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Refinance Instruments
Lessons from Their Use in Some Industrialized Countries

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Abstract

Many central banks around the world are gradually shifting from a system of direct controls towards the implementation of monetary policy through market-oriented instruments, including refinance facilities. This paper reviews the use of refinance instruments in a sample of industrialized countries, and discusses how central banks use them to influence short-term interest rates and to manage banks' reserves. Some lessons are suggested for their implementation in developing countries or economies in transition.

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Summary

Many central banks around the world are gradually shifting from a system of direct controls towards the implementation of monetary policy through market-oriented instruments. However, some traditional market-based instruments, such as outright open-market operations, cannot be immediately used as the main instruments for monetary management in most developing countries and economies in transition, because a number of prerequisites are not fulfilled. In the transition period, refinance instruments may be valuable for the flexible implementation of monetary policy.

This paper first reviews the use of refinance instruments in a sample of industrialized countries. Typically, central banks offer standing facilities, that is, instruments used at the initiative of banks that carry preannounced rates. However, over the last decade monetary management has increasingly relied on operations with money market instruments. Because these operations are done at the initiative of central banks, operate through market mechanisms, and serve to manage the global amount of liquidity in the system, they are ideal tools for central bank management of monetary policy.

The joint implementation of standing facilities and money market instruments allows central banks to make the monetary policy stance explicit, as well as to fine-tune short-term interest rates. Although the quantitative importance of standing facilities has diminished in recent years, they play an important role as an instrument of emergency funding to finance end-of-day imbalances. However, central banks rely predominantly on money market instruments to regulate the overall liquidity in the system. In cases in which refinance windows are operated at below market rates, they provide very limited amount of funds; in some cases they can be seen as a counterpart to high non-remunerated reserve requirements.

Among the many lessons it details, the paper identifies the usefulness of central bank rates, whose level is decided by the central bank. The experiences of the selected countries suggest also that the instruments designed to provide the secular amount of central bank refinancing cannot be used to fine-tune interest rates. The design of refinance instruments has to take into consideration the exchange rate regime, and should provide incentives to trade funds on the interbank market initially. Finally, the paper identifies reasons for the use of collateralized operations, and presents some conclusions on the use of the reserve requirement.

I. Introduction

Many central banks are gradually shifting from a system of direct controls towards the implementation of monetary policy through market-oriented instruments. However, often the central bank is constrained by the low level of development of market mechanisms and the absence of sound and competitive banking systems. Moreover, in many countries--particularly formerly centrally planned economies--commercial banks depend heavily on central bank credit.

Indeed in many developing countries or economies in transition, some traditional market-based instruments, such as outright open-market operations, cannot be immediately used as the main instrument for monetary management, because a number of prerequisites are not fulfilled, such as a competitive banking market, the availability of government or central bank paper and active secondary markets on these securities, and an efficient payments system. In the transition period, refinance instruments may be valuable for the implementation of monetary policy with some flexibility. Moreover, these instruments are also used by a number of industrialized countries.

The purpose of this paper is to review the use of refinance instruments by central banks in some industrialized countries. Although there are well-developed financial markets in those countries, and open-market operations tend to prevail, central banks still rely on refinance instruments, such as discount windows, credit auctions or repurchase agreements. Chapter II describes refinance instruments. Chapter III discusses how central banks in a sample of industrialized countries, namely the United States, Japan, Germany, Belgium and France use these instruments to regulate short-term interest rates. 1/ Chapter IV focuses on the role of these instruments in the management of banks' reserves. Chapter V gives some concluding remarks.

II. Description of Refinance Instruments

The central banks in the selected sample use two types of refinance instruments: standing facilities and money market instruments. Both are collateralized operations.

Refinance instruments operate as modified rediscount windows. In a traditional rediscount operation, the ownership of the collateral is transferred to the central bank for its whole residual maturity. As a consequence, refinancing is granted for a period of time corresponding to the maturity of the collateral involved in the transaction. Because this is a source of rigidity for the daily management of liquidity, especially since the assets involved in rediscount operations are usually non-negotiable,

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1/ These countries were selected because of the similitude in the operating procedures used by their respective central banks.

many central banks have adopted modified arrangements. In some cases, the refinance window operates as a collateralized loan (a repurchase operation), which allows the central bank flexibility in choosing the maturity of the refinancing, which typically is shorter than the residual maturity of the collateral.

Whereas a classic rediscount operation provides refinancing at a fixed rate for the remaining maturity of the underlying asset, collateralized lending does not. Therefore, the cost of refinancing a certain paper with a collaterized lending facility is uncertain. Since the remaining maturity of the paper will generally exceed that of the refinance operation, the cost of refinancing will vary as refinance operations have to be rolled over. 1/ Collateral is also used in the case of money market instruments as explained below.

Experiences vary across countries regarding which assets central banks accept as collateral for their refinancing. As shown in Tables 1 and 2, central banks of the selected countries admit one or both of the two main categories of collateral: government securities or prime quality private paper, which may or may not be marketable. 2/ When assessing the quality of assets, monetary authorities may rely on ratings published by private agencies or on their own assessment, if such ratings are unavailable.

The technique used to transfer the collateral to the central bank differs also across the selected countries. In Germany for instance, in the absence of a book-entry system, accepted collateral has to be lodged in advance with the central bank in disposition accounts. This allows the Bundesbank to extend funds automatically through the Lombard facility, to finance end-of-day clearing imbalances. In France, by contrast, banks are no longer required to lodge collateral in advance with the central bank. When funds are extended against private paper, banks issue and sell to the central bank, "mobilization certificates" representing eligible private paper given as collateral. If government securities are used as collateral, a book-entry system allows to transfer ownership of each individual security through a payment-against-delivery arrangement. 3/

1/ This point is of particular importance in the case of refinance operations backed by medium or long-term assets.

2/ Because assets accepted as collateral are not usually traded by central banks, the comparative advantages of a marketable collateral is not really crucial.

3/ Prior to 1987, commercial paper accepted as collateral had to be deposited in advance with the central bank. In order to streamline administrative procedures, this technique was abolished and replaced by the present system of "mobilization certificates" representing eligible paper.

1. Standing facilities

Refinance standing facilities are instruments offered by central banks to provide funds, which have the following characteristics: (1) they are used at the initiative of individual banks, (2) they carry preannounced rates, and (3) in some cases, central banks also offer deposit standing facilities.

(1) Standing facilities are used at the initiative of banks, which determine the amounts used, although generally subject to some limits. Central banks tend to limit free access through the implementation of formal or informal ceilings, especially when they charge interest rates below market levels (Table 1).

(2) Refinance standing facilities provide funding at a pre-announced rate. However, the importance of the guarantee of the cost of refinancing has shrunk with the growing use of standing facilities that provide short-term loans against collateral.

(3) Deposit standing facilities allow banks to lend surplus liquidity to the central bank. Belgium is the only country in the sample to use this instrument. Not only is interest on these deposits below market rates, but access is subject to limits: within a first quantitative limit, the interest rate applied is slightly below market rates; deposits exceeding this first limit are remunerated at a rate well below market rates.

Table 1 presents additional features of standing facilities in the selected countries.

2. Operations with money market instruments

Over the last decade, monetary management in most industrialized countries has increasingly relied on operations with money market instruments instead of standing facilities. Because those operations are done at the initiative of central banks, operate through market mechanisms, and serve to manage the global amount of liquidity in the system, they are ideal tools for the central bank to manage monetary policy.

These instruments, whose main features are presented in Table 2, are reverse transactions in domestic securities (repurchase and resale transactions or repos), that is loans backed by domestic assets, or reverse transactions in foreign currency (foreign currency swap transactions), that is loans backed by a foreign currency.

Table 1 . Standing Facilities Implemented in Five Industrialized Countries

	Rate	Collateral	Access	Main Issues
United States	Discount rate Rate below short-term market rates. It applies to discount operations and loans against collateral.	Securities of the U.S. Government and federal agencies. Local government securities or private assets of acceptable quality.	Access strictly controlled by the Fed, and granted for very short-term periods.	Convey policy signals to the market. Source of emergency funding.
Germany	Discount rate Rate below short-term market rates. It applies to classic discount operations.	Private paper and government paper (federal and local) with remaining maturity < 3 months.	Rediscount ceilings according to capital, and portfolio of admissible paper.	Convey policy signals to the market. Ceilings are entirely used.
	Lombard rate Penalty rate above short-term market rates. It applies to loans against collateral.	Public paper, including liquidity paper, private paper, lodged in advance with the BUBA in disposition accounts.	Access at the initiative of banks, or automatic if their account is overdrawn at the end of the day.	Convey policy signals to the market. Upper bound for market rates. Source of emergency funding.
Japan	Discount rate Rate below short-term market rates. The same rate applies to classic discount operations and collateralized loans.	Mainly government securities.	Rationing procedure. Lending may be withdrawn at any time.	Convey policy signals to the market. Limits rate fluctuation
France	5 to 10 days repo rate Penalty rate above short-term market rates. It applies to loans against collateral.	Government paper, good quality short-term credit (2 years or less) to enterprises.	Access at the initiative of banks. Collateral may be limited to Government paper.	Convey policy signals to the market. Upper bound for market rates. Source of emergency funding.
Belgium	Deposit facility Penalty rate below short-term market rates.	Not relevant.	Within limits fixed by the central bank.	Lower bound for market rates. Serves to mop up daily surpluses of liquidity.
	Discount rate Rate below short-term market rates. It applies to collateralized loans.	Private paper only.	Within rediscounts ceilings.	Convey policy signals to the market. Refinancing of private paper.
	Special advances rate Penalty rate above short-term market rates.	Government paper only.	Within limits fixed by the central bank.	Upper bound for market rates. Source of emergency funding.

Source: See References, pp.26-27.

Table 2. Money Market Instruments Implemented in Five Industrialized Countries

	Instrument	Collateral	Auction System	Other Features
Germany	Credit auction The rate of volume tenders is one of the key rates of the central bank (DBK).	Government paper (including liquidity paper), securities listed at the stock market deposited at DBK.	Volume tender Rate known in advance. Interest rate tender Multiple-rate auctions.	Amount and maturity fixed by DBK. Weekly auctions (2 or 4 weeks maturity).
	Forex swaps	Foreign currencies Credit risk managed by credit lines.	Interest rate tender Multiple-rate auctions.	Infrequent use because of its effects on the exchange market.
	Auction of treasury discount paper	Not relevant.	Interest rate tender Multiple-rate auctions, open to banks and non banks.	Serves as monetary policy instrument. Do not imply financing of the government.
France	Credit auction The rate is a key rate of BDF and the lower bound for short-term market rates.	Government paper, good quality short-term credit (2 years or less) to private enterprises.	Volume tender Rate not known in advance.	Amount and maturity fixed by BDF. In practice weekly auctions of one-week maturity.
	Reverse transactions	Government securities.	On a bilateral basis at a market price.	Instrument of fine-tuning.
United States	Reverse transactions	Government securities.	Transactions negotiated with primary dealers at a market rate.	Instrument of fine-tuning.
Belgium	Credit auction The rate of volume tenders is one of the key rates of the central bank (BNB).	Government securities and private paper.	Volume tender Rate known in advance. Interest rate tender Both multiple and uniform rate auctions.	Amount and maturity fixed by BNB (in practice weekly auctions).
	Forex swaps	Foreign currencies Credit risk managed by credit lines.	Interest rate tender Banks are served at rates they bid.	Occasional use.
	Reverse transactions	Mainly government securities.	On a bilateral basis at a market rate.	Instrument of fine-tuning.
Japan	Bill discount window Market rates.	Bills (maturities 7 to 180 days) of good quality, and traded in the money market.	On a bilateral basis at a market rate.	Instrument of fine-tuning.

Source: See references, pp. 26-27.

Operations with money market instruments differ from standing facilities on essential points. They are conducted in a competitive manner, and at the initiative of the central bank. The central bank is likely to deal with any bank, on the basis of a public offer, or at the prevailing conditions of the market. Because interest rates applying to these operations are unknown in advance and are likely to be modified for each individual operation, they are often described as variable rate operations.

Although they are market-oriented operations, operations with money market instruments differ also from outright open-market purchases and sales. Operations with money market instruments take place in the market for cash and thus affect directly this market's interest rates. Although they involve securities as collateral, they do not affect the secondary market for securities. By contrast, outright open-market purchases and sales affect directly the price of securities on the secondary market, and only indirectly the interbank market, through their impact on the amount of liquidity in the system. Thus, the latter transactions are especially appropriate to manage the overall liquidity in the system, but may be less appropriate to the fine-tuning of short-term market rates.

Money market instruments used by the central banks in the sample of industrialized countries take the form of repurchase and resale transactions (repos). These comprise the purchase of assets by the central bank under a contract providing for their resale at a specified price on a given future date, and are used to supply reserves. The mirror image, sale and repurchase transactions (reverse repos) are sales of assets by the central bank under a contract providing for their repurchase at a specified price on a given future date; they are used to absorb liquidity. Typically, the seller buys back the asset at the same price at which he sold it, and pays the original buyer interest on the implicit loan on the buy-back date. Repurchase agreements have been treated variously as a sale with an agreement to buy back, involving a change in the ownership of the asset, or as a collateralized loan. Most often they are treated as the latter. The borrower--who sold the security with an agreement to repurchase--remains the owner of the collateral, even though it may temporarily be in the lender's possession. Thus, he retains the right to all coupon interest accruing on the collateral, during the time of the duration of the repurchase agreement. The precise status of a repurchase agreement, however, varies between countries.

The attractiveness of such operations stems first from the fact that they can be implemented quickly and have no significant effect on the price of the assets used in the operations. Second, the central bank retains the initiative in setting the amount, timing and duration of the contract, and in deciding whether to renew it or to let it unwind upon maturity; hence these operations give the central bank flexibility in the control of money market conditions. Third, because the added reserves in case of a repo, or conversely the subtracted reserves in case of a reverse repo, will automatically be extinguished when an operation matures, these arrangements are a flexible tool for managing highly variable bank reserves, and for

injecting or mopping up reserves on a short-term basis. Fourth, they are often less disruptive to the financial system than outright sales and repurchases of securities, since the ownership of the securities does not change under a repurchase agreement.

Reverse transactions in domestic securities may be implemented according to a procedure available to all banks on the same basis. Typically these operations involve credit auctions or reverse credit auctions, whereby the central bank injects funds (in the case of a credit auction), or absorbs funds (in the case of a reverse credit auction).

Various auction procedures enable central banks to manage interest rates and/or volumes flexibly. With volume tenders, banks bid only for volumes supplied by the central bank at a pre-set interest rate. This rate may be pre-announced when the auction is made public, or may be disclosed after banks have submitted their bids, and be part of the results of the auction. 1/ Interest rates tenders allow banks to bid both for the amount and the rate. There are two alternative ways of running these tenders: a multiple-rate auction, in which refinancing is allocated at the rates bid by banks, or a uniform rate auction, in which all accepted bids will pay the cutoff interest rate (or marginal rate) at which the desired level of liquidity is injected. 2/ In practice interest rate tender is used when the central bank is willing to let interest rates adjust to participants' expectations. Volume tenders, by contrast, help to make monetary policy intentions (as regards interest rates) explicit and to stabilize market expectations.

France, Germany and Belgium use volumes tenders. In the case of France, banks do not know in advance the interest rate pre-set by the central bank, whereas in Germany and in Belgium, they do. In addition, the Bundesbank and the National Bank of Belgium use interest rate tenders: the Bundesbank implements the multiple-rate auction, whereas the Central Bank of Belgium uses the multiple-rate auction and, at times, the uniform rate auction.

Experiences vary across the sample countries regarding the extent to which central bank operations are conducted with all market participants or only with a few intermediaries. In Belgium and the United States, the desire for operational efficiency has led the central bank to conduct most market operations with a few specialized counterparts. At times the

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1/ In the case of a volume tender with no pre-announced interest rate, participants bid both for the amount and the rate. However, only bids proposed at/or above the pre-set rate are accepted by the central bank.

2/ The multiple rate auction is also called the American auction, whereas the marginal rate auction is also called the Dutch auction. See Appendix I and Appendix II for an example of credit auction according to each of these techniques.

Bundesbank may also select a few participants for its Schnelltenders 1/ and the Banque de France may select a few large banks when it wishes to bring about a rapid change in market interest rates through fine-tuning operations. However, in France and in Germany, regular credit auctions are conducted with all market participants, in order to give equal access to all banks to the refinancing of the Central Bank.

The Banque de France has, however, its own network of counterparts *Opérateurs Principaux du Marché*. These banks collect bids from all the banks each time the central bank conduct credit auctions, and add them to their own bids before sending them to the central bank. After the results have been published, the central bank grants the refinancing to each individual bank, according to their bids. This mechanism allows the central bank to operate with all market participants, while reducing the amount of information to collect for each operation.

Generally, the whole process of a credit auction takes two working days. However, when needed, both the Banque de France and the Bundesbank can operate a credit auction within one working day.

Foreign currency swap transactions (a combination of a spot and forward transaction) may be used as an instrument of domestic money market policy. They are used at times in Germany and Belgium, in particular when the central bank wishes to sterilize the impact of large foreign reserve flows on domestic liquidity conditions. This instrument has also been used in France, even though it is not explicitly part of the set of instruments of the Banque de France. However, because these operations may have an impact on the foreign exchange market, they are not frequently used. 2/

III. Use of Refinance Instruments To Influence Short-Term Interest Rates

Despite differences in the way monetary policies are implemented, money market interest rates are an important target for daily monetary operations in all the sample countries. Moreover, increased resort to market-oriented techniques in recent years has promoted convergence in the monetary instruments and procedures which central banks use to influence short-term market rates. In this context, refinance instruments play three roles: 1) they serve as indicators of the monetary policy stance; 2) they serve to regulate the overall level of market rates; and 3) they are used to fine-tune the call money rate.

1/ "Schnelltenders" or "quick tenders" are used by the Bundesbank to provide liquidity for a short period to a few selected banks the very day the operation is announced.

2/ For a detailed review of foreign exchange swaps see Hooyman (1993).

1. Indicator of the monetary policy stance

When using indirect monetary policy instruments, central banks have to convey policy signals to the market to make explicit the stance of monetary policy. Usually they do so through their key interest rates. Changes in these rates will manifest a shift in the orientation of monetary policy: a cut will indicate a loosening and an increase a tightening of monetary policy stance. The immediate response of market interest rates to a change (the announcement effect) will much depend on the extent to which the change was anticipated: a move largely anticipated by the market will probably have a limited impact, whereas an unexpected move or, even more, a move in the opposite direction to the one expected is likely to provoke a large reaction.

Some central banks rely primarily on a single key rate both to steer market rates and to give policy signals. Others employ several rates which may give more flexibility both in the conduct of operations and in the provision of policy signals. In some cases, one rate provides an upper or a lower limit to market rates, while another serves to guide them. In other cases, two rates may set a band for short-term market rates.

In all the sample countries, central banks use the standing facility rate to convey policy signals. In addition, some central banks also use the money market refinance rate: France, Belgium, and Germany use the rate of volume tenders for this purpose. Because these rates apply to actual refinance operations, a move is likely to have a direct impact on the market.

Less notable shifts in the monetary policy stance would more likely be suggested through changes in market-oriented indicators: the Banque de France may modify its benchmark for the call money rate, the Fed may change its Fed funds target, although this might also signal changes in the stance of monetary policy, and so forth. 1/

Central banks can also indicate policy intentions by changing procedures, in particular the auction procedure or the maturity of refinancing. For instance, the Bundesbank and the National Bank of Belgium can switch from interest rate tenders to volume tenders to stabilize market expectations. At other times, they may switch to interest tenders to give a greater weight to market forces in interest rate determination.

2. Regulation of the overall level of market rates

Central banks not only give broad indications to market participants but may also regulate the overall level of short-term money market rates.

1/ In the case of the United States, changes in the discount rate often follow changes in the Fed funds rate and are used to establish a new floor for this rate.

Refinance instruments play a core role in the management of money market rates. Table 3 below gives some indication, as of the beginning of June 1993, on the position of short-term money market rates, relative to key central bank rates.

Table 3. Short-Term Money Market Rates and Key Central Bank Rates, June 1993

(in Percent)

	Lower Bound	Money Market Rate	Upper bound
United-States	Discount rate 3	Call money rate 3	No official bound
Japan	Discount rate 2.50	Call money rate 3.12	No official bound
Germany	Discount rate 7.25 Credit auction 7.60	Call money rate 7.90	Lombard facility 8.50
Belgium	Discount rate 6.25 Credit auction 7.00	Call money rate 7.25	Overdraft facility 8.2
France	Credit auction 7.50	Call money rate 7.94	5 to 10 days repo 8.50

Source: IMF, *International Financial Statistics*, and various central bulletins (various issues).

With respect of the structure of refinance instruments, the countries sampled can be categorized as follows: 1) the United States and Japan, 2) Germany and Belgium, 3) France.

(1) In the United States and Japan, the central bank maintains a unique standing facility (the discount window), whose rate is below market rates. When market rates rise, widening the spread, banks will tend to increase their borrowing; they will tend to curtail borrowing when the spread narrows. Thus, the call money rate cannot deviate sharply or for a long time from the level of the discount rate. However, because access to the discount window is not free, this mechanism has to be complemented by fine-tuning operations (see below).

(2) The central banks of Germany and Belgium implement a mechanism which combines several windows. The Bundesbank uses two standing

facilities: the discount window and the Lombard window. The discount window is a preferential refinance facility whose rate is below market rates, and functions as a lower bound for short-term rates. The Lombard window provides loans to bridge temporary reserve shortages. The rate applied to this emergency funding serves as an upper bound for market rates. The central bank in Belgium implements a similar mechanism, although limits apply to its overdraft facility. 1/ Thus, the evolution of interbank rates in Germany and Belgium is bounded by the spread between the discount rate and the emergency funding facility. However, in practice market rates fluctuate within a narrower margin. Both central banks implement credit auctions whose rate is between the discount rate and the emergency funding facility. As a consequence, money market rates tend to fluctuate between rates of credit auctions and of the emergency funding facility.

(3) In France, the central bank maintains a single standing facility whose rate is set above market rates. 2/ As with the Lombard window, it is used as an emergency facility which serves as an upper bound to short-term interest rates. The lower bound is set by periodic credit auctions. The spread between the rates of these two instruments seldom exceeds 100 basis points.

3. Fine-tuning of the call money rate

The call money rate is a short-term market rate that central banks target. They intervene on the money market to keep it within a desired path.

(1) Credit auctions are not appropriate for the fine-tuning of interest rates, because of the delay between the moment they are initiated and the settlement date (one or two days). Thus, the daily management of the market is operated through more flexible transactions such as direct lending or borrowing on the interbank market, or reverse transactions negotiated bilaterally. 3/

For instance, when the Banque de France conducts bilateral reverse transactions in domestic assets, it makes no official announcement and operates with a few counterparts at prevailing market conditions. Because these transactions operate at the margin, they have an impact on the money market rate even though they involve small amounts of liquidity.

In the United States, the Fed repo transactions are very similar to credit auctions in Germany, France and Belgium. However, because there is a

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1/ Belgium's overdraft facility is subject to a ceiling. Above the ceiling, banks may get funding at a higher rate, well above market rates.

2/ The Banque de France no longer has real discount window. It offers 5 to 10-day repurchase agreements available at the initiative of banks.

3/ These transactions do not require a delay between the negotiation of the transaction and the settlement of funds.

liquid repo market, repo operations can be used for the fine-tuning of short-term interest rates. The Fed negotiates with primary dealers on the basis of a multiple-rate auction system, and completes the entire transaction within a few hours. Such quick implementation allows the Fed to rely entirely on this instrument to regulate the Fed funds rate on a daily basis. In addition, the Fed's repo provides funds on a demand or open basis, which allows either party to terminate the operation at any time up to the maximum number of days specified in the agreement. Thus, this procedure has the advantage of providing a self-correction mechanism in the case where the Fed over-supplies liquidity because of forecast errors. In this case, the interbank rate (the Fed fund rate) would fall below the contracted repo rate and banks would have an incentive to terminate their repos with the Fed; that liquidity withdrawal would help to raise interest rates. 1/ The Fed may use up to 15-day repos, but in practice it rarely transacts for periods longer than three days.

When market rates fall below their desired level, reverse repurchases may be used by the Fed to withdraw liquidity. With a reverse repo, the Fed offers to sell one or several bill issues to dealers at the prices at which these issues are trading in the market. It then asks the dealers to offer a price at which they will resell these bills. The dealers' offered buy-back (repurchase) prices determine the implicit interest rate they wish to earn on the money they lend. The Fed accepts those bids with the lowest implicit interest rate. These contracts are made only for fixed periods and cannot be terminated before maturity.

(2) The frequency of fine-tuning operations is in part related to the way reserve requirements operate. In particular, when banks are required to hold large amounts of reserves compared to the average daily shifts in overall liquidity, the frequency of central banks interventions diminishes. In Germany, where reserve requirements play an important role in stabilizing the demand for reserves, the central bank typically intervenes only once a week through credit auctions, and rarely operates between two credit auctions. In France, by contrast, partly as a result of recent cuts in reserve requirements, the frequency of central bank intervention in the market has tended to increase. In Belgium, the absence of reserve requirement makes frequent end-of-day transactions of the central bank to absorb or provide liquidity to help bank square their position at the central bank. These transactions are, however, conducted at penalty rates to encourage banks to trade on the interbank market first.

The frequency of fine-tuning operations reflects also different philosophies of monetary management: infrequent operations tend to leave more room for market forces to play. In Germany, Belgium and France, market rates fluctuate within the band framed by refinance instruments, (as discussed above), whereas in the United States, the Fed closely manages the overnight rate for the Fed Funds market.

1/ A similar mechanism applies in Japan.

(3) Legal arrangements, and typically the interdiction for some central banks to remunerate banks' accounts, have also an impact on the fine-tuning operating procedures used by central banks. Because the Bundesbank is not authorized to remunerate banks' accounts, it mops up excess liquidity by issuing three-day treasury bills. However, for the reasons mentioned above, such operations are infrequent. In the United States, for similar reasons, the Fed uses reverse repurchase agreements. In France, because there is not such interdiction, the central bank operates usually through direct borrowing.

IV. Management of Banks' Reserves

The quantitative importance of standing facilities has diminished in recent years. However, they play an important role as an instrument of emergency funding to finance end-of-day imbalances. On the other hand, central banks rely on money market instruments to regulate the overall liquidity in the system.

1. Declining quantitative role of refinance standing facilities

Refinance standing facilities, and especially the discount window, were for many years the prominent, if not the only, instrument used by central banks to refinance the banking system. This quantitative role has declined in the 1970s and 1980s in most of the industrialized countries, because of increased reliance placed on money market instruments. However, in some countries the discount window is used to provide subsidized refinancing.

Indeed, in Germany, Japan and to a lesser extend Belgium, the central bank still provides significant refinancing to the banking system through a discount window. Because this refinancing is granted below market rates, it is a way to provide subsidized funding to banks. 1/ 2/ As a consequence, this refinancing is subject to ceilings.

In Germany the discount window presently accounts for about a quarter to a third of central bank refinancing. By comparison, in 1985 it provided more than half of the refinancing. The spread between the discount rate and the money market rate has tended to narrow: it reached 60 basis points in June 1993, but rose to 220 basis points during part of 1991 and was most of the time above 100 basis points during the 1980s. Access to refinancing through the discount facility is entirely at the initiative of commercial banks but is bounded by each banks' individual ceiling. In allocating the ceilings, the central bank takes into consideration the level of capital and

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1/ In some cases (Germany, for instance) this could be considered as a counterpart to a high non-remunerated reserve requirement.

2/ The level of subsidies granted by the central bank can be estimated by considering the spread between the discount rate and the market rate, and the share of refinancing granted through the discount window.

the amount of eligible assets of commercial banks. In practice, commercial banks use all their allocations of refinancing.

In Japan, the discount window represents about three quarters of the refinancing of the banking system. 1/ The rate charged by the Bank of Japan on these operations was about 60 basis points below the money market rate in June 1993 but in the past was up to 200 basis points below. Within quarterly individual ceilings, the central bank determines every day the amount each bank can use, taking into consideration two criteria: first, the global liquidity situation of the system, and second, the position of the individual bank requesting refinancing. As a result, banks are not certain to obtain refinancing even if the amounts they request are within their individual ceilings.

The National Bank of Belgium abolished its discount window at the beginning of 1991, as part of a global reform of its instruments of monetary policy. In mid-1991, however, it decided to create a specific discount window to refinance private paper. It sets a global ceiling on use of this window, which it splits among commercial banks according to deposits collected and the level of lending on the money market. Refinancing through this standing facility amounts to about 10 percent of the global refinancing. 2/ The spread between the discount rate and the money market rate averaged 100 basis points by mid 1993.

In the United States and France, refinance standing facilities occasionally contribute residual amounts to the refinancing of the banking system. The Banque de France used to operate a preferential discount window for medium-term export credits, which it began to phase out as of 1986, and which will be totally extinguished shortly. As a result, it still holds a portfolio of pre-1986 rediscounted medium-term private paper; however, it has disconnected the interest rate subsidy it provides from the refinancing itself. 3/

Table 4 gives some indications on the quantitative importance of credit from the central bank compare to the outstanding domestic credit of deposit money banks (DMBs). Refinancing from the central bank does not exceed

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1/ The discount rate applies to two operations: to the rediscounting of paper, which has a marginal role (2 percent of the refinancing) and to collateralized lending, which makes up most of the refinancing provided through the discount window.

2/ In practice operations carried out under this facility are 15 to 60-day loans against collateral.

3/ Eligible credits are rediscounted at a preferential rate (4.5 percent, 6 percent or 7.5 percent), but the liquidity thereby allocated to the banks has to be immediately deposited at the central bank, in a blocked account bearing a market-related interest rate.

6 percent (maximum in Germany: 5.6 percent). 1/ Thus, the quantitative importance of credit from the central bank often extended at below market rates is negligible compared to credit extended by DMBs. In Germany for instance, country with the higher relative level of credit from the central bank, credit extended to DMBs at the preferential rediscount window (around 25 percent of total credit from the central bank) represented only 1.5 percent of domestic credit extended by DMBs at the end of June 1993.

Table 4. Credit from the Central Bank to DMBs Relative to Domestic Credit, June 30, 1993 1/

(Billions of U.S. Dollars)

	Japan	Germany	France	Belgium	United States
Domestic credit granted by DMBs (A)	4,740	2,440	1,335	210	2,915
Central bank credit to DMBs (B)	161	137	13	2	-
Portfolio of Securities of the central bank (C)	138	-	5	-	296
Minimum required reserves (D)	223	33	4	-	56
B/A	3.4%	5.6%	1.0%	1.0%	-
(B+C)/A	6.3%	5.6%	1.3%	1.0%	10.1%
(B+C-D)/A	1.6%	4.3%	1.0%	1.0%	8.2%

Source: IMF, *International Financial Statistics*, and Bulletin of the National Bank of Belgium.

1/ December 1992, for Belgium (last available figures).

These figures clearly show that refinancing windows at below market rates in these countries are not intended to direct credit to given economic sectors, as it is usually the case in countries using such windows on a larger scale. In the sample countries, they are a survival of past practices. In the case of Japan and Germany, they can also be seen as a counterpart to high non-remunerated reserve requirements.

1/ Total domestic assets of the central bank (direct credit to DMBs, plus portfolio of Government securities) reaches a maximum of 10 percent in the case of the United States.

2. Standing facilities as source of emergency funding

As a source of emergency funding, standing facilities play an important role in smoothing fluctuations in market rates. 1/ When designing the technical aspects of an emergency funding facility to cope with temporary shortages of funds, it is necessary to take into consideration the degree of development of markets and payments system, the soundness of the banks, and the range of central bank instruments.

In countries with a liquid interbank market and a sound financial system, it is likely that the global equilibrium of the market will also entail an equilibrium at the level of each individual financial institution. In those cases, central bank emergency lending facility may be just an overdraft facility to finance end-of-day clearing imbalances, with access limited by charging an interest rate above market rates. If the interbank market and the payment systems are underdeveloped or financial institutions are weak, a penalty rate just slightly above market rates may be insufficient to discourage illiquid banks from resorting to that facility, even when the system as a whole has sufficient liquidity. In those cases, ceilings may be indispensable, as well as penalty rates increasing with the frequency of use of the facility. 2/

In the sample countries, interbank markets are liquid and the financial system generally sound. Overdraft facilities typically carry a penalty rate slightly above market rates, and, therefore, they provide a ceiling to very short-term market rates. In addition, they are likely to give the central bank more freedom to use other refinance instruments and open-market operations: a miscalculation in the amount of liquidity injected or to be moped up may be corrected, in a way automatically, through overdraft borrowing. Nevertheless, the penalty rate prevents this facility from causing an excessive monetary expansion.

In the United States, the discount window may be used for very short periods, often overnight, to cover sudden and unforeseen deposit outflows. This adjustment borrowing, therefore, tends to be used mainly by institutions that have volatile checking account liabilities or that are heavily involved in relatively short-term lending. Access is, however, strictly regulated by the Federal Reserve.

1/ Facilities to assist banks experiencing a shortage of funds are called "lender-of-last-resort facilities." This terminology may be used to refer both to instruments designed to finance end-of-day clearing imbalances, and to arrangements designed to support problem banks. This section refers to the former.

2/ Moreover, additional measures (such as intervention of the banking supervision authorities) may be appropriate in cases in which the demand for credit is highly interest inelastic, for instance because banks and enterprises face soft budget constraints.

The Lombard facility in Germany is typically an overdraft facility to finance end-of-day clearing imbalances. It provides funds usually for a short period of time, not exceeding a few days. Because banks have permanently collateral deposited with the Bundesbank, the latter automatically grants a loan whenever a bank's account is overdrawn at the end of the day. 1/ Belgium and France use similar procedures.

3. Management of the overall liquidity in the system

The financial systems in the sample countries permanently require the central bank to provide liquidity. Except in the United States and Japan, where outright open-market operations prevail, credit auctions provide the bulk of the needed liquidity in all the selected countries. 2/ When they need to reduce overall liquidity, central banks will let the outstanding amount of their credit fall, for instance, when auctioned credits mature.

(1) The frequency and the maturity of credit auctions is tailored to give central banks sufficient control on bank reserves. Unduly large excess reserves have to be avoided, as well as habitual recourse to central bank standing facilities, or substantial need for fine-tuning. In practice, the frequency and maturity of credit auctions take into account the monetary programming capacity of the central bank, the amplitude of overall liquidity movements, and the design of reserve requirements.

The monetary programming capacity of the central bank refers to its capacity to forecast changes in the composition of his balance sheet, especially foreign reserves, currency in circulation and net credit to the Government. Such forecasts are indispensable for an accurate estimation of the amount of liquidity the central bank has to offer at the auction. Forecasts have to cover at least the period of time between two credit auctions, which links the frequency of auctions to the horizon of the forecasting exercise.

The reduction of the maturity of auctioned credit in Germany at the time of the 1992 foreign exchange crisis of the ERM is an illustration of the impact of the amplitude of the shifts in the overall liquidity on the frequency of credit auctions. At that time, the Bundesbank shifted the maturity of auctioned credit from two to four weeks to one to three weeks, in order to cope better with large inflows of funds in the system, because of an increase of its foreign reserves. The reduction in the maturity made it easier to reduce the amount of Bundesbank refinancing, because such credit cannot be repaid before maturity.

1/ Commercial banks have to give prior authorization to the Bundesbank.

2/ However, in Japan, Germany, and to a lesser extent, Belgium, the rediscount window comprises a significant share of the refinancing. In France, outright open-market operations contribute an increasing share of refinancing (40 to 30 percent).

The reduction of the maturity of auctioned credit auctions from two to three weeks to one week in France in 1992 illustrates the link between credit auctions and reserve requirements. At that time, the significant reduction in the amount of required reserves drastically diminished the latter's stabilizing action on bank reserves' volatility, and, therefore, increased the volatility of short-term market rates. In order to stabilize money market rates, the central bank had to increase the frequency of its market interventions, which required an increased frequency in credit auctions and a shorter credit maturity.

(2) The Bundesbank introduced a new instrument at the beginning of 1993, to reinforce the structural dependence of the banking system on central bank refinancing. Thus on March 1, 1993, the Bundesbank began to auction liquidity paper with three, six, and nine-month maturities, using an interest rate tender. 1/ In legal terms, this paper takes the form of treasury discount paper of the Federal Republic of Germany, while all interest and redemption commitments must be met by the Bundesbank. 2/ Because these operations are open to all investors (banks and non-banks, domestic and foreign), they allow the central bank to influence non-banks' cash holdings directly.

The introduction of this new instrument was directly connected with a significant relaxation of reserve requirements. 3/ It enables the Bundesbank to extend its scope for influencing financial flows by giving it an instrument to mop up liquid funds, not only from banks but also from non-banks at home and abroad. 4/

(3) Following the 1992 ERM crisis, which resulted in large inflows of funds in the country, the National Bank of Belgium started using forex swaps on a large scale. This was to neutralize the impact of these inflows on domestic liquidity, and maintain the dependence of banks on the credit of the central bank.

1/ Because these issues are designed to mop up liquidity for a period of time longer than the usual maturity of refinance operations, they reinforce the structural dependence of the banking system on central bank credit, provided mostly through credit auctions.

2/ Section 42 of the Deutsche Bundesbank Act prevents the Bundesbank from issuing its own paper.

3/ The effect on liquidity of the release of minimum reserves (DM 32 billion) was slightly greater than the impact of issuing liquidity paper (up to DM 25 billion at the first issue). The remaining liquidity surplus has been eliminated by reducing the volume sold at credit auctions.

4/ The impact of these operations on the central bank profits is not straightforward. Because the Bundesbank is at the same time providing refinancing for a short-term period (one month), and mopping up liquidity for a longer period of time, the maturity mismatch produces an interest rate exposure. When the first operations were initiated, the mismatch was profitable because of the profile of the yield curve at that time.

V. Concluding Remarks

Among the many lessons from the use of market-based refinance instruments, special attention has to be given to interest rates management. As a consequence the conduct of an indirect monetary policy requires also the use of fine-tuning instruments. The design of instruments has also to take into consideration the exchange regime. Some additional conclusions related to the design of instruments are finally presented.

1. Interest rate management

The credibility of monetary policy, because of its influence on anticipations, is an important component in the conduct of monetary policy with market-based instruments. Part of the credibility of a central bank depends on its capacity to take corrective measures, and to make clear to markets the stance of its monetary policy. Moreover, market interest rates serve as an indicator for the daily management of liquidity in the system.

a. The need for central bank's rates

In all the countries in this paper's sample, refinance instruments provide central banks with at least one official interest rate, whose level they decide. The publication and changes in official rates are used by central banks to make their intentions known. Such practice has developed because of an increasing role played by financial markets in the allocation of financial resources. It is also a consequence of a greater volatility in monetary aggregates, which eroded confidence in them, because of shifts in financial assets resulting from disintermediation and financial innovation. As a result, central banks often prefer to indicate their intentions by changes in their official rates.

b. Use of short-term interest rates in daily monetary management

Central banks often use market interest rates--typically the call money rate in the sample countries--as an instantaneous indicator of the overall amount of liquidity in the system. In normal circumstances, an increase of market rates will indicate a tightening of liquidity, whereas a drop will indicate an easing. These indications will guide the central bank in the fine-tuning of the market.

However, interest rate fluctuations may also indicate anticipations, that the central bank may or may not want to offset. To be able to discern whether fluctuations are the consequence of anticipations, or indicate a liquidity problem, the central bank has to look at other indicators, such as the inflation rate, balance of payments, growth rate of monetary aggregates, exchange rate. Among them, the exchange rate is the one providing an instantaneous indication.

The manipulation of officials rates, along with the management of short-term money market rates, helps to make monetary policy intentions explicit and give central banks means to stabilize market expectations, thus reducing interest rate volatility.

2. The need for fine-tuning instruments

Because of the importance interest rates have, the conduct of monetary policy in a market-based way may lead to the use of instruments for the fine-tuning of the market, i.e., to influence interest rates. This can be either because the authorities want to convey a new policy signal to the market, without having to change their official rates, or because errors in the liquidity forecasts result in undesirable fluctuations in market interest rates. In addition, central banks need instruments designed to provide the system with the bulk of liquidity it needs.

The experience of the selected countries suggests that a single instrument cannot serve both needs. Fine-tuning instruments, to be effective, have to be flexible, with an immediate and direct effect on a targeted interest rate. Instruments designed to provide the secular amount of central bank refinancing may operate with a lag period, they do not necessarily need to have a direct impact on the interest rate used by the central bank to monitor the market, and they can operate more indirectly than fine-tuning instruments. Typically, outright sales and purchases of securities on the secondary market or credit auctions are instruments designed to provide the secular refinancing, whereas repo operations and lending or borrowing by the central bank on the interbank market are used as fine-tuning instruments.

3. Influence of the exchange regime on the use of refinance instruments

Refinance instruments are adapted to the exchange regime. In Germany, France and Belgium, because of a fixed exchange regime, the central bank stands ready to buy or sell whatever amount of foreign currency is needed to stabilize the exchange rate. However, often the central bank wishes to offset the impact of foreign exchange market intervention on reserve money. For that, the central bank needs flexible instruments, either to mop up liquidity or to provide funds, and thus compensate for the effect of its foreign exchange interventions. Credit auctions are used to this end, with the maturity of auctioned credit likely to be modified when necessary.

Because of limited liquidity and depth of securities markets in these countries, 1/ outright purchases or sales of securities on the secondary market would not permit to cope with these flows with the same flexibility.

A pegged exchange regime, with a liberalized capital account, imposes also a strong constraint on the management of interest rates by the central bank. Because the exchange rate is not allowed to adjust, interest rates have to be flexible. Thus, this reduces potential risks that could be associated with volume auctions, which allow the central bank to set both price and volume. Therefore, central banks in France, Germany, and Belgium have to set the interest rate applying to the volume auction at a level consistent with the exchange rate they want to defend: their apparent freedom is actually constrained by market forces. 2/

4. The design of refinance instruments

The selected countries have designed their refinance instruments in such a way as to provide an incentive to trade funds first on the interbank market, and to prevent the central bank from taking a credit risk. In some countries, reserve requirements serve to support other instruments.

a. Incentives to trade funds first on the interbank market

In the selected countries, the interest rate on refinance standing facilities whose access in normal circumstances is not subject to a ceiling is above market rates. 3/ As a consequence, banks experiencing a shortage of funds will have an incentive to trade funds first on the interbank market, and to go to the central bank only once they have fully exhausted the possibilities offered by the market. Thus commercial banks can access additional reserve money only when there is a global shortage of liquidity.

1/ In a liquid market, a customer entering the market to buy a security can find a ready seller at the lowest ask price, whereas a seller entering the market can find a ready buyer at the highest bid price, and the highest bid and lowest ask prices are close to one another. The market for a security is said to be deep if a large amount of that security can be bought (sold) at a price close to the lowest ask (highest bid).

2/ A similar argument could be developed in the case of countries were the capital account is not liberalized. In this case, inconsistencies between interest rates and the exchange rate are likely to result in pressures on the balance of payments, or the development of a parallel market. This may motivate an increase in interest rates. However, the process may be faster in countries with an open capital account: inconsistencies between the exchange rate an the level of interest rates will induce capital outflows in the short run.

3/ The interest rate applying to a deposit standing facilities is below market rates.

Different arrangements can be worked out to that end. The Banque de France uses two instruments to allocate funds: an overdraft facility, with a penalty rate, provides funds to cover end-of-day clearing imbalances, and a credit auction provides the bulk of refinancing. The Bundesbank uses three channels: a standing facility at below market interest rates provides a fixed part of the refinancing, a credit auction provides the residual and variable refinancing, and an overdraft facility with a penalty rate provides funds to cover end-of-day clearing imbalances.

b. The need for collateral

All central bank refinance instruments are based on the temporary or outright purchase (or sale) of assets of indisputable quality, government paper as well as private paper. This protects the quality of central bank assets. As importantly, it is a necessary condition to operate a credit auction: the interest rate of the auction should not be affected by different credit risks applying to different banks taking part in the auction.

c. The use of reserve requirement

Central banks, in most countries, rely on reserve requirement as supporting instruments to complement or support their open market interventions. Because required reserves are held on an average basis, they play a role of stabilizer of the money market, as explained above. When there are no reserve requirements (Belgium) or when their level is low (France) the interventions of the central bank tend to be more frequent. In these countries, a continuous presence of the central bank on the market does not impede a smooth functioning of the market. However, in countries where commercial banks are not used to central bank interventions, such a continuous presence could well contribute to reduce market liquidity, as participants may prefer to transact with the central bank instead of trading funds in the market. 1/

1/ Additional reasons, such as poor payments system and prudential considerations may also recommend the use of reserve requirement in countries in transition. However, such an issue is out of the scope of this paper.

Credit Auctions: Volume Tenders

1) Interest rate not pre-announced

a) Bids proposed by banks

Rates (%)	8.25	8.50	8.75	9.00
Bank A	100	100	1,000	1,000
Bank B	2,000	1,000	500	500
Bank C	-	500	500	500
Bank D	-	-	100	100
Total	2,100	1,600	2,100	2,100
Cumulative total	7,900	5,800	4,200	2,100

b) Global results

- interest rate of the auction: 8.50%
- global amount of liquidity allocated: 4640
- percentage of accepted bids allocated: 80% = (4640\5800)

c) Individual results

	Bank A	Bank B	Bank C	Bank D
Accepted bids (i > 8.50%)	2,100	2,000	1,500	200
Refinancing granted (80%)	1,680	1,600	1,200	160
Interest rate charged (%)	8.50	8.50	8.50	8.50

2) Interest rate pre-announced

In that case, bids are supposed to be proposed at the preannounced rate. Banks will receive a certain percentage of their bids, corresponding to the ratio between the global amount of liquidity to be allocated and the total of bids presented by banks.

Credit Auctions: Interest Rate Tenders

1. Multiple-rate auction

a) Bids proposed by banks

Rates (%)	8.25	8.50	8.75	9.00
Bank A	100	100	1,000	1,000
Bank B	2,000	1,000	500	500
Bank C	-	500	500	500
Bank D	-	-	100	100
Total	2,100	1,600	2,100	2,100
Cumulative total	7,900	5,800	4,200	2,100

b) Global results

- global amount of liquidity allocated: 4640
- weighted average rate of the auction: 8.84%
- range of accepted rates: 8.50% - 9.00%
- percentage of bids accepted at the cutoff rate (8.50%): 27.50%

c) Individual results

	Bank A	Bank B	Bank C	Bank D
Bids at 9.00	1,000	500	500	100
Bids at 8.75	1,000	500	500	100
Bids at 8.50	28	275	137	-
Total	2,028	1,275	1,137	200
Average rate (%)	8.87	8.79	8.83	8.87

2. Uniform rate auction

a) Bids proposed by banks

Rates (%)	8.25	8.50	8.75	9.00
Bank A	100	100	1,000	1,000
Bank B	2,000	1,000	500	500
Bank C	-	500	500	500
Bank D	-	-	100	100
Total	2,100	1,600	2,100	2,100
Cumulative total	7,900	5,800	4,200	2,100

b) Global results

- global amount of liquidity allocated: 4,640
- rate of the action (cutoff rate): 8.50%
- percentage of bids accepted at the cutoff rate: 27.50%

c) Individual results

	Bank A	Bank B	Bank C	Bank D
Bids at 9.00	1,000	500	500	100
Bids at 8.75	1,000	500	500	100
Bids at 8.50 (27.50%)	28	275	137	-
Total	2,028	1,275	1,137	200
Interest rate charged (%)	8.50	8.50	8.50	8.50

References

Baliño, Tomás J.T., "Instruments of Monetary Policy: Technical Aspects," Paper presented at the 1985 Central Bank Department central banking seminar.

Banque Nationale de Belgique, *Bulletin Mensuel*, (March and September 1991, February 1992).

Bredenkamp, Hugh, "Conducting Monetary and Credit Policy in Countries of the Former Soviet Union: Some Issues and Options" IMF Working Paper, WP/93/23, (Washington: International Monetary Fund, 1993).

Batten, Dallas S., Blackwell, Michael P., Kim, In-Su, Nocera, Simon E., and Ozeki, Yuzury, "The conduct of Monetary Policy in the Major Industrialized Countries: Instruments and Operating Procedures, IMF Occasional Paper, No. 70, (Washington: International Monetary Fund, July 1990).

Committee of Governors of the Central Banks of the Member States of The European Economic Community, *Annual Report 1992*, (April 1993).

Cottarelli, Carlo, "Divorce: Limiting Central Bank Credit to the Government: Theory and Practice," IMF Occasional Paper, No. 100 (Washington: International Monetary Fund, December 1993).

Deutsche Bundesbank, *Monthly Report*, (January and February 1993).

Dufloux, Claude, and Karlin, Michel, "Les Instruments de la Politique de la Liquidité Bancaire et des Taux d'Intérêt en Allemagne," *La Revue Banque* (Paris, Janvier 1991), pp. 69-74.

Feldman, Robert, and Mehra, Rajnish, "Auctions: Theory and Possible Applications to Economics in Transition," IMF Working Paper, WP/93/12 (Washington: International Monetary Fund, February 1993).

Galbis, Vicente, "High Real Interest Rates Under Financial Liberalization: Is There a Problem?", IMF Working Paper, WP/93/17 (Washington: International Monetary Fund, January 1993).

Hardy, Daniel C., "Reserves Requirements and Monetary Management: An Introduction," IMF Working Paper, WP/93/35, (Washington: International Monetary Fund, April 1993).

Hilbers, Paul, "The Use of Monetary Policy Instruments During the Transition from a Centrally Planned to a Market Economy," IMF Working Paper, WP/93/87 (Washington: International Monetary Fund, November 1993).

Hooyman, Catharina J., "The Use of Foreign Exchange Swaps by Central Banks: A Survey," IMF Working Paper, WP/93/64 (Washington: International Monetary Fund, August 1993).

Intérêts, La Banque d'Italie, La Banque Nationale de Belgique, *Publication du Groupe CPR*, (Paris, 2ème trimestre 1991).

Laurens, Bernard, "La Conduite de la Politique Monétaire en France," *Economic Development Institute of The World Bank*, Catalogue Nº 340/058F, (Washington, 1991).

Leite, Sergio Pereira, and Sundararajan, V. "Issues in Interest Rate Management and Liberalization," *Staff Papers*, International Monetary Fund, (Washington), Vol. 37 (December 1990), pp. 735-52.

Lindgren, Carl-Johan, "The Transition from Direct to Indirect Instruments of Monetary Policy," ed. by Patrick Downes and Reza Vaez-Zadeh, *The Evolving Role of Central Banks* (Washington: International Monetary Fund, 1991).

Quintyn, Marc, "From Direct to Indirect Monetary Policy Instruments: The French Experience Reconsidered," IMF Working Paper, WP/91/33 (Washington: International Monetary Fund, March 1991).

Swinburne, Marc, and Castello-Branco, Marta, "Central Bank Independence and Central Bank Functions," ed. by Patrick Downes and Reza Vaez-Zadeh, *The Evolving Role of Central Banks*, (Washington: International Monetary Fund, 1991).