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THE EUROPEAN CENTRAL BANK: A BANK OR A MONETARY POLICY RULE

David Folkerts-Landau

Peter M. Garber

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ABSTRACT

A European central banking institution will be an essential feature of the final stage of the European Economic and Monetary Union. The EC Committee of Central Bank Governors has recently produced a Draft Statute of the European System of Central Banks and of the European Central Bank.

The draft Statute mandates the maintenance of price stability as the explicit primary objective of the ECB, and the necessary monetary functions and operations of the system are defined in accordance with standard practice. The maintenance of a stable financial and payments system, however, is not an explicit objective of the ECB, and only limited banking functions are admitted as one of the system's tasks.

The draft Statute clearly subscribes to a "narrow" concept of the System of Central Banks with a single objective--monetary stability--rather than a "broad" concept with the additional objective of financial-market stability. In this paper we examine the consequences of a "narrow" central banking system for Community financial markets.

We conclude that in the absence of such banking functions it will be necessary to slow or even prevent the ongoing development of Community-wide liquid, securitized financial markets, supported by a large-volume wholesale payments system. Instead, the historically prevalent bank-intermediated financial system will have to be maintained to lower the likelihood of liquidity crises that demand central bank intervention.

David Folkerts-Landau
International Monetary Fund
700 19th Street, NW
Washington, DC 20431

Peter M. Garber
Department of Economics
Brown University, Box B
64 Waterman Street
Providence, RI 02912

I. Introduction

It is generally agreed that a European central banking institution will be an essential feature of the final stage of the European Economic and Monetary Union (EMU). To this end the EC Committee of Central Bank Governors has recently produced a Draft Statute of the European System of Central Banks and of the European Central Bank. ^{1/} Although differences of views among governments of member states have meant that the Draft Statute remains incomplete in a number of areas, the most fundamental and consequential omission is the lack of a clear mandate for the ECB to undertake traditional banking functions in support of the financial sector.

Central banks have traditionally had two major objectives. First, central banks have sought to maintain a stable and efficient financial and payments system. This has generally required performing certain banking functions for the financial sector, such as providing an ultimate source of liquidity (i.e., a discount window), participating in the payments system, and regulating and supervising key sectors of the financial system. Second, central banks have sought to stabilize the price level and general economic activity by carrying out monetary functions such as open market operations, foreign exchange operations, and the establishment of minimum reserve requirements.

^{1/} Sent to the EC Ministers on November 19, 1990, and amended on April 11, 1991. The proposed European System of Central Bank ("System") is to consist of a central institution, the European Central Bank (ECB), and of participating central banks of the Member States of the Community ("national central banks").

The draft Statute mandates the maintenance of price stability as the explicit primary objective of the ECB, 2/ and the necessary monetary functions and operations of the system are defined in accordance with standard practice. The maintenance of a stable financial and payments system, however, is not an explicit objective of the ECB, and only limited banking functions are admitted as one of the system's five tasks. In particular, the system is authorized only "to participate as necessary in the formulation, coordination and execution of policies relating to prudential supervision and the stability of the financial system," which falls notably short of being mandated "to formulate, coordinate, and execute such policies." 3/ There is no obligation for the ECB to initiate support of the banking or payments system. Furthermore, Article 18.2 4/ enables the ECB to restrict the scope for, and set the terms of, all open market and credit operations carried out by national central banks to stabilize local financial or payment systems.

2/ "Article 2 - Objectives

2.1 The primary objective of the system shall be to maintain price stability.

2.2 Without prejudice to the objective of price stability, the system shall support the general economic policy of Community."

3/ See Article 3. Further references to the banking functions of the System are equally restrictive. In particular, Article 18.1 enables the System to "conduct credit operations with credit institutions and other market participants" but only to achieve the limited monetary objectives of the System. Article 22 enables the System to "provide facilities...and issue regulations to ensure efficient and sound clearing and payments systems", but it does not enable the system to extend credit or liquidity support to the payments system. Article 25.1 enables the ECB only to "offer advice and to be consulted in the interpretation and implementation of community legislation relating to the prudential supervision of credit and of the financial institutions". Article 25.2 offers the possibility of designating the ECB as a competent supervisory authority but such a transferal of competence must be specified by further Community legislation.

4/ "Article 18.2. The ECB shall establish general principles for open market and credit operations carried out by itself or the national central banks, including the announcement of conditions under which they stand ready to enter into such transactions".

The draft Statute thus clearly subscribes to a "narrow" concept of the System of Central Banks with a single objective--monetary stability--rather than a "broad" concept with the additional objective of financial-market stability. In this paper we examine the consequences of a "narrow" central banking system for Community financial markets.

We conclude that in the absence of such banking functions it will be necessary to slow or even prevent the ongoing development of Community-wide liquid, securitized financial markets, supported by a large-volume wholesale payments system. Instead, the historically prevalent bank-intermediated financial system will have to be maintained to lower the likelihood of liquidity crises that demand central bank intervention.

In the remainder of this paper, we first examine the relation between securitization and financial crises (Section II). We then discuss the role payments systems play in securitized financial markets and the involvement of central banks in payments systems (Section III). In Section IV we define the central bank's basic choice problem in establishing the extent of its banking functions, and in Section V we establish the need for central banks to supervise financial markets. Section VI concludes the paper.

II. Securitization and Liquidity Crises

Securitization 5/

The accelerating securitization of credit claims, ownership claims, and derivative contracts is a fundamental phenomenon in the evolution of financial markets and market institutions. Securitization induces the establishment of new institutions, drives developments in market mechanisms, payments mechanisms, and other institutional arrangements, and above all spurs an increased demand for liquidity. In this section, we shall show that the extent of securitization of credit and ownership claims is a determining factor in defining a central bank's role as lender-of-last-resort. The more securitized are credit, ownership, and derivative contracts, the greater the likelihood of liquidity problems.

5/ The term "securitization" has frequently been used in the financial press to describe the creation of high-quality negotiable, liquid securities by setting aside illiquid claims, such as mortgage obligations, consumer receivables, etc. to fund such securities. We employ the term here to describe a broader phenomenon, namely, the creation of any credit, ownership, or derivative claims that are publicly tradable, either in an organized market or over-the-counter, and whose prices are, therefore, determined at frequent intervals in an open market. Thus, commercial paper and negotiable certificate of deposits are securitized instruments, while the interbank market in central bank liabilities, such as the U.S. Federal Funds market, is not securitized. The most important quantitative example of securitization involves disintermediation from the banking system.

As financial systems mature, there has been a general tendency to substitute securitized credit for bank credit, and equity shares for nontradable ownership interests. ^{6/} Better known corporations have increasingly obtained credit in the bond market directly. In some countries, most notably in Germany, there has been a significant increase in the number of initial public equity offerings by mid-sized industrial companies. An important form of securitization has been the growth of negotiable high-quality short-term non-bank corporate and bank obligations, i.e., commercial paper and certificates of deposit, (see Table) and the growth of exchange-traded derivative products such as interest rate futures. Finally, a substantial part of illiquid bank assets has been securitized through the repackaging of bank assets into tradable securities, most notably in the mortgage market.

The extent of securitization is relatively more advanced in some industrial countries, e.g., the United States, the United Kingdom, and France than in others, such as Germany (see Table and Chart). However, an improved ability to circumvent existing restrictions on securitization by shifting such activity to less regulated jurisdictions has induced a gradual lifting of existing restrictions on securitization in most countries. ^{7/}

^{6/} To the extent that it existed, the historical comparative advantage of banking institutions in assessing credit risk, in monitoring borrower behavior, and in dealing with nonperforming debtors is being eroded by, inter alia, advances in information technology, innovations in creditworthiness signalling mechanisms, and improvements in the legal system. Furthermore, financial intermediaries, acting as agents rather than as principals, such as investment banks, have been increasingly innovative in designing techniques and instruments to bring borrowers and nonbank lenders together. The growth of institutional investors, such as pension funds and insurance companies, has also created growing demand for securitized debt and equity. Finally, a growing stock of outstanding tradable financial instruments increases the scope for financial institutions to make a market in these instruments, thus increasing liquidity and reducing transaction costs.

^{7/} Folkerts-Landau and Mathieson (1988).

Domestic and International Commercial Paper Markets, 1986-90

Amounts outstanding at end-year, in billions of U.S. dollars ^{1/}

	Market opening	1986	1987	1988	1989	1990
United States....	pre-1960	325.9	373.6	451.6	521.9	557.8
Japan.....	end-1987	-	13.8	73.8	91.1	117.3
France.....	end-1985	3.7	7.6	10.4	22.3	31.0
Canada.....	pre-1960	11.9	14.9	21.0	25.5	26.8
Sweden.....	1983	3.7	7.8	9.5	15.9	22.3
Australia. ^{2/} ...	mid-1970s	4.1	7.5	7.9	11.1	10.9
United Kingdom...	1986	0.8	3.8	5.7	5.7	9.1
Spain. ^{3/}	1982	2.5	2.8	3.1	4.2	8.4
Finland.....	mid-1986	0.4	2.5	4.9	6.9	8.3
Norway.....	end-1984	0.9	2.1	1.7	2.0	2.6
Netherlands.....	1986	0.1	0.9	1.0	0.8	2.0
Total.....		354.0	437.3	590.6	707.4	796.5
ECP.....	mid-1980s	13.9	33.3	50.6	58.4	70.4
memo-other Euro- notes ^{4/}		15.1	16.9	13.5	11.1	19.1
Grand total		367.9	470.6	641.2	765.8	866.9

Source: Bank for International Settlements, International Banking and Financial Market Developments, August, 1991.

^{1/} Converted at end-year exchange rates, except for Australia.

^{2/} End-June of each year converted at end-June exchange rates.

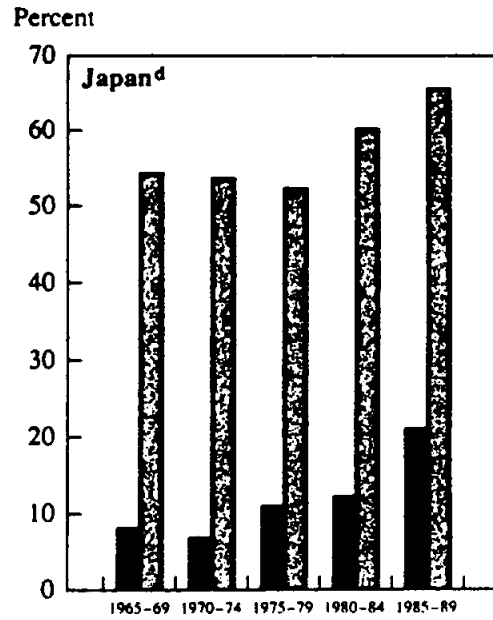
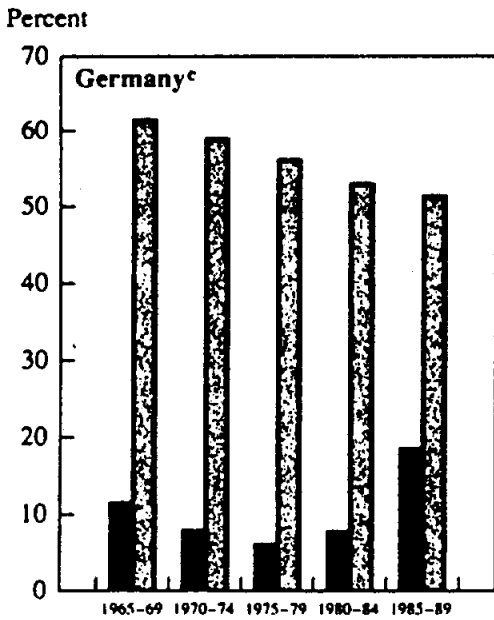
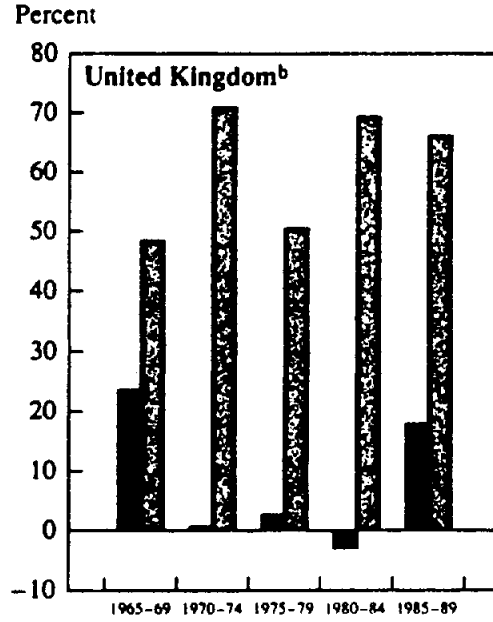
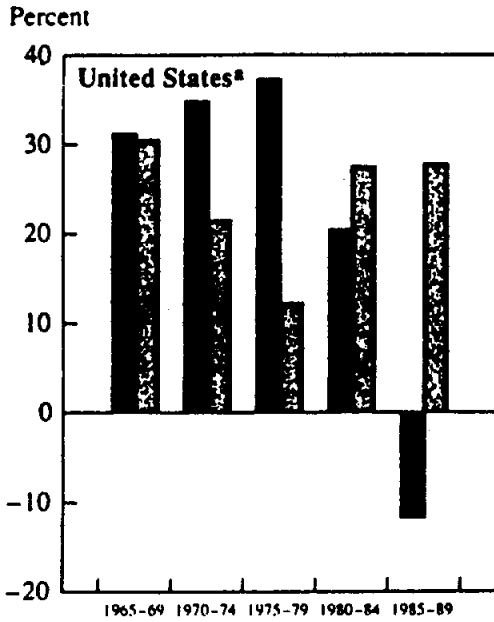
^{3/} Partial coverage.

^{4/} Short-term notes only.

Chart

Indirect vs. Securitized Funding

Percent of Total Business Funds Raised Through Securities and Bank Loans, 1965-89



■ – Funds raised through securities
 ▨ – Funds raised through bank loans

Source: Frankel and Montgomery, 1991.

Liquidity Crises

Liquidity crises occur in two basic forms in modern financial systems. The first type of liquidity crisis is triggered by the traditional run on a bank or banking system. The second type relates to illiquidity in securitized money or capital markets. Bank runs result from investor doubts about the solvency of a bank, or a group of banks. Such runs take the form of a sudden shift in portfolios away from bank liabilities in favor of short-term government securities or corporate assets. Events that adversely affect the value of some bank assets may lead to doubts about a bank's solvency, particularly because the larger part of bank assets are nontradable and therefore are not subjected to market-valuation at regular intervals. The bank may then experience difficulty in refinancing its short-term liabilities as the holders of such liabilities make precautionary portfolio shifts. A failure may spill-over into the banking system, thus requiring central bank intervention.

Securitization of money markets has generally made it possible for banks, in particular wholesale money center banks, to finance their assets in large part with bought funds, such as the negotiable CDs, interbank funds, and repurchase agreements. The risk of being unable to refinance a great part of the bank's liabilities would have been significantly less if the bank had operated without relying on wholesale money market funding of its liabilities.

To forestall the failure of a particular bank, or group of banks, from spilling over onto the banking system, the central bank can supply liquidity to the affected banks through its discount facilities and will wish to do so if it deems the banks to be solvent. Alternatively, it can use its influence to induce a selected group of healthy banks to provide liquidity assistance to the affected banks in return for an equity stake. Finally, it can allow

an insolvent bank to fail, while avoiding a general banking crisis by supplying liquidity to the rest of the banking system.

Banking crises were a fairly regular occurrence in most countries before the 1940s, leading at times to severe contractions of the money stock with significant negative effects on economic activity. §/ Since then, however, central banks have learned to avoid general bank liquidity crises by providing emergency assistance to the banking system during times of crises. Some typical recent examples of such crises in the U.K. have been the failure of some large secondary banks in 1973, and the Johnson Matthey Bankers crises in 1984. Both required official support operations. The U.S. Continental Illinois Bank crisis in 1984 also required large scale central bank intervention to prevent contagion to the banking system. Concern about the stability of the banking system led the German

§/ The ability to create currency through the open market purchase of securities or direct lending against eligible collateral has allowed central banks to supply liquidity in times of crisis and thereby guarantee the exchange rate between bank deposits and currency. In fact, during the period from 1793 to 1933 the United States experienced at least 17 banking crises, while none have occurred since 1933, the beginning of active Federal Reserve intervention. Thus, the systemic financial instability in banking and payment systems was eliminated through the introduction of the central bank clearinghouse where banks would hold their clearing balances and that stood ready to assist banks to convert bank deposit liabilities into currency by taking bank assets as collateral (Schwartz, 1988).

Bundesbank in 1983 to request a group of German banks to assist the failing Schroeder, Munchmeyer, Hengst & Co. Bank. 9/

The second type of liquidity crisis--illiquidity in key money or capital markets--occurs as the direct consequence of increased securitization. In securitized money and capital markets, banks are relied upon to supply liquidity to nonbank participants. For example, corporate issuers of money market instruments generally arrange credit lines with banks to assure access to funds on maturity in case problems occur in rolling over the securities. Nonbank financial intermediaries, such as broker/dealers also rely on banks. While they actively supply liquidity to short- and long-term markets as market-makers, dealers also must arrange bank lines of credit to be able to offer this service. Likewise, participants on organized futures and options markets, the heart of the last decade's development in financial engineering, make intensive use of bank lines because of the

9/ During the secondary banking crises in 1973 in the U.K. the Bank of England organized a "lifeboat," a group of primary clearing banks that provided liquidity to the affected banks. The failure of several of the secondary banks is estimated to have resulted in significant loss (\$234 million) for the Bank of England, as well as for the lifeboat (\$117 million). The Bank of England also arranged a lifeboat for Johnson Matthey Bankers to prevent the failure of the bank from having systemic consequences. The final cost of the operation is yet to be determined.

The Federal Reserve Bank of Chicago advanced \$3.5 billion to Continental Illinois Bank during a run on the bank, and the FDIC extended full coverage to all depositors (see U.S. Treasury (1991)).

requirement of nearly instantaneous delivery of cash needed to satisfy margin calls. Credit lines to banks are the only practicable method of assuring such delivery. 10/

A smoothly functioning dealer effectively provides the service of swapping one security for another. The swaps fund the dealer's operation, allowing the dealer to provide liquidity while avoiding the tapping of the dealer's bank line of credit. Nevertheless, only when dealing in very liquid instruments can dealers almost always avoid funding through banks. Dealers maintain credit lines in good funds and securities to finance peak load inventory acquisition or short positions. 11/ Low capitalization and high leverage are the essential characteristics of the dealer in securities. They therefore tend to be undiversified, highly leveraged, and vulnerable to failure. 12/

10/ The payment of fees for the use of such credit lines serves as compensation to banks for maintaining reserves and for satisfying regulatory capital requirements and other restrictions necessary to access their lines of credit to a central bank. Such payments are reflected in the market yields of money market instruments. Securities whose dealers or issuers rarely expect to draw on bank lines of credit to provide liquidity are most liquid, and this is expressed in relatively low market yields. Securities whose dealers expect frequently to use bank lines are relatively less liquid, and the higher probability of having to incur the costs of using the reserves of the banking system manifests itself in a relatively higher yield, or equivalently in the haircut in price, for such securities. Garber and Weisbrod (1990).

A liquid, securitized money market provides perfect substitutes for both bank liabilities and assets. It, therefore, allows a banking system to shrink or to expand its balance sheet so that reserve requirements are nonbinding--that is, banks hold the amount of reserves that they want to minimize the total costs of effecting end-of-day net settlement of all the payments generated from inside and outside the banking system, including from the money markets.

11/ For a discussion of the impact of available dealer liquid resources on securities market spreads, see Grossman and Miller (1988).

12/ For U.S. dealers in securities, the SEC requires "net capital" of 6 2/3 percent of liabilities where net capital is defined as net worth plus subordinated debt and adjusted for a haircut reflecting the volatility of securities positions.

The failure of a major money market borrower or dealer may precipitate a liquidity crisis in a money market, such as the commercial paper market. The failure of a borrower can undermine investor confidence and make it difficult for other money market borrowers to roll-over their outstanding obligations, forcing them to draw on their bank lines. The banking system may not be willing to meet this sudden increase for short-term commercial credit because of concern about credit risk. ^{13/} Banks may also be unwilling to continue to finance some dealers because of doubts about their solvency. The banking system may also be unable to generate sufficient funding as the illiquidity or collapse of the CD dealer network may have spread to the CD market because of a lack of investor confidence. The ensuing failure among money market borrowers unable to roll-over their obligations, or among dealers unable to fund their positions, will further undermine confidence.

The potential systemic nature of such a situation invites central bank liquidity intervention. An example was the liquidity crisis in the U.S. commercial paper market in 1970, triggered by the Penn Central bankruptcy, as well as the liquidity crisis caused by the October 1987 stock market crash. Both crises required Federal Reserve intervention. ^{14/}

^{13/} For example, during a recent period in August 1991 securities dealers in US securities market were forced to draw on their lines of credit with the money center banks after the rate on repurchase agreements--their traditional source of funding inventories--had unexpectedly risen to levels that could have impaired the solvency of some of the dealers. The sudden increased demand for funds sent banks into the Fed Funds market, which drove the Fed Funds rate to above 30 percent and induced the Federal Reserve to lend in excess of \$3 billion through the discount window in order to preserve orderly markets.

^{14/} The Federal Reserve actively supplied liquidity to the banking system through the discount window, and it encouraged the banking system to maintain and extend credit lines to dealers and other market makers so as to avoid a chain of bankruptcies.

Sudden increases in price volatility in securitized capital markets is a sign of illiquidity that, in turn, can cause precipitous declines in prices and result in bankruptcies among market participants. In capital markets, trading strategies such as stop-loss sales or portfolio insurance rely on market liquidity for their success. For any one small player, the assumption of a liquid market with price continuity is probably reasonable. When all of the selling strategies are triggered simultaneously, however, they have proved to be infeasible. The rest of the market participants may have no knowledge of the existence of such traders because their sell orders lie buried in the future. They will come to the market only if triggered by the proper contingency. When the time comes for these massive sales to occur, the sellers may find no buyers prepared to take the other side of the market at the last reported price, and the price may suddenly collapse. A lack of liquidity in the market may cause a snowballing of sell orders. If the price falls dramatically below its fundamental value due to these liquidity problems, further sales may be triggered. Banks may make margin calls on their loans to security holders and dealers, and cancel lines of credit. This may either bankrupt the holders and dealers or force a sale of their stock, further depressing prices. Hence, marking to market the essence of securitized markets can precipitate bankruptcy from illiquidity among dealers, eliminating dealer networks and inducing a permanent illiquidity and lower prices on securities involved. The spread of insolvencies resulting from price declines and inability to meet margin calls may ultimately affect the banking system as defaults on bank loans mount.

Central bank intervention can prevent liquidity crises caused by large price movements from becoming systemic. The central bank can supply emergency liquidity assistance to the banking system or induce the banking system to supply liquidity to the

nonbank market makers. The welfare gain arises from preventing the transformation of liquid into illiquid securities and needless bankruptcies among dealers, and ultimately among banking institutions. If such events are pure liquidity events, then intervention is costless in terms of central bank resources and price level stability.

Alternatively, if the central bank mistakes a fundamental decline of asset prices for a temporary liquidity problem and intervenes, it will either have to (1) weaken the capital of the banking system; (2) countenance price inflation; or (3) absorb some loss itself. By erroneously adding liquidity to a market when the price of the security is higher than its ultimate level, the central bank expands reserves and pressures banks to lend against the securities. If the security price eventually falls as central bank liquidity is withdrawn, market makers will go bankrupt, leaving bad loans on the books of the banks and reducing bank capital. Depositors' confidence in banks will furthermore diminish, and banks will be less able to provide liquidity services in the future. To reduce the damage to the banks of this mistake, the central bank may decide not to contract reserves to their normal level. This leads to a permanent expansion in the money stock and to a rise in the price level.

Banking markets and liquidity crises

In a financial system without a securitized money market, short-term funding and liquidity management must occur through bank balance sheets, and banks also act as the major brokers and dealers for money. In such a system, there has generally been a small number of large bank players in the market for wholesale funds. Clearing of payments is effectively done internally to banking organizations or among a small group of tightly connected banks.

Few occasions will arise when funds are demanded on a large scale for unexpected settlements. The central bank, therefore, will not often be called upon to provide credit. Alternatively stated, placing most short-term funding on bank balance sheets means that financial markets create few liquid claims, so liquidity problems emerge infrequently.

In addition, a central bank that limits short-term funding to the banking system can make minimum reserve requirements binding and thereby impose a tax on the entire financial system in the form of higher yields and lower prices (liquidity haircuts in the prices) of relatively illiquid securities. Since financial markets would be prohibited from supplying close substitutes to bank products, banks cannot shrink their balance sheets and reserves to a nonbinding level and conduct their liquidity business primarily off their balance sheets.

Thus, financial systems with securitized money and capital markets are more likely to be subjected to liquidity crises than a financial system dominated by the banking market.

Stifling securitized money markets taxes illiquid issuers

With restricted money markets, large and high quality short-term credits must be carried on bank balance sheets. If a central bank permits large-scale, liquid, and securitized money markets, large institutions that are potential issuers of liquid, short-term securities tend to remove themselves from bank balance sheets, thereby reducing the demand for bank reserves. The price of accessing bank liquidity, therefore, falls for less liquid issuers of securities. A policy of permitting a liquid, securitized money market favors issuers of liquid and illiquid securities by allowing them to access capital more cheaply. If illiquid issues are concentrated among the smaller, riskier firms, the structure of investment by type of firm and type of activity is altered. Alternatively a highly

restricted money market will raise the cost of capital to less liquid firms, channeling capital to the larger, lower risk firms.

III. Liquidity and the Payments System

The liquidity of financial markets (money, capital, and derivative), as well as the pace of securitization of financial markets hinges on the ability to settle payments and to move cash. ^{15/} A wholesale payments system capable of processing a large volume of intra-day payment orders is imperative to support the large turnover in securities markets needed for liquidity, the rapidly changing dealer positions financed with repurchase agreements, and margin requirements arising in futures and options markets. In contrast, in a system that lacks such markets, rapidity of payment processing is less crucial since such a large gross turnover and net settlement does not emerge among the numerous entities that are not members of a limited-entry clearing arrangement.

Most wholesale payments systems consist of a central bank that settles payments among a group of clearing banks via their reserve accounts (such as the Fedwire system in the United States) and various private clearinghouse arrangements among subgroups of banks (such as CHIPS for international dollar payments, regional or giro clearing systems in Germany, and netting schemes such as FXNET for foreign exchange transactions). ^{16/} Banks are typically the central participants in wholesale payments systems because of their direct access to "good funds" (central bank liabilities) for

^{15/} By cash, we mean "good funds"--that is, central bank deposits that can shift rapidly through a system of settlement.

^{16/} See Folkerts-Landau (1991).

payments, which gives them a comparative advantage in establishing efficient payment arrangements. Good funds constitute the core of any payments system because they are available at full nominal value to make payments under all market conditions (including market crises).

The role of the central bank in a payments system is dictated by the fundamental nature of payments systems: the more effective wholesale payments systems are in supporting securitized money and capital markets, the greater is the credit risk generated within the settlements system, and thus the greater the likelihood of liquidity crises.

In a system of continuous settlement, each payment message from one bank to another is accompanied by the good funds specified in the message. As long as the sending bank has sufficient reserves on hand, payments messages are processed without delay. In continuous settlements, receiving banks bear no credit risk from participating in the payment mechanism. This is because the payment must be blocked when the amount of payment exceeds the good funds on hand until more funds are received. If numerous banks face a similar situation, the payments system can become gridlocked. Banks wish to make large payments to each other but cannot send payments because they have not received payments. Thus, a system of continuous settlement on the one hand eliminates credit risk among banks from the day's payments. On the other hand, it does so by reducing the potential speed of transmitting payments. This reduction of liquidity increases the cost of financial activity.

The gridlock problem can be reduced by banks' increasing their reserve holdings. This would involve selling loans to other investors in return for good funds. Bank

customers would have to pass-through a higher cost of reserves as the price of increasing processing speed.

To avoid large reserve positions, banks usually engage in net settlement. ^{17/} They pay the difference between total payments and total receipts at the end of the day, through a clearinghouse formed for the purpose of executing the net settlement. Good funds held by banks are transferred to the clearinghouse to collateralize partially bank payment orders. Banks can execute delivery of good funds without increasing their total reserves because the individual members of the clearinghouse and their customers believe that net due to positions accumulating during the day are covered by delivery of good funds at settlement. ^{18/}

Credit risk in payment systems arises from the possibility that any of the parties in the chain of intra-day transactions may default on its payment obligations at the time of settlement. If the clearinghouse operates under settlement finality, then the credit risk of

^{17/} The Swiss payments system is an important exception, in that it is a gross settlement system without intra-day credit extension.

^{18/} In settling net positions, the clearinghouse makes a claim that in the event that one member is in bankruptcy, it has the right to offset payments due from that member with payments due to that member. The clearinghouse makes prior claims over all other creditors to the bankrupt member's liabilities to the clearinghouse to the extent that they are offset by that member's claims on the clearinghouse. Much of the security the clearinghouse adds to the payments mechanism is derived from liability rules. Reserve requirements protect the payments mechanism in a similar fashion. They are assets of the several member banks, but the clearinghouse has prior claim to them in the event of bankruptcy.

the sending bank is distributed over the receiving banks according to the loss-sharing formula adopted by the clearinghouse. ^{19/}

Systemic risk occurs as an outgrowth of settlement risk. The failure of one participant to settle deprives other institutions of expected funds and prevents these institutions from settling in their turn. Thus, although a participant may conduct no business directly with a failed institution, chains of obligation may make it suffer because of the impact that the failed institution has on a participant's ability to settle--that is, the cost of settlement failure reaches beyond the exposure of creditor banks to the failing bank.

Settlement at the end of the day is a way for the market to test periodically the liquidity and solvency of the clearing banks. Failure of an institution to settle may result in an unwinding of all intra-day payments instructions; alternatively, under settlement finality, its obligations will be covered by a clearinghouse reserve or by central bank lending to the clearinghouse or to its members. An unwinding of transactions or failure to fully cover intraday payments made for the delinquent institutions out of clearinghouse reserves will impair the ability of other banks to make payments and hence may produce a systemic liquidity crisis in the absence of central bank intervention.

^{19/} The U.S. Federal Reserve is an example of a clearinghouse that bears the risk of settlement failure. Reserves of individual banks serve as a guarantee to the Fed of the delivery of good funds against end-of-day net due to positions, but the Fed is covered against a bank's nonsettlement only by that bank's reserve deposits. CHIPS now also operates as a collateralized clearing corporation with settlement finality for payments generated in the Eurodollar and foreign exchange markets.

The failure of an institution to settle can easily be transmitted over the payments system and it could precipitate multiple failures of otherwise healthy financial institutions. ^{20/} As a result, major central banks have played an important role in managing the payments system, including supplying liquidity. For example, the Bank of New York, a major clearing bank in the U.S. payments system, experienced a computer breakdown on November 21, 1985, which led the U.S. Federal Reserve to make an overnight loan of \$22.6 billion from the discount window, collateralized by \$36 billion in securities. The sheer size of average daily payments flows through the domestic and international U.S. dollar wholesale payments system--\$1.4 trillion in 1988--and the difficulties experienced in settling trades and payments following a computer breakdown at the Bank of New York and during the October 1987 equity price downturn have shown that wholesale payments system are a source of systemic risk. In fact, some observers believe "that the greatest threat to the stability of the financial system as a whole during the October stock market crash was the danger of a major default in one of the clearing and settlement systems." ^{21/}

A gross or continuous payments system with payment finality and intra-settlement period overdraft facilities, such as the U.S. Fedwire system, avoids systemic liquidity

^{20/} Some of these concerns have been discussed in recent conferences and symposia. For example, the Group of Thirty Symposium on Clearance and Settlement Issues in the Global Securities Markets in London in March 1988; and the International Symposium on Banking and Payment Services, sponsored by the Board of Governors of the Federal Reserve System, June 7-9, 1989; and the Williamsburg Payments System Symposium of the Federal Reserve Bank of Richmond, May 20, 1988.

^{21/} Greenspan (1989).

crises arising from settlement failures since its payments are final. ^{22/} However, only a central bank has the ability to create a payments system with absolute settlement finality.

In Fedwire payments, the Federal Reserve guarantees unconditionally that a bank payment message sent over Fedwire will be honored as good funds at settlement. If a bank fails to deliver good funds, the Fed supplies the funds without assessing other banks for the deficit in reserves resulting from the failure. Thus, over the course of any day, the Fed insures the market in wholesale payments. Hence, the Fed significantly increases liquidity in the money markets and the efficiency of the payments mechanism. As a result, however, it assumes the risk of making payments for a bank in default. The revenue on reserves deposited with the Fed serves as a compensation for the risk it bears, but it may or may not represent sufficient compensation. There may be more efficient means of charging for this risk bearing, since in taxing the Fed's net revenues, the Treasury ultimately bears the risk of operating the payment system.

Concerns about the intra-day credit exposure in net-settlement payments systems with payment finality led the Federal Reserve to introduce caps on debit positions with Fedwire and CHIPS, and to propose interest charges on such debit positions. The presence of a cap

^{22/} The U.S. Fedwire system is the Federal Reserves' nationwide wire system for transferring funds and U.S. Government securities among foreign and domestic depository institutions operating in the United States. Fedwire is the world's largest wholesale payments settlement mechanism with an average daily value of transactions of \$700 billion (excluding CHIPS net settlement) in 1989. Fedwire payments are made by debiting and crediting reserve accounts maintained by depository institutions at their Federal Reserve banks. The Fedwire payment is finally and irrevocably paid when a reserve bank sends a payment message to a receiving depository institution. The Federal Reserve Bank will execute the payments instruction even if it leads to a debit balance. If the sending bank failed while in overdraft, the risk would be borne by the Federal Reserve Bank. Such an overdraft must, however, be settled by the end of the day, hence the term "daylight overdraft."

on the debit position that an individual bank is allowed to run with Fedwire effectively limits the loss that could be incurred by the Federal Reserve as a result of payments instructions sent out over the Fedwire by a failing bank. However, in a situation where investors have lost confidence in a large money center bank and fail to renew short-term funds, such as maturing certificates of deposit and repurchase agreements, the bank would quickly reach its net debit limit and might then be unable to repay its short-term creditors. As a result, the central bank could be faced with the need to provide funds to the bank through the discount window and hence be subject to the credit risk inherent in the bank asset used as collateral. ^{23/}

In contrast, financial systems with a limited extent of securitization have in practice a small number of large universal banks in the market for wholesale funds. Wholesale payments and securities transactions are cleared internally in these organizations. The risk of nonsettlement is small due to the lack of significant exposure to nonbank financial institutions and an increased ability to work out unexpected problems quickly among the small number of players. Hence, although the clearing banks ultimately clear on the books of the central bank, there is little need for the central bank to provide intra-day credit or stand ready to act as lender-of-last-resort to the clearinghouse to ensure the payments settlement.

^{23/} A large proportion of the assets of money center or clearing banks are financed by short-term funds--certificates of deposit, repurchase agreements, interbank loans--and it is possible that a loss of such funding could make it necessary for the bank to discount assets other than the eligible government securities. In this case the central bank would be exposed to the private credit risk inherent in such assets.

The Role of the ECB in the Payment System

Although the draft Statute empowers the ECB to issue regulations governing the clearing and payments systems in the Community, it does not mandate the ECB to play an active part in the payments system by providing intra-day credit or extend lender-of-last-resort guarantees to a clearinghouse.

Current practices regarding clearing and settlement of payments vary widely across member countries. Since mandatory reserves would be held at the ECB, the final settlement of payments among clearing banks would have to occur on the books of the ECB. ^{24/} It will thus be necessary to define clearly the ECB's support for the payments system: whether it will support a gross or continuous settlement system with daylight good funds or a private clearinghouse arrangement by supplying liquidity if the clearinghouse fails to settle.

^{24/} In the Federal Reserve system, each district Federal Reserve Bank has a formal identity, and member banks formally maintain deposit accounts with their district Federal Reserve Bank. Funds move instantly from one member to another, however, even though they have accounts with different district Federal Reserve Banks. There is no central Federal Reserve Bank like an ECB, however, where the district Feds keep funds for interdistrict settlement. Settlement across district Feds occurs through a manipulation under the direction of the Open Market Committee, which reallocates Treasury securities on the balance sheets of the district Federal Reserve Banks.

Such support will be necessary if the ECB wishes to facilitate growth in money market trading volume and development of derivative markets. ^{25/} Failure to support actively the payments system in the interest of achieving the efficiency gains from liquid money and capital markets will ensure that the U.S. dollar will continue to act as a vehicle currency for a significant volume of Community financial markets transactions. The dollar clearing facilities currently available, together with strong Federal Reserve (and Treasury) liquidity support, will continue to maintain the U.S. dollar's pre-eminent role in international transactions.

IV. The Central Bank's Choice Problem

In Section II, we showed that financial systems with liquid, securitized money and capital markets are more likely to experience liquidity crises than bank-intermediated financial systems. Hence, such financial systems have a greater need for a central bank with a lender-of-last-resort function. In Section III, we indicated that the greater the extent of securitization, the greater the demands on the wholesale payments system and the greater

^{25/} The only Community-wide payments system currently operating is the ECU Clearing and Settlement System. The 45 participating clearing banks, located in 10 EC countries, use SWIFT as netting center, and settle final clearing balances in sight deposits accounts they maintain at the BIS. Such accounts are not allowed to show a debit balance. Clearing banks with a debit position have to obtain ECU funds from creditor banks through bilateral operations. If a clearing bank has insufficient funds in its ECU account to cover its end-of-day settlement obligations, then all intra-day payments instructions will be unwound and those pertaining to the debtor bank will be eliminated. The new clearing balances will be established and added to the clearing for the following day. In securitized financial systems, with high-volume wholesale payments flows among clearing banks, such an unwinding is very likely to cause illiquidity in several other participating institutions (Humphrey, 1986). For this reason, the CHIPS system has adopted settlement finality with explicit loss-sharing arrangements in 1990.

the need for the central bank to provide daylight credit or to act as a lender-of-last resort in cases of settlement failure. The elements of a central bank policy role regarding the extent of the central bank's banking functions thus emerges clearly as a balancing of the cost of lender-of-last-resort operations with the benefits flowing from liquid, securitized financial markets.

The role and functions of central banks in the major industrial countries emerged during the 19th and early 20th century largely in response to the need to centralize interbank clearing and the holding of reserves. In addition, most central banks also served to monopolize the issue of bank notes and acted as the Government's bank. Central banks supplied liquidity in times of crises (elastic supply of currency) to financial markets and to individual institutions, first in conjunction with their clearinghouse role and then with their note issuance role, by discounting various types of commercial paper. 26/ 27/

26/ The German Reichsbank, founded in 1875, was the only major exception, although it supplied liquidity to the financial system during crises by purchasing prime bills on the open market, it did not act as a lender-of-last-resort to individual banks. The risk that a bank failure might lead to generalized illiquidity in the banking system was perceived to be negligible, and the Reichsbank stood aside in a number of bankruptcies among the largest banks. As a result, it also was able to avoid any role in supervising or regulating commercial banks. It appears that the structure of bank liquidity of German commercial banks made such an aloof position vis-à-vis individual banks possible. In particular, the ratio of cash to banks sight deposits was relatively high and the ratio of bank capital to bank deposits was also comparatively high and, therefore, the risk of contagion among banks was relatively smaller. Thus, individual bank failures were unlikely to spill-over, and generalized liquidity shortages could be met with open-market purchases of bills and supervision and regulation of banks could be performed by a separate agency. In short, liquidity problems were unlikely because all markets including banking markets, were kept notably illiquid. See National Monetary Commission (1910a), and Goodhart (1988).

27/ See Goodhart (1988); Bagehot (1922); Willis (1923); Timberlake (1978); Smith (1936); Sprague (1910); National Monetary Commission (1910a,b,c,d,e,f).

These microeconomic or banking functions were in most instances combined with the monetary function of supporting a metallic standard or fixed parities under the Bretton Woods system, through an appropriate discount policy. With the monetary and economic catastrophes of the 1920s and the 1930s, and the consequent ascendancy of macroeconomics as a separate discipline in economics, the policy objectives of central banks became ever more defined in terms of the macroeconomic goals of economic stabilization, including price level stabilization. The banking role of central banks became intellectually secondary to the monetary role. ^{28/} In practice, however, the new macroeconomic policy operations were only superimposed on, rather than taking the place of, the pre-existing banking operations of the pre-war central banks, which continued to operate fully as banking entities. Although "operating instruments" such as short-term interest rates were used as levers, whose manipulation might effect the ultimate goals, they simultaneously were used as the central banks' traditional instruments for influencing banking and financial market activity. ^{29/}

^{28/} This change is especially noticeable in the evolution of post-World War II textbooks on money and banking. These became essentially second rate macroeconomics texts, reflecting the view of central banking prevalent in macroeconomics, in which the role of central banks was economic stabilization and the role of banks was purely a mechanistic balance sheet activity of producing deposits that formed a key part of the controllable money supply.

^{29/} The rapid collapse of the main schools of thought in macroeconomics, and the fracturing of macroeconomics itself as a coherent discipline, in the 1980s has engendered an understanding that a central bank cannot play an activist role in stabilizing real economic activity, leaving the attainment of price stability as the main macroeconomic goal. The only consideration of central banking policy as a banking rather than as a monetary policy in the recent academic macroeconomics literature is Sargent and Wallace's (1982) paper on the real bills doctrine vs. price level stability. Sargent and Wallace show that a policy based on a real bills doctrine is welfare maximizing when capital markets are constrained. The result is tainted, however, by its being made in the context of an overlapping generations model of money demand.

Current central banking practices in the major industrial countries tend to support the hypothesis that liquid, securitized financial markets need to be supported by a central bank with broad banking functions--lender-of-last-resort, involvement in payment system, and the supervision and regulation of the banking system. In particular, central banks in the large industrial countries with highly securitized and liquid financial markets, such as the United States and the United Kingdom, have a clear objective to secure stable banking and financial markets, in addition to their monetary policy objective. The central banks in these countries have repeatedly demonstrated their willingness to act as lender-of-last-resort to the financial system as a whole, as well as to individual institutions, ^{30/} while at the same time imposing a supervisory and regulatory framework to minimize the occurrence of such crises.

On the other hand, central banks in financial systems with predominantly bank-intermediated credit, such as Germany, have not found it necessary to act as lender-of-last-resort. Consistent with the tradition of its early predecessor the 19th century Reichsbank,

^{30/} The experience of U.S. Federal Reserve System is the most relevant as a model for the new European system of central banks and the ECB. The Fed's views were clearly formulated by Chairman Volker in 1983: "A basic continuing responsibility of any central bank--and the principal reason for the founding of the Federal Reserve--is to assure stable and smoothly-functioning financial and payments systems. These are prerequisites for, and complementary to, the central bank's responsibility for conducting monetary policy as it is more narrowly conceived.

To these ends, the Congress has over the last 70 years authorized the Federal Reserve (a) to be a major participant in the nation's payments mechanism, (b) to lend at the discount window as the ultimate source of liquidity for the economy, and (c) to regulate and supervise key sectors of the financial markets, both domestic and international. These functions are in addition to, and largely predate, the more purely "monetary" functions of engaging in open market and foreign exchange operations and setting reserve requirements; historically, in fact, the "monetary" functions were largely grafted on to the "supervisory" functions, not the reverse" (Federal Reserve System, 1984).

the German Bundesbank lacks a mandate to act as a lender-of-last-resort, and has only limited supervisory and regulatory responsibilities. ^{31/}

The welfare loss of liquidity crises can be partly offset by a central bank acting as lender-of-last-resort to the financial system or to individual institutions. However, in any credit operation that it undertakes in the lender-of-last-resort role, a central bank will incur the credit risk and potential losses, associated with the claims it acquires when expanding its liabilities to supply liquidity. Such losses will occur when the market value of the collateral is less than the amount of the loan or advance to the banks concerned. ^{32/} As a remuneration for such credit risk, the central bank receives income from holding the reserve balances of the banking system.

While the monetary effects of the liquidity operations can be sterilized, the central bank's losses on acquired bank assets fall ultimately to the taxpayers. In effect, the taxpayer has assumed the credit risk inherent in bank assets that serve as collateral for central bank lending. Such losses will have to be balanced against the benefits derived from liquid, securitized financial markets with an efficient payments system. Furthermore, the moral hazard generated by the presence of a lender-of-last-resort will have to be

^{31/} The Bundesbank's experience undoubtedly served to form views about the role of the ECB. For example, Dr. H. Tietmayer, member of the Board of the Bundesbank, made the case for a narrow ECB. "...if too many tasks were to be assigned to the European Central Bank this could complicate the conduct of monetary policy. The ECBS should be free, therefore, from responsibilities other than those for monetary policy. In particular, banking supervision should not be assigned to the ECBS, but should be left with national authorities, if only to prevent the ECBS from being forced into a "lender of last resort" function that would not be compatible with its task of safeguarding the currency..." Deutsche Bundesbank, 1991.

^{32/} For example, in a wholesale payments system with daylight credit and settlement finality, such as Fedwire, it may be possible for a bank to send a sufficient volume of payments messages to exceed the value of its assets.

mitigated by supervision and prudential regulation of the financial system by the central bank.

Policy Choice

To reduce the expected cost to the public sector arising from the central bank's lending operations undertaken to stabilize financial markets, the central bank can restrict the extent to which financial markets are securitized, it can eliminate payments system risk by requiring continuous settlement with payment finality, and it can impose supervisory and prudential requirements on the banking system. These restrictions will reduce the likelihood of liquidity crises and may reduce the loss to the central bank if a crisis occurs. Such policies, however, tend to restrict the activities of banking firms, limit the range of available instruments, increase the cost of operating the payments system, and generally reduce liquidity in financial markets, all of which will increase the total cost of the financial transactions supporting a given volume of real activities. ^{33/} In the extreme, the central bank can restrict the financial system to operate largely through bank intermediation.

In practice, central banks have, for historical reasons or otherwise, chosen different positions along the credit risk--financial market efficiency trade-off ranging from the highly liquid securitized capital markets in the United States to the predominately bank-intermediated financial system in Germany. The draft Statute for the ECB would seem to leave very little room for the ECB to actively stabilize Community financial markets.

^{33/} For example, the absence of extensive derivative market, raises the cost of hedging operations. It is a general proposition that any restrictions on the number and type of instruments that make financial markets less complete leads to inefficient resource allocation.

Implicitly therefore, the Statute foresees a bank-intermediated financial system without any significant further securitization of finance.

It will then not only be necessary to restrict the further development of liquid, securitized financial markets and large volume wholesale payments systems in the Community financial system, but it will also be necessary to scale-back such developments in the U.K. and French financial markets.

An important reason that banking functions, in particular lender-of-last-resort operations, cannot be undertaken by national central banks in an ECB system is that such operations may have monetary effects and may be costly in terms of central bank resources. It will be more difficult for national central banks to resist calls to come to the assistance of a local banking system than for a multi-national ECB. Thus, even if the monetary effects of a liquidity operation by a national central bank could be undone by the ECB, it is nevertheless advisable to control banking operations from the center. Nor could the ECB rely on its ability to avoid a systemic crisis by financing a group of European banks to form a "lifeboat" to assist a bank or a group of banks in need of liquidity. The diversity of banks across member countries and the lack of cohesions among these banks rules out such operations.

V. Supervision and Regulation of Banking Systems

In addition to restricting the extent of securitization of financial intermediation, central banks can reduce the credit risk incurred during liquidity operations through an appropriate regulatory and supervisory regime on financial systems (not exclusively on banking systems). The regime would be designed to limit the expected losses on bank

assets acquired during a liquidity operation to a desired level. In particular, regulations can be designed so that disturbances from the activities of banks other than those relating to payments and liquidity do not spill over into the payments system and become systemic. Such regulations include risk-related capital requirements, separation of investment banking activity from payments activity, position limits, and frequent assessment of the solvency of the bank through supervision and inspection of the bank's assets. The more restrictive the regulatory and supervisory regimes, however, the greater the total cost of financial transactions, specifically the cost of making payments.

The draft Statute does not envisage an active role for the ECB in the prudential supervision of financial institutions, ^{34/} which is consistent with the limited banking functions mandated in the draft Statute for the ECB. As long as the ECB does not intend to supply liquidity as a lender-of-last-resort to stabilize Community financial markets, it will not be necessary to restrict the amount of credit risk it might assume under such operations through supervisory and regulatory policies. ^{35/}

If, however, the ECB does assume a lender-of-last-resort role, then it will also have to assume a supervisory and regulatory role at the center of the Community financial system, rather than leave such activities to the national central banks or other agencies. This is because the assignment of responsibility for the supervision of the banking system should avoid intra-agency conflict of interest. Such conflict would arise if the central bank

^{34/} Article 25.2 holds out the possibility of designing the ECB as a complete supervisory authority but such a transfer of competence would have to be specified by community legislation.

^{35/} Germany is the only major industrial country with a central bank that does not have a substantial supervisory function.

puts its resources at stake, while another agency is responsible for establishing the solvency of central bank debtors. For example, the supervision of the banking system, i.e., the assessment of the market value of banking assets, could be subject to intense political pressure leading to a delay in corrective measures. An independent central bank with its own resources at stake is more likely to assess the solvency of potential borrowers sufficiently accurately to protect its own resources. Thus, as long as there is any potential for central bank lending to credit institutions, the central bank should be responsible for supervising the banking system.

A second argument in favor of centralizing the responsibility for bank supervision in the central bank relates to the central bank's first-hand involvement in liquidity support operations. To reduce credit risk to a minimum and in order to establish the modalities of its intervention (e.g., open market operations versus discount window) the ECB will have to establish quickly whether it is facing a pure liquidity crisis or an insolvency crisis. The initial problem will most likely have become apparent at the time payments are settled, and hence speed is of the essence if a systemic payments crisis is to be avoided. The expertise and information necessary to conduct a successful liquidity operation at minimal credit risk requires the intimate involvement of the central bank with the banking system. During the October 1987 stock market crash, for example, the successful intervention by the Federal Reserve required a knowledge of dealer obligations to the banking system, of the potential magnitude of margin calls, and of the position of the money center banks. It is unlikely that such expertise can be developed and retained outside the ECB.

VI. Conclusion

The draft Statute for a System of European Central Bank, the centerpiece of EMU, defines a "narrow" ECB--a central bank shirking basic banking functions, such as lender-of-last-resort to financial markets and the payments system, and supervision and regulation of banking markets. In this paper, we have demonstrated that this choice will also determine the future structure of the Community financial system. In particular, an ECB eschewing any substantive banking function will have to guide the development of Community financial markets in the direction of a predominately bank-intermediated financial system, avoiding any significant degree of liquid, securitized markets, including markets for short-term corporate obligations, bank liabilities, repurchase agreements, derivative instruments, and equity products.

Alternatively, if Community financial markets are to develop further towards liquid, securitized financial markets with a high-volume wholesale payments system, then it will be essential for the ECB to assume a well-defined lender-of-last-resort function, as well as supervisory and regulatory responsibilities.

A policy choice in favor of a bank-intermediated Community financial system, which would inevitably result in a higher cost of financial transactions supporting a given volume of real transactions, would imply that a significant portion of intra-Community financial transactions would continue to use the dollar-based financial system.

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