monetary policy transmission mechanism in Japan was presented for the whole post World War II period. Regarding the implementation of monetary policy a distinction was made between three subsequent periods: the traditional (1953–1975), new (1975–1981) and modern monetary policy (1981–present).

Finally, we will discuss the relationship between the monetary authorities in Japan against the background of recent developments. The double digit growth of the aggregate $M_2 + \text{CDs}$ from 1987 was accompanied by an until recently gradual appreciation of the yen vis-à-vis the U.S. dollar and contributed only to a limited extent to an increase of domestic inflation in Japan.

In the middle of 1989 the appreciation of the yen turned into a depreciation against the dollar and other currencies, such as the Deutsche Mark. Thereby, the price level of import goods to Japan rose sharply in 1989. The higher import price level combined with the increased stock of liquidity at the end of the eighties meant a considerable threat to the goal of price stability (CPI). The potential inflation conceived by the Bank of Japan was mainly responsible for the origin of a conflict between the central bank and the Ministry of Finance. In February 1990 contradictory statements by the Governor of the Bank of Japan and the Deputy Minister of Finance led to a

public controversy between both monetary authorities.²³ During 1990, this remarkable lack of consensus regarding future monetary policy resulted in much turmoil on the Japanese financial markets. The crux of the conflict was a deep-lying difference of opinion between the authorities with respect to the relative weight of price stability and economic growth as goals of monetary policy. Traditionally, the Bank of Japan attaches great importance to the goal of price stability. On the contrary, the Ministry of Finance attaches greater value to the goal of economic growth. The Ministry is of the opinion that the central bank has to provide for ample money supply and unimpeded economic growth and should raise the official discount rate only in case of ultimate necessity.

The conflict between both authorities ought to be judged against the background of the process of financial reform in Japan and the changing balance of power regarding the decision-making and implementation of monetary policy. The influence of the Ministry of Finance is mostly based on financial regulation ('regulatory leverage') and is gradually declining by the progress of financial innovation and liberalization in recent years. However, the Bank of Japan derives its influence from the guidance and steering of financial markets ('market leverage') and is able to conduct step by step a more independent policy. The rising autonomy of the central bank is obstructed by the Ministry of Finance to a large extent by using its administrative guidance. The conflict focused on the official discount rate, because this monetary instrument can only be changed with the formal approval of the Policy Board – in which the Ministry is represented – and the informal consent of the Minister of Finance.²⁴ The specific nature of the relationship between the Bank of Japan and the Ministry of Finance is still subject of further discussion. The monetary authorities in Japan are aware of the urgency to clarify their relationship and to restore and maintain their credibility in the financial markets.

References

- Japan Plans New Treasury-Bill Operations, *The Asian Wall Street Journal*, December 15, 1989.
Bank of Japan, 1973, *Money and banking in Japan* (The MacMillan Press, Ltd., London/Basingstoke).
Batten, D., M. Blackwell, I. Kim, S. Nocera and Y. Ozeki, 1989, The instruments and operating procedures for conducting monetary policy in the group of five countries, IMF Working Paper 89/57, July 21.
Blundell-Wignall, A. and F. Browne, 1991, Increasing financial market integration, real exchange rates and macroeconomic adjustment, OECD Department of Economics and Statistics, Working Paper No. 96, February.

²³ For a description of this controversy see: S. Wagstyl, The curtain falls on the era of the triple merits, *Financial Times*, February 24, 1990, p.8.

²⁴ The relation between the Bank of Japan and the Ministry of Finance is discussed in Cargill (1989).

- Cargill, T.F., 1985, A U.S. perspective on Japanese financial liberalization, *Bank of Japan, Monetary and Economic Studies* 3, No. 1, May, 115-161.
- Cargill, T.F. and S. Royama, 1988, *The transition of finance in Japan and the United States: a comparative perspective* (Hoover Institution Press, Stanford).
- Cargill, T.F., 1989, Central bank independence and regulatory responsibilities: The Bank of Japan and The Federal Reserve, *Salomon Brothers Center for the Study of Financial Institutions, Monograph Series in Finance and Economics*, 1989-2.
- Eijffinger, S.C.W., 1986, *Over de beheersbaarheid van de geldhoeveelheid* (On the controllability of the money supply) (VU Uitgeverij, Amsterdam).
- Federation of Bankers Associations of Japan, 1984, *Banking system in Japan*. (Federation of Bankers Associations of Japan, Tokyo).
- Federation of Bankers Associations of Japan, 1988, *Report on specialized financial institution system in Japan*, by The Financial System Subcommittee (Federation of Bankers Associations of Japan, Tokyo).
- Federation of Bankers Associations of Japan, 1989, *Japan Financial Statistics 1989* (Federation of Bankers Associations of Japan, Tokyo).
- Federation of Bankers Associations of Japan, 1990, *On a new Japanese financial system, Second Interim Report*, by the Second Financial System Committee of the Financial System Research Council (Federation of Bankers Associations of Japan, Tokyo).
- Federation of Bankers Associations of Japan, 1991, *Japanese Banks'91* (Federation of Bankers Associations of Japan, Tokyo).
- Fukui, T., 1986, Recent developments of the short-term money market in Japan and changes in monetary control techniques and procedures by the Bank of Japan, *Special Paper No. 130* (The Bank of Japan Research and Statistics Department, Tokyo).
- Hamada, K. and A. Horiuchi, 1984, *The political economy of Japanese financial markets*, Paper presented at the Japan Political Economy Research Conference, Tokyo, August.
- Hollerman, L., 1988, *Japan disincorporated: the economic liberalization Process* (Hoover Institution Press, Stanford).
- Horiuchi, A., 1984, The "low interest rate policy" and economic growth in postwar Japan, *The Developing Economies*, December, No. 4, 349-369.
- Hutchison, M.M., 1986, *Monetary control, interest rates and exchange rates: the case of Japan, 1973-1986*, Working Paper 145, University of California at Santa Cruz.
- Johnson, C., 1982, MITI and the Japanese miracle: the growth of industrial policy, 1925-1975 (Charles E. Tuttle Co., Tokyo).
- Kanda, H., 1990, *Legal aspects of securitization in Japan*, Paper presented at SOAS Conference "Which Path for the Japanese Financial System", London, March.
- Kuroda, A., 1989, *Financial globalization and monetary policy in Japan: an overview*, Paper presented at the Chulalongkorn University Conference on "International Dimensions of Japanese Financial Development: Implications on ASEAN and Thailand", March.
- McCall Rosenbluth, F., 1989, *Financial politics in contemporary Japan* (Cornell University Press, Ithaca/London).
- Nakao, M. and A. Hori, 1991, *The process of decision-making and implementation of monetary policy in Japan*, *Special Paper Series Bank of Japan*, No. 198, March.
- Okabe, M., 1990, *The conduct and the transmission mechanism of Japanese monetary policy 1975-1989: a literature survey*, Institute for Monetary and Economic Studies, The Bank of Japan, preliminary version, March.
- Royama, S., 1983/1984, *The Japanese financial system: past, present, and future*, *Japan Economic Studies* 12, Winter, 3-32.
- Royama, S., 1988, *The financial system of Japan: a new view*, *Japan Economic Studies* 16, Spring, 76-97.
- Royama, S., 1989/1990, *Monetary policy under the evolution of open money markets in Japan*, mimeo.
- Sakakibara, E. and R.A. Feldman, 1983, *The Japanese financial system in comparative perspective*, *Journal of Comparative Economics* 7, 1-24.
- Shimamoto, R., 1982, *Monetary control in Japan*, in: P. Meek, ed., *Central bank views on monetary targeting* (Federal Reserve Bank of New York, New York) 80-85.

- Suzuki, Y., 1980, Money and banking in contemporary Japan: the theoretical setting and its application (Yale University Press, New Haven/London).
- Suzuki, Y., 1985, Japan's monetary policy over the past 10 years, *Bank of Japan Monetary and Economic Studies* 3, No. 2, September, 1-9.
- Suzuki, Y., 1986, Money, finance, and macroeconomic performance in Japan (Yale University Press, New Haven/London).
- Suzuki, Y. and H. Yomo, ed., 1986, Financial innovation and monetary policy: Asia and the West (University of Tokyo Press, Tokyo).
- Suzuki, Y., ed., 1987, *The Japanese financial system* (Clarendon Press, Oxford).
- Suzuki, Y., 1989a, Japan's economic performance and international role (University of Tokyo Press, Tokyo).
- Suzuki, Y., 1989b, Policy targets and operating procedures in the 1990s: the case of Japan, in: Federal Reserve Bank of Kansas City, *Monetary policy issues in the 1990s* (Federal Reserve Bank of Kansas City, Kansas City) 161-173.
- Tamura, T., 1991, The Bank of Japan mechanism, presentation to BRI Conference, London, 4-5 March.
- Teranishi, J., 1986a, The "catch-up" process, financial system, and Japan's rise as a capital exporter, *Hitotsubashi Journal of Economics* 27, Special Issue, October, 133-146.
- Teranishi, J., 1986b, Economic growth and regulation of financial markets: Japanese experience during postwar high growth period, *Hitotsubashi Journal of Economics* 27, December, 149-165.
- Teranishi, J., 1990, Finance and economic development in postwar Japan, Paper presented at the Conference on Financial Development in Japan, Korea and Taiwan, Institute of Academia Sinica, Taipei, August.
- Viner, A., 1987, *Inside Japan's financial markets* (The Economist Publications Ltd, London).
- Wright, R.W. and G.A. Pauli, 1987, *The second wave: Japan's global assault on financial services* (Waterlow Publishers, London).
- Various issues of the *Asian Wall Street Journal*, *Economic Statistics Monthly Bank of Japan*, *Japan Economic Journal*, *Nikkei Weekly* and *Zenginkyo Financial Review*.

Reprint Series, CentER, Tilburg University, The Netherlands:

- No. 1 G. Marini and F. van der Ploeg, Monetary and fiscal policy in an optimising model with capital accumulation and finite lives, *The Economic Journal*, vol. 98, no. 392, 1988, pp. 772 - 786.
- No. 2 F. van der Ploeg, International policy coordination in interdependent monetary economies, *Journal of International Economics*, vol. 25, 1988, pp. 1 - 23.
- No. 3 A.P. Barten, The history of Dutch macroeconomic modelling (1936-1986), in W. Driehuis, M.M.G. Fase and H. den Hartog (eds.), *Challenges for Macroeconomic Modelling*, Contributions to Economic Analysis 178, Amsterdam: North-Holland, 1988, pp. 39 - 88.
- No. 4 F. van der Ploeg, Disposable income, unemployment, inflation and state spending in a dynamic political-economic model, *Public Choice*, vol. 60, 1989, pp. 211 - 239.
- No. 5 Th. ten Raa and F. van der Ploeg, A statistical approach to the problem of negatives in input-output analysis, *Economic Modelling*, vol. 6, no. 1, 1989, pp. 2 - 19.
- No. 6 E. van Damme, Renegotiation-proof equilibria in repeated prisoners' dilemma, *Journal of Economic Theory*, vol. 47, no. 1, 1989, pp. 206 - 217.
- No. 7 C. Mulder and F. van der Ploeg, Trade unions, investment and employment in a small open economy: a Dutch perspective, in J. Muysken and C. de Neubourg (eds.), *Unemployment in Europe*, London: The Macmillan Press Ltd, 1989, pp. 200 - 229.
- No. 8 Th. van de Klundert and F. van der Ploeg, Wage rigidity and capital mobility in an optimizing model of a small open economy, *De Economist*, vol. 137, nr. 1, 1989, pp. 47 - 75.
- No. 9 G. Dhaene and A.P. Barten, When it all began: the 1936 Tinbergen model revisited, *Economic Modelling*, vol. 6, no. 2, 1989, pp. 203 - 219.
- No. 10 F. van der Ploeg and A.J. de Zeeuw, Conflict over arms accumulation in market and command economies, in F. van der Ploeg and A.J. de Zeeuw (eds.), *Dynamic Policy Games in Economics*, Contributions to Economic Analysis 181, Amsterdam: Elsevier Science Publishers B.V. (North-Holland), 1989, pp. 91 - 119.
- No. 11 J. Driffill, Macroeconomic policy games with incomplete information: some extensions, in F. van der Ploeg and A.J. de Zeeuw (eds.), *Dynamic Policy Games in Economics*, Contributions to Economic Analysis 181, Amsterdam: Elsevier Science Publishers B.V. (North-Holland), 1989, pp. 289 - 322.
- No. 12 F. van der Ploeg, Towards monetary integration in Europe, in P. De Grauwe et al., *De Europese Monetaire Integratie: vier visies*, Wetenschappelijke Raad voor het Regeringsbeleid V 66, 's-Gravenhage: SDU uitgeverij, 1989, pp. 81 - 106.

- No. 13 R.J.M. Alessie and A. Kapteyn, Consumption, savings and demography, in A. Wenig, K.F. Zimmermann (eds.), *Demographic Change and Economic Development*, Berlin/Heidelberg: Springer-Verlag, 1989, pp. 272 - 305.
- No. 14 A. Hoque, J.R. Magnus and B. Pesaran, The exact multi-period mean-square forecast error for the first-order autoregressive model, *Journal of Econometrics*, vol. 39, no. 3, 1988, pp. 327 - 346.
- No. 15 R. Alessie, A. Kapteyn and B. Melenberg, The effects of liquidity constraints on consumption: estimation from household panel data, *European Economic Review*, vol. 33, no. 2/3, 1989, pp. 547 - 555.
- No. 16 A. Holly and J.R. Magnus, A note on instrumental variables and maximum likelihood estimation procedures, *Annales d'Économie et de Statistique*, no. 10, April-June, 1988, pp. 121 - 138.
- No. 17 P. ten Hacken, A. Kapteyn and I. Woittiez, Unemployment benefits and the labor market, a micro/macro approach, in B.A. Gustafsson and N. Anders Klevmarken (eds.), *The Political Economy of Social Security*, Contributions to Economic Analysis 179, Amsterdam: Elsevier Science Publishers B.V. (North-Holland), 1989, pp. 143 - 164.
- No. 18 T. Wansbeek and A. Kapteyn, Estimation of the error-components model with incomplete panels, *Journal of Econometrics*, vol. 41, no. 3, 1989, pp. 341 - 361.
- No. 19 A. Kapteyn, P. Kooreman and R. Willemse, Some methodological issues in the implementation of subjective poverty definitions, *The Journal of Human Resources*, vol. 23, no. 2, 1988, pp. 222 - 242.
- No. 20 Th. van de Klundert and F. van der Ploeg, Fiscal policy and finite lives in interdependent economies with real and nominal wage rigidity, *Oxford Economic Papers*, vol. 41, no. 3, 1989, pp. 459 - 489.
- No. 21 J.R. Magnus and B. Pesaran, The exact multi-period mean-square forecast error for the first-order autoregressive model with an intercept, *Journal of Econometrics*, vol. 42, no. 2, 1989, pp. 157 - 179.
- No. 22 F. van der Ploeg, Two essays on political economy: (i) The political economy of overvaluation, *The Economic Journal*, vol. 99, no. 397, 1989, pp. 850 - 855; (ii) Election outcomes and the stockmarket, *European Journal of Political Economy*, vol. 5, no. 1, 1989, pp. 21 - 30.
- No. 23 J.R. Magnus and A.D. Woodland, On the maximum likelihood estimation of multivariate regression models containing serially correlated error components, *International Economic Review*, vol. 29, no. 4, 1988, pp. 707 - 725.
- No. 24 A.J.J. Talman and Y. Yamamoto, A simplicial algorithm for stationary point problems on polytopes, *Mathematics of Operations Research*, vol. 14, no. 3, 1989, pp. 383 - 399.
- No. 25 E. van Damme, Stable equilibria and forward induction, *Journal of Economic Theory*, vol. 48, no. 2, 1989, pp. 476 - 496.

- No. 26 A.P. Barten and L.J. Bettendorf, Price formation of fish: An application of an inverse demand system, *European Economic Review*, vol. 33, no. 8, 1989, pp. 1509 - 1525.
- No. 27 G. Noldeke and E. van Damme, Signalling in a dynamic labour market, *Review of Economic Studies*, vol. 57 (1), no. 189, 1990, pp. 1 - 23.
- No. 28 P. Kop Jansen and Th. ten Raa, The choice of model in the construction of input-output coefficients matrices, *International Economic Review*, vol. 31, no. 1, 1990, pp. 213 - 227.
- No. 29 F. van der Ploeg and A.J. de Zeeuw, Perfect equilibrium in a model of competitive arms accumulation, *International Economic Review*, vol. 31, no. 1, 1990, pp. 131 - 146.
- No. 30 J.R. Magnus and A.D. Woodland, Separability and aggregation, *Economica*, vol. 57, no. 226, 1990, pp. 239 - 247.
- No. 31 F. van der Ploeg, International interdependence and policy coordination in economies with real and nominal wage rigidity, *Greek Economic Review*, vol. 10, no. 1, June 1988, pp. 1 - 48.
- No. 32 E. van Damme, Signaling and forward induction in a market entry context, *Operations Research Proceedings 1989*, Berlin-Heidelberg: Springer-Verlag, 1990, pp. 45 - 59.
- No. 33 A.P. Barten, Toward a levels version of the Rotterdam and related demand systems, *Contributions to Operations Research and Economics*, Cambridge: MIT Press, 1989, pp. 441 - 465.
- No. 34 F. van der Ploeg, International coordination of monetary policies under alternative exchange-rate regimes, in F. van der Ploeg (ed.), *Advanced Lectures in Quantitative Economics*, London-Orlando: Academic Press Ltd., 1990, pp. 91 - 121.
- No. 35 Th. van de Klundert, On socioeconomic causes of 'wait unemployment', *European Economic Review*, vol. 34, no. 5, 1990, pp. 1011 - 1022.
- No. 36 R.J.M. Alessie, A. Kapteyn, J.B. van Lochem and T.J. Wansbeek, Individual effects in utility consistent models of demand, in J. Hartog, G. Ridder and J. Theeuwes (eds.), *Panel Data and Labor Market Studies*, Amsterdam: Elsevier Science Publishers B.V. (North-Holland), 1990, pp. 253 - 278.
- No. 37 F. van der Ploeg, Capital accumulation, inflation and long-run conflict in international objectives, *Oxford Economic Papers*, vol. 42, no. 3, 1990, pp. 501 - 525.
- No. 38 Th. Nijman and F. Palm, Parameter identification in ARMA Processes in the presence of regular but incomplete sampling, *Journal of Time Series Analysis*, vol. 11, no. 3, 1990, pp. 239 - 248.
- No. 39 Th. van de Klundert, Wage differentials and employment in a two-sector model with a dual labour market, *Metroeconomica*, vol. 40, no. 3, 1989, pp. 235 - 256.

- No. 40 Th. Nijman and M.F.J. Steel, Exclusion restrictions in instrumental variables equations, *Econometric Reviews*, vol. 9, no. 1, 1990, pp. 37 - 55.
- No. 41 A. van Soest, I. Woittiez and A. Kapteyn, Labor supply, income taxes, and hours restrictions in the Netherlands, *Journal of Human Resources*, vol. 25, no. 3, 1990, pp. 517 - 558.
- No. 42 Th.C.M.J. van de Klundert and A.B.T.M. van Schaik, Unemployment persistence and loss of productive capacity: a Keynesian approach, *Journal of Macro- economics*, vol. 12, no. 3, 1990, pp. 363 - 380.
- No. 43 Th. Nijman and M. Verbeek, Estimation of time-dependent parameters in linear models using cross-sections, panels, or both, *Journal of Econometrics*, vol. 46, no. 3, 1990, pp. 333 - 346.
- No. 44 E. van Damme, R. Selten and E. Winter, Alternating bid bargaining with a smallest money unit, *Games and Economic Behavior*, vol. 2, no. 2, 1990, pp. 188 - 201.
- No. 45 C. Dang, The D_j -triangulation of $\mathbb{R}^n$ for simplicial algorithms for computing solutions of nonlinear equations, *Mathematics of Operations Research*, vol. 16, no. 1, 1991, pp. 148 - 161.
- No. 46 Th. Nijman and F. Palm, Predictive accuracy gain from disaggregate sampling in ARIMA models, *Journal of Business & Economic Statistics*, vol. 8, no. 4, 1990, pp. 405 - 415.
- No. 47 J.R. Magnus, On certain moments relating to ratios of quadratic forms in normal variables: further results, *Sankhya: The Indian Journal of Statistics*, vol. 52, series B, part. 1, 1990, pp. 1 - 13.
- No. 48 M.F.J. Steel, A Bayesian analysis of simultaneous equation models by combining recursive analytical and numerical approaches, *Journal of Econometrics*, vol. 48, no. 1/2, 1991, pp. 83 - 117.
- No. 49 F. van der Ploeg and C. Withagen, Pollution control and the ramsey problem, *Environmental and Resource Economics*, vol. 1, no. 2, 1991, pp. 215 - 236.
- No. 50 F. van der Ploeg, Money and capital in interdependent economies with overlapping generations, *Economica*, vol. 58, no. 230, 1991, pp. 233 - 256.
- No. 51 A. Kapteyn and A. de Zeeuw, Changing incentives for economic research in the Netherlands, *European Economic Review*, vol. 35, no. 2/3, 1991, pp. 603 - 611.
- No. 52 C.G. de Vries, On the relation between GARCH and stable processes, *Journal of Econometrics*, vol. 48, no. 3, 1991, pp. 313 - 324.
- No. 53 R. Alessie and A. Kapteyn, Habit formation, interdependent preferences and demographic effects in the almost ideal demand system, *The Economic Journal*, vol. 101, no. 406, 1991, pp. 404 - 419.
- No. 54 W. van Groenendaal and A. de Zeeuw, Control, coordination and conflict on international commodity markets, *Economic Modelling*, vol. 8, no. 1, 1991, pp. 90 - 101.

- No. 55 F. van der Ploeg and A.J. Markink, Dynamic policy in linear models with rational expectations of future events: A computer package, *Computer Science in Economics and Management*, vol. 4, no. 3, 1991, pp. 175 - 199.
- No. 56 H.A. Keuzenkamp and F. van der Ploeg, Savings, investment, government finance, and the current account: The Dutch experience, in G. Alogoskoufis, L. Papademos and R. Portes (eds.), *External Constraints on Macroeconomic Policy: The European Experience*, Cambridge: Cambridge University Press, 1991, pp. 219 - 263.
- No. 57 Th. Nijman, M. Verbeek and A. van Soest, The efficiency of rotating-panel designs in an analysis-of-variance model, *Journal of Econometrics*, vol. 49, no. 3, 1991, pp. 373 - 399.
- No. 58 M.F.J. Steel and J.-F. Richard, Bayesian multivariate exogeneity analysis - an application to a UK money demand equation, *Journal of Econometrics*, vol. 49, no. 1/2, 1991, pp. 239 - 274.
- No. 59 Th. Nijman and F. Palm, Generalized least squares estimation of linear models containing rational future expectations, *International Economic Review*, vol. 32, no. 2, 1991, pp. 383 - 389.
- No. 60 E. van Damme, Equilibrium selection in 2×2 games, *Revista Espanola de Economia*, vol. 8, no. 1, 1991, pp. 37 - 52.
- No. 61 E. Bennett and E. van Damme, Demand commitment bargaining: the case of apex games, in R. Selten (ed.), *Game Equilibrium Models III - Strategic Bargaining*, Berlin: Springer-Verlag, 1991, pp. 118 - 140.
- No. 62 W. Güth and E. van Damme, Gorby games - a game theoretic analysis of disarmament campaigns and the defense efficiency - hypothesis -, in R. Avenhaus, H. Karkar and M. Rudnianski (eds.), *Defense Decision Making - Analytical Support and Crisis Management*, Berlin: Springer-Verlag, 1991, pp. 215 - 240.
- No. 63 A. Roell, Dual-capacity trading and the quality of the market, *Journal of Financial Intermediation*, vol. 1, no. 2, 1990, pp. 105 - 124.
- No. 64 Y. Dai, G. van der Laan, A.J.J. Talman and Y. Yamamoto, A simplicial algorithm for the nonlinear stationary point problem on an unbounded polyhedron, *Siam Journal of Optimization*, vol. 1, no. 2, 1991, pp. 151 - 165.
- No. 65 M. McAleer and C.R. McKenzie, Keynesian and new classical models of unemployment revisited, *The Economic Journal*, vol. 101, no. 406, 1991, pp. 359 - 381.
- No. 66 A.J.J. Talman, General equilibrium programming, *Nieuw Archief voor Wiskunde*, vol. 8, no. 3, 1990, pp. 387 - 397.
- No. 67 J.R. Magnus and B. Pesaran, The bias of forecasts from a first-order autoregression, *Econometric Theory*, vol. 7, no. 2, 1991, pp. 222 - 235.

- No. 68 F. van der Ploeg, Macroeconomic policy coordination issues during the various phases of economic and monetary integration in Europe, *European Economy - The Economics of EMU*, Commission of the European Communities, special edition no. 1, 1991, pp. 136 - 164.
- No. 69 H. Keuzenkamp, A precursor to Muth: Tinbergen's 1932 model of rational expectations, *The Economic Journal*, vol. 101, no. 408, 1991, pp. 1245 - 1253.
- No. 70 L. Zou, The target-incentive system vs. the price-incentive system under adverse selection and the ratchet effect, *Journal of Public Economics*, vol. 46, no. 1, 1991, pp. 51 - 89.
- No. 71 E. Bomhoff, Between price reform and privatization: Eastern Europe in transition, *Finanzmarkt und Portfolio Management*, vol. 5, no. 3, 1991, pp. 241 - 251.
- No. 72 E. Bomhoff, Stability of velocity in the major industrial countries: a Kalman filter approach, *International Monetary Fund Staff Papers*, vol. 38, no. 3, 1991, pp. 626 - 642.
- No. 73 E. Bomhoff, Currency convertibility: when and how? A contribution to the Bulgarian debate, *Kredit und Kapital*, vol. 24, no. 3, 1991, pp. 412 - 431.
- No. 74 H. Keuzenkamp and F. van der Ploeg, Perceived constraints for Dutch unemployment policy, in C. de Neubourg (ed.), *The Art of Full Employment - Unemployment Policy in Open Economies*, Contributions to Economic Analysis 203, Amsterdam: Elsevier Science Publishers B.V. (North-Holland), 1991, pp. 7 - 37.
- No. 75 H. Peters and E. van Damme, Characterizing the Nash and Raiffa bargaining solutions by disagreement point axioms, *Mathematics of Operations Research*, vol. 16, no. 3, 1991, pp. 447 - 461.
- No. 76 P.J. Deschamps, On the estimated variances of regression coefficients in misspecified error components models, *Econometric Theory*, vol. 7, no. 3, 1991, pp. 369 - 384.
- No. 77 A. de Zeeuw, Note on 'Nash and Stackelberg solutions in a differential game model of capitalism', *Journal of Economic Dynamics and Control*, vol. 16, no. 1, 1992, pp. 139 - 145.
- No. 78 J.R. Magnus, On the fundamental bordered matrix of linear estimation, in F. van der Ploeg (ed.), *Advanced Lectures in Quantitative Economics*, London-Orlando: Academic Press Ltd., 1990, pp. 583 - 604.
- No. 79 F. van der Ploeg and A. de Zeeuw, A differential game of international pollution control, *Systems and Control Letters*, vol. 17, no. 6, 1991, pp. 409 - 414.
- No. 80 Th. Nijman and M. Verbeek, The optimal choice of controls and pre-experimental observations, *Journal of Econometrics*, vol. 51, no. 1/2, 1992, pp. 183 - 189.
- No. 81 M. Verbeek and Th. Nijman, Can cohort data be treated as genuine panel data?, *Empirical Economics*, vol. 17, no. 1, 1992, pp. 9 - 23.

- No. 82 E. van Damme and W. Güth, Equilibrium selection in the Spence signaling game, in R. Selten (ed.), *Game Equilibrium Models II - Methods, Morals, and Markets*, Berlin: Springer-Verlag, 1991, pp. 263 - 288.
- No. 83 R.P. Gilles and P.H.M. Ruys, Characterization of economic agents in arbitrary communication structures, *Nieuw Archief voor Wiskunde*, vol. 8, no. 3, 1990, pp. 325 - 345.
- No. 84 A. de Zeeuw and F. van der Ploeg, Difference games and policy evaluation: a conceptual framework, *Oxford Economic Papers*, vol. 43, no. 4, 1991, pp. 612 - 636.
- No. 85 E. van Damme, Fair division under asymmetric information, in R. Selten (ed.), *Rational Interaction - Essays in Honor of John C. Harsanyi*, Berlin/Heidelberg: Springer-Verlag, 1992, pp. 121 - 144.
- No. 86 F. de Jong, A. Kemna and T. Kloek, A contribution to event study methodology with an application to the Dutch stock market, *Journal of Banking and Finance*, vol. 16, no. 1, 1992, pp. 11 - 36.
- No. 87 A.P. Barten, The estimation of mixed demand systems, in R. Bewley and T. Van Hoa (eds.), *Contributions to Consumer Demand and Econometrics, Essays in Honour of Henri Theil*, Basingstoke: The Macmillan Press Ltd., 1992, pp. 31 - 57.
- No. 88 T. Wansbeek and A. Kapteyn, Simple estimators for dynamic panel data models with errors in variables, in R. Bewley and T. Van Hoa (eds.), *Contributions to Consumer Demand and Econometrics, Essays in Honour of Henri Theil*, Basingstoke: The Macmillan Press Ltd., 1992, pp. 238 - 251.
- No. 89 S. Chib, J. Osiewalski and M. Steel, Posterior inference on the degrees of freedom parameter in multivariate-*t* regression models, *Economics Letters*, vol. 37, no. 4, 1991, pp. 391 - 397.
- No. 90 H. Peters and P. Wakker, Independence of irrelevant alternatives and revealed group preferences, *Econometrica*, vol. 59, no. 6, 1991, pp. 1787 - 1801.
- No. 91 G. Alogoskoufis and F. van der Ploeg, On budgetary policies, growth, and external deficits in an interdependent world, *Journal of the Japanese and International Economies*, vol. 5, no. 4, 1991, pp. 305 - 324.
- No. 92 R.P. Gilles, G. Owen and R. van den Brink, Games with permission structures: The conjunctive approach, *International Journal of Game Theory*, vol. 20, no. 3, 1992, pp. 277 - 293.
- No. 93 J.A.M. Potters, I.J. Curiel and S.H. Tijs, Traveling salesman games, *Mathematical Programming*, vol. 53, no. 2, 1992, pp. 199 - 211.
- No. 94 A.P. Jurg, M.J.M. Jansen, J.A.M. Potters and S.H. Tijs, A symmetrization for finite two-person games, *Zeitschrift für Operations Research - Methods and Models of Operations Research*, vol. 36, no. 2, 1992, pp. 111 - 123.

- No. 95 A. van den Nouweland, P. Borm and S. Tijs, Allocation rules for hypergraph communication situations, *International Journal of Game Theory*, vol. 20, no. 3, 1992, pp. 255 - 268.
- No. 96 E.J. Bomhoff, Monetary reform in Eastern Europe, *European Economic Review*, vol. 36, no. 2/3, 1992, pp. 454 - 458.
- No. 97 F. van der Ploeg and A. de Zeeuw, International aspects of pollution control, *Environmental and Resource Economics*, vol. 2, no. 2, 1992, pp. 117 - 139.
- No. 98 P.E.M. Borm and S.H. Tijs, Strategic claim games corresponding to an NTU-game, *Games and Economic Behavior*, vol. 4, no. 1, 1992, pp. 58 - 71.
- No. 99 A. van Soest and P. Kooreman, Coherency of the indirect translog demand system with binding nonnegativity constraints, *Journal of Econometrics*, vol. 44, no. 3, 1990, pp. 391 - 400.
- No. 100 Th. ten Raa and E.N. Wolff, Secondary products and the measurement of productivity growth, *Regional Science and Urban Economics*, vol. 21, no. 4, 1991, pp. 581 - 615.
- No. 101 P. Kooreman and A. Kapteyn, On the empirical implementation of some game theoretic models of household labor supply, *The Journal of Human Resources*, vol. 25, no. 4, 1990, pp. 584 - 598.
- No. 102 H. Bester, Bertrand equilibrium in a differentiated duopoly, *International Economic Review*, vol. 33, no. 2, 1992, pp. 433 - 448.
- No. 103 J.A.M. Potters and S.H. Tijs, The nucleolus of a matrix game and other nucleoli, *Mathematics of Operations Research*, vol. 17, no. 1, 1992, pp. 164 - 174.
- No. 104 A. Kapteyn, P. Kooreman and A. van Soest, Quantity rationing and concavity in a flexible household labor supply model, *Review of Economics and Statistics*, vol. 72, no. 1, 1990, pp. 55 - 62.
- No. 105 A. Kapteyn and P. Kooreman, Household labor supply: What kind of data can tell us how many decision makers there are?, *European Economic Review*, vol. 36, no. 2/3, 1992, pp. 365 - 371.
- No. 106 Th. van de Klundert and S. Smulders, Reconstructing growth theory: A survey, *De Economist*, vol. 140, no. 2, 1992, pp. 177 - 203.
- No. 107 N. Rankin, Imperfect competition, expectations and the multiple effects of monetary growth, *The Economic Journal*, vol. 102, no. 413, 1992, pp. 743 - 753.
- No. 108 J. Greenberg, On the sensitivity of von Neumann and Morgenstern abstract stable sets: The stable and the individual stable bargaining set, *International Journal of Game Theory*, vol. 21, no. 1, 1992, pp. 41 - 55.
- No. 109 S. van Wijnbergen, Trade reform, policy uncertainty, and the current account: A non-expected-utility approach, *American Economic Review*, vol. 82, no. 3, 1992, pp. 626 - 633.

- No. 110 M. Verbeek and Th. Nijman, Testing for selectivity bias in panel data models, *International Economic Review*, vol. 33, no. 3, 1992, pp. 681 - 703.
- No. 111 Th. Nijman and M. Verbeek, Nonresponse in panel data: The impact on estimates of a life cycle consumption function, *Journal of Applied Econometrics*, vol. 7, no. 3, 1992, pp. 243 - 257.
- No. 112 I. Bomze and E. van Damme, A dynamical characterization of evolutionarily stable states, *Annals of Operations Research*, vol. 37, 1992, pp. 229 - 244.
- No. 113 P.J. Deschamps, Expectations and intertemporal separability in an empirical model of consumption and investment under uncertainty, *Empirical Economics*, vol. 17, no. 3, 1992, pp. 419 - 450.
- No. 114 K. Kamiya and D. Talman, Simplicial algorithm for computing a core element in a balanced game, *Journal of the Operations Research*, vol. 34, no. 2, 1991, pp. 222 - 228.
- No. 115 G.W. Imbens, An efficient method of moments estimator for discrete choice models with choice-based sampling, *Econometrica*, vol. 60, no. 5, 1992, pp. 1187 -1214.
- No. 116 P. Borm, On perfectness concepts for bimatrix games, *OR Spektrum*, vol. 14, no. 1, 1992, pp. 33 - 42.
- No. 117 A.P. Jurg, I. Garcia Jurado and P.E.M. Borm, On modifications of the concepts of perfect and proper equilibria, *OR Spektrum*, vol. 14, no. 2, 1992, pp. 85 - 90.
- No. 118 P. Borm, H. Keiding, R.P. McLean, S. Oortwijn and S. Tijs, The compromise value for NTU-games, *International Journal of Game Theory*, vol. 21, no. 2, 1992, pp. 175 - 189.
- No. 119 M. Maschler, J.A.M. Potters and S.H. Tijs, The general nucleolus and the reduced game property, *International Journal of Game Theory*, vol. 21, no. 1, 1992, pp. 85 - 106.
- No. 120 K. Wärneryd, Communication, correlation and symmetry in bargaining, *Economics Letters*, vol. 39, no. 3, 1992, pp. 295 - 300.
- No. 121 M.R. Baye, D. Kovenock and C.G. de Vries, It takes two to tango: equilibria in a model of sales, *Games and Economic Behavior*, vol. 4, no. 4, 1992, pp. 493 - 510.
- No. 122 M. Verbeek, Pseudo panel data, in L. Mátyás and P. Sevestre (eds.), *The Econometrics of Panel Data*, Dordrecht: Kluwer Academic Publishers, 1992, pp. 303 - 315.
- No. 123 S. van Wijnbergen, Intertemporal speculation, shortages and the political economy of price reform, *The Economic Journal*, vol. 102, no. 415, 1992, pp. 1395 - 1406.
- No. 124 M. Verbeek and Th. Nijman, Incomplete panels and selection bias, in L. Mátyás and P. Sevestre (eds.), *The Econometrics of Panel Data*, Dordrecht: Kluwer Academic Publishers, 1992, pp. 262 - 302.

- No. 125 J.J. Sijben, Monetary policy in a game-theoretic framework, *Jahrbücher für Nationalökonomie und Statistik*, vol. 210, no. 3/4, 1992, pp. 233 - 253.
- No. 126 H.A.A. Verbon and M.J.M. Verhoeven, Decision making on pension schemes under rational expectations, *Journal of Economics*, vol. 56, no. 1, 1992, pp. 71 - 97.
- No. 127 L. Zou, Ownership structure and efficiency: An incentive mechanism approach, *Journal of Comparative Economics*, vol. 16, no. 3, 1993, pp. 399 - 431.
- No. 128 C. Fershtman and A. de Zeeuw, Capital accumulation and entry deterrence: A clarifying note, in G. Feichtinger (ed.), *Dynamic Economic Models and Optimal Control*, Amsterdam: Elsevier Science Publishers B.V. (North-Holland), 1992, pp. 281 - 296.
- No. 129 L. Bovenberg and C. Petersen, Public debt and pension policy, *Fiscal Studies*, vol. 13, no. 3, 1992, pp. 1 - 14.
- No. 130 R. Gradus and A. de Zeeuw, An employment game between government and firms, *Optimal Control Applications & Methods*, vol. 13, no. 1, 1992, pp. 55 - 71.
- No. 131 Th. Nijman and R. Beetsma, Empirical tests of a simple pricing model for sugar futures, *Annales d'Économie et de Statistique*, no. 24, 1991, pp. 121 - 131.
- No. 132 F. Groot, C. Withagen and A. de Zeeuw, Note on the open-loop Von Stackelberg equilibrium in the Cartel versus Fringe model, *The Economic Journal*, vol. 102, no. 415, 1992, pp. 1478 - 1484.
- No. 133 S. Eijffinger and N. Gruijters, On the effectiveness of daily intervention by the Deutsche Bundesbank and the Federal Reserve System in the US dollar - deutsche mark exchange market, in Baltensperger/Sinn (eds), *Exchange-Rate Regimes and Currency Unions*, Basingstoke: The Macmillan Press Ltd., 1992, pp. 131 - 156.
- No. 135 A. K. Bera and S. Lee, Information matrix test, parameter heterogeneity and ARCH: a synthesis, *Review of Economic Studies*, 60, 1993, pp. 229 - 240.
- No. 136 H. G. Bloemen and A. Kapteyn, The joint estimation of a non-linear labour supply function and a wage equation using simulated response probabilities, *Annales d'Économie et de Statistique*, No. 29, 1993, pp. 175 - 205.
- No. 137 H. Bester, Bargaining versus price competition in markets with quality uncertainty, *The American Economic Review*, Vol. 83, No. 1, March 1993, pp. 278 - 288.
- No. 138 K. Wärneryd, Anarchy, uncertainty, and the emergence of property rights, *Economics and Politics*, Vol. 5, No. 1, March 1993, pp. 1 - 14.
- No. 139 A. L. Bovenberg and L.H. Goulder, Promoting investment under international capital mobility: an intertemporal general equilibrium analysis, *The Scandinavian Journal of Economics*, Vol. 95, No. 2, 1993, pp. 133 - 156.
- No. 140 S. Eijffinger and E. Schaling, Central bank independence in twelve industrial countries, *Banca Nazionale del Lavoro Quarterly Review*, No. 184, March 1993, pp. 49 - 89.

No. 141

S. Eijffinger and A. van Rixtel, The Japanese financial system and monetary policy: a descriptive review, *Japan and the World Economy*, Vol. 4, No. 4, 1992, pp 291-309.

Bibliotheek K. U. Brabant

17 000 01138434 5