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T.R.G. Bingham

RECENT CHANGES IN FINANCIAL MARKETS:
THE IMPLICATIONS FOR SYSTEMIC
LIQUIDITY

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ABSTRACT: Arguing that the uninterrupted efficient operation of the secondary securities market is as important for the stability of the financial system as the maintenance of the integrity of the banking system, this paper examines the interrelationship between the structure of secondary securities markets and their liquidity and stability. The authorities can help to make these markets robust by promoting the issue of standardized, low-risk negotiable contracts, by enabling market makers to emerge but not to dominate the market, by lowering or eliminating transactions taxes and by ensuring that appropriate price quotation and clearing and settlement systems are in place.

KEY WORDS: securities markets, systemic stability, liquidity, market making, secondary markets.

**RECENT CHANGES IN FINANCIAL MARKETS:
THE IMPLICATIONS FOR SYSTEMIC LIQUIDITY**

T.R.G. Bingham

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1. Recent Changes in Financial Markets

One of the most significant of the many changes that have taken place in financial conditions over the past few decades has been the rapid expansion in the markets for financial claims. A surge has taken place both in the amount of traditional securities outstanding, but the increase in turnover in secondary markets for them has been still greater¹. In addition a whole range of traded derivative instruments - options, futures and swaps - and the synthetic instruments constructed with them have emerged.

This paper examines some of the implications of the rapid expansion of securities markets. The remainder of this section sets out briefly several consequences of this development and selects for closer analysis changes in the way liquidity needs are met. Theories bearing upon the structure of the financial system and the role of different intermediaries are reviewed in the second section. The third one examines secondary markets for financial claims and the role of the market-maker in light of these theories. The fourth and final section draws some conclusions about the relationship between market structure and liquidity and stability.

1.1. Consequences

One important consequence of the growth of the market for financial claims has been a considerable expansion in the ability to manage different contingencies. To be sure the

1. Data relating to amounts outstanding and turnover of securities listed on the world's most important exchanges are shown in annex tables. Anecdotal evidence suggests that growth was also rapid in other less organized markets. More recently, however, following the market break of October 1987, there appears to have been a moderation, and in some cases an outright reversal, in the growth of secondary market transactions.

number of unexpected events that need to be dealt with has grown, and it can be argued that it would have been far better, had exchange and interest stability been achieved through coherent and internationally consistent macro-economic policy. However, once uncertainty has increased for whatever reason, improved ability to contend with it indubitably contributes to welfare.

A second consequence of the growth of securities markets has been a fairly radical shift in the environment in which banks and other financial intermediaries operate. By increasing substitutability between different claims both nationally and internationally, the expansion of financial markets has intensified competition and made the terms on deposits and other instruments, which earlier had been insulated from changes in market conditions, much more sensitive to shifts in demand and supply. In addition, it has altered the way in which monetary policy is implemented and narrowed the scope for autonomous action by the monetary authorities.

It is noteworthy, however, that the growth of securities markets has not led to a diminution in the role of financial intermediation. Institutional investors such as pension funds, mutual funds and insurance companies have come to account for a larger and larger share of business in these markets. Direct transactions by households make up a declining share of business in most markets. Even banks, intermediaries which might be thought to suffer a result of the growth of securities markets, have been important issuers, purchasers, originators and dealers in securities.

1.2. Changing ways of meeting liquidity needs

As important as these particular changes are, the present paper does not discuss them but rather focuses on a third and possibly still more significant consequence: the shift in the way liquidity needs are satisfied. It is now

possible to sell a wide range of financial instruments at comparatively low cost in deep and active markets. Liquidity needs are therefore met not only by holding cash and demand deposits but also by keeping marketable assets on hand for sale at short notice. Even when such claims are not sold, the greater depth of the secondary markets augments their value as collateral for loans and facilitates new issues of similar paper in primary markets by institutions with the requisite credit standing.

The principal thesis of this paper is that markets for financial assets have become so central for the satisfaction of liquidity needs that their continued functioning is now as important for the maintenance of systemic liquidity as is the preservation of the integrity of the banking system. Just as confidence in the soundness of the banking system allows banks to fund medium and long-term loans with short-term deposits, so too does confidence in the ability to sell a financial asset easily, quickly and cheaply make it possible to hold marketable claims of varying maturities to satisfy what are essentially short-term liquidity needs. In this way, a well-functioning financial market increases the availability of medium and long-term finance, thereby lowering the interest rates relevant for real investment decisions.

1.3. Systemic liquidity

In the secondary market the liquidity of a security for any particular holder is dependent on the fact that other holders do not attempt to sell their claims simultaneously. They in turn refrain from doing so if they are confident that they could sell their claims easily and without large losses should they wish to do so. In this respect there is a close analogy with the liquidity of bank deposits. Because banks generally have assets with maturities exceeding that of their liabilities, the liquidity of an individual's deposit depends on the fact that all depositors do not make withdrawals from

their accounts simultaneously. In both the marketable claims and banking cases, liquidity arises because of beliefs about the actions - or rather inaction - of others. In such conditions it is essential to ensure the stability not only of the banking system but also of markets for financial claims so that the benefits to the economy as a whole - the "externalities" - of the continued provision of liquidity are not jeopardized.

This is the core of the meaning of the term "systemic stability", a phrase that is frequently bandied about without being given a precise and unambiguous definition. Preserving systemic stability can be seen as maintaining the externalities associated with the individual's belief that he can satisfy his liquidity needs by withdrawing funds from a bank or selling assets in a market. Expressed in a somewhat different way, maintaining systemic liquidity entails preventing herd reactions or, in statistical terms, avoiding pronounced positive covariance between sales (or prices) of financial claims.

Even though the direct provision of liquidity to the securities market may in some circumstances be vital for ensuring the continued smooth functioning of the financial system, the present paper does not consider the "market-maker of last resort" issue in any depth. By its very nature, such action will be exceptional and, apart from making sure that appropriate monitoring systems are in place and that contingency plans exist, there is little that can be done prior to the fact. Moreover, the existence of moral hazard - the tendency for market participants to exercise less caution when they are confident that the authorities will provide assistance in a crisis - makes the elaboration and announcement of strategies counterproductive. The focus of this paper is rather on the interrelationship between firstly, the structure, and secondly, the stability and liquidity of the financial market. In other words the paper examines what

structures tend to promote active trading at reasonable costs and to withstand unexpected shocks.

2. Economic Theory and Financial Structure

The analysis of the structure of financial relationships has sometimes been relegated to the sidelines of economic theory. This can be attributed to four of its features:

- (i) the assumption of perfect information and costless transactions in the simplest yet most influential version of the Walrasian models of interspatial or intertemporal exchange;
- (ii) the abstraction away of slightly different but easily substitutable financial claims in the basic IS-LM analysis of macro-economic relationships;
- (iii) the persistence of the view that money is a veil behind which "real" forces shape the course of economic events; and
- (iv) the proposition that the principal social function of the financial system is to even out savings/investment imbalances.

Nonetheless, the analysis of financial relations has been an important leitmotif in economic thinking. Three separate strains of economic thought have either explicitly analysed the structure of the financial system or implicitly contained a view about the private or social role of financial institutions and financial relationships.

Firstly, portfolio theory, which sprang from recognition of the importance of uncertainty for human decisions, provides insight into the financial behaviour of wealth holders when assumptions are made about their attitudes towards risk. Moreover, when supplemented with some additional assumptions (the existence of transactions costs, asset indivisibilities, etc), it provides a rationale for the existence of certain types of financial intermediaries (mutual

funds) and the provision of certain financial services (risk pooling).

Secondly, the elaboration of the IS-LM model in such a way that monetary policy actions are seen to be transmitted along a chain of closely substitutable financial assets implies the existence of a particular market structure, namely one in which financial contracts can be replaced by other fairly similar ones. Replacement can take place when the original contract matures, when it is called (assuming that it contains call provisions) or when it is sold in the secondary market. Moreover, the view that money creation is the result of "transformation" of financial claims by the banking system implies the existence of financial institutions, and in particular a specific type of financial intermediary: deposit-taking institutions (banks) that acquire financial claims and issue liabilities (deposits) with different maturities.

Thirdly, the recent flowering of the economics of information and incentives has provided insight into the nature of the financial system, suggesting that it is the endogenous outcome of tastes, technology and the political process.

The following section briefly surveys these three traditions, focusing in particular on the financial structure and the provision of liquidity.

2.1. Portfolio theory

By providing a comprehensive analysis of the behaviour of the individual decision-maker in the face of risk and uncertainty, portfolio theory significantly extends the calculus of decision-making based solely on the assessment of return or profit. In addition, it provides indirect insight into the structure of the financial system by furnishing an account of the benefits accruing to the risk averse agent of risk reduction through portfolio diversification and by

explaining how risk re-allocation can augment overall welfare if agents have different attitudes towards risk.

The distinction between the benefits arising from risk diversification and those arising from its re-allocation through asset trading or various contractual agreements (swaps, options, futures) can be illustrated by examining the conditions necessary for the two types of benefits. For the benefits of diversification to come about a heterogeneity of outcomes is needed. All agents may still have the same degree of risk aversion. For risk trading to generate benefits, not only must there be a diversity of outcomes, but there must be varying degrees of risk aversion. These differences can be illustrated by the following examples.

First, assume that there are various assets all having a return of $r \pm e$ where r is the riskless return and e is the stochastic gain or loss. When the likelihood of gain is equal to the likelihood of loss, a risk neutral investor will be indifferent to holding all wealth in a single type of asset. A risk averse investor, however, will prefer to hold a diversified portfolio since he values a reduction in uncertainty more than the gain that would arise if he by chance happened to hold all his wealth in an asset that yielded a return of $r + e$. The benefits arise because the agent is risk averse, not because there are different degrees of risk aversion.

Secondly assume that there are two different agents, one highly risk averse and one only moderately so. Assume also that there are only two assets, one which is highly risky and another which is not risky. If both agents' initial asset holdings are equally divided between the high risk and the low risk asset, overall welfare can be improved by risk trading. For example if the highly risk averse agent trades some of his holdings of the risky asset for the low risk one, both agents will move to higher indifference curves in the risk-return space. In this case the benefits arise from risk trading or the reallocation of risk-bearing, not from the reduction of

uncertainly through portfolio diversification. Risk can, of course, also be re-allocated through swaps, options or operations that do not involve explicit portfolio re-adjustment.

As such, the analysis of the portfolio decisions of individual agents provides little insight into the structure of the financial system, though it does imply the existence of a spectrum of claims with different risk-return characteristics. However, when supplemented with additional assumptions (e.g. the existence of transactions costs and/or asset indivisibilities), it explains why financial intermediaries may emerge. If, for example, there are transactions costs arising from the need for contract documentation - not to mention informational costs related to search, verification and monitoring - a financial intermediary may find it profitable to offer a range of contracts with different characteristics. When there is a fixed cost for any and every transaction, it will be in the interest of an ultimate agent to purchase one asset with the precise risk-return characteristics that he desires rather than to purchase several claims and thereby achieve his preferred risk-return profile.

If in addition there are higher odd-lot charges and discounts for block trading, economies of scale in transactions will provide a justification for the existence of an intermediary. The existence of search costs is a reason why one, rather than several claims, are purchased.

An intermediary offering risk pooling services must, of course, be a low risk entity since the ultimate wealth holder will then have just one asset instead of several. The benefits of diversification will be lost if the pooling entity goes bankrupt. The marking to market of claims on a pooling entity (mutual fund) is one way of reducing the likelihood of default.

As important as portfolio theory is for explaining the financial behaviour of economic agents confronting uncertainty

and risk, the theory does not provide an adequate account of the emergence of the externalities associated with systemic liquidity as defined above. Moreover, although portfolio theory explains why some financial services are performed through intermediaries, the type of intermediary it predicts (a mutual fund), is only one of the many types that exist and one which, in addition, provides only a fraction of the many services offered by banks, securities houses, brokers, insurance companies, etc.

2.2. "Transformational" analysis

Recognition of the need for the elaboration of the simple IS-LM macro-economic model which contained only one asset (money) and no analysis of the money supply process led both monetarist and Keynesian thinkers to provide an account of the role of banks and other financial institutions as "transformers" of finance. Because the basic aim of the analysis was to explain how policy actions affected macroeconomic aggregates (growth, employment, inflation and the balance of payments), priority was not given to providing a rigorous account of the micro-economic behaviour of either ultimate agents or institutions dealing in financial assets. A fractional reserve view of banking could be used to explain the money-creation process, but it was also possible to build on portfolio theory to give this highly mechanistic view a choice-theoretic foundation. A change in central bank money, i.e. the reserves of the banking system, was seen to lead to portfolio disequilibrium on the part of the banks and other asset holders, which could be eliminated by changing the composition and/or size of the portfolio. Whether prices or output reacts depends on the capacity utilization and elasticities of supply.

Irrespective of its micro-economic underpinnings, the financial system is in this view of the world seen to augment welfare by "transforming" maturities, i.e. converting demand

deposits or other shorter-term liabilities into longer-term claims. Although this entails risks, it is possible because of the low perceived probability that all deposits will be withdrawn at the same time. As long as confidence in the financial system is maintained, the funds withdrawn would, apart from predictable "leakages", be channelled back into the system.

Three features of this conception of the financial system are worthy of note. Firstly, although it is compatible with a profit-maximizing account of the micro-economic behaviour of financial institutions, the emphasis is not on private actions but rather on the functioning of the system as a whole. The "transformation" of maturities leads to positive externalities, i.e. to benefits for the community as a whole over and above the profit earned by intermediaries providing the transformation services.

Secondly, this analysis implies that the level of economic activity is not independent of the financial structure. Maturity transformation allows more medium and long-term investment to be financed than would be the case if the only source of finance for such investment were medium and long-term savings. The ability to predict the likelihood of deposit withdrawals makes banks willing to "mismatch" their assets and liabilities and thereby augments the amount of long-term funds available, which *ceteris paribus* lowers their cost. If banks or other institutions engaged in maturity transformation did not exist, investment would not be as great.

Thirdly, as important as its systemic insights are, this analysis does not account for all the services provided by the financial system nor does it adequately distinguish banks from other institutions engaged in maturity transformation. For instance, it does not explain reverse maturity transformation which occurs when mortgage banks "lend short" and "borrow long" often at the same time providing "loan size transformation services", i.e. making a few large

bonds issues and granting many small loans. Nor does it account for other risk management activities, e.g. interest rate risk, foreign exchange risk or default risk. Nor does it explain trading activities or agency services, e.g. payments, clearing, safekeeping, foreign exchange conversion, which make up an increasing proportion of banks' earnings. Clearly, therefore, although highly useful for explaining the social function of the financial system, it is not in itself an adequate account of the wide range of activities performed by financial institutions.

2.3. Information and incentives

Unlike either portfolio theory or transformational analysis, the economics of information and incentives provides direct insight into the structure of the financial system, which is seen to be the endogenous outcome of information that is asymmetrically distributed, costly to collect and difficult to verify.

Moral hazard and adverse selection are two obvious drawbacks of costly information that may hamper the working of a market. For example, when buyers are unable to determine the quality of a product before purchase, the market price will reflect average quality. Suppliers of lower than average quality products will have an incentive to bring their "lemons" to market and even to lower the quality of their products if it is unlikely that this will be perceived (moral hazard), whereas suppliers of high quality products will tend to withhold them (adverse selection). If these problems are serious, a market may not even emerge.

Moral hazard and adverse selection problems can be alleviated through screening, signalling, monitoring and the establishment of appropriate incentive structures. The financial system providing these services can thus be seen as essentially a social mechanism to contend with costly

information, given differences in tastes (risk aversion) and certain conventions regarding contracting.

For example, the debt-equity ratio provides both information and incentives. A low debt-equity ratio may indicate commitment on the part of the entrepreneur. At the same time it provides an incentive for effort on his part since the residual claims (equity) are then large relative to the senior claims (debt) and the entrepreneur will keep all earnings over and above his contractual debt payments. A low debt-equity ratio will also, *ceteris paribus*, increase the likelihood that all contractual debt payments will be made. In the event of default the value of senior claims is also larger since there are, *ceteris paribus*, fewer claims. This is a far cry from the view of the world which holds that the debt-equity ratio is immaterial.

Similarly, in this conception of the world financial intermediation occurs because of the existence of search, verification, monitoring and enforcement costs. There are slight but important differences between these costs, differences which explain the variety of intermediation that occurs and the combinations in which financial services are provided. Search costs are those associated with identifying a potential (financial) investment. Verification costs arise because of the incentive to misrepresent a project. Assuming that a given investment has been identified and the accuracy of this information has been confirmed, it may be useful to put in place monitoring systems to determine any change in conditions. Finally, it may be necessary to devise incentives and structures such as covenants in loan contracts to ensure that the debtor behaves in an appropriate manner. In some of these activities, monitoring for example, there are clear economies of scale, which is one explanation why these activities are carried out through intermediaries.

A bank can be seen as an intermediary that acquires information, verifies it, monitors behaviour and puts in place appropriate incentives. It earns profits by charging

implicitly for its proprietary information and the services it provides. The particular types of deposit and loan contracts that are used are a reflection of this function and also help to resolve a further but ancient problem: monitoring the monitor (*quis custodiet ipsos custodes?*). Very many of the problems that the intermediary confronts vis-à-vis those to whom it extends credit are faced by those who lend to the intermediary. A major reason why intermediaries do not simply sell the information obtained through their search activities is credibility. If the information at its disposal is accurate and valuable, the intermediary will have an incentive to use it itself. Potential purchasers are aware of this and harbour fewer doubts about the quality of the information if the institution commits some of its own funds or assumes part or all of the risk.

The nominal deposit contract is one way of dealing with the "*quis custodiet*" problem. Since the value of the deposit is fixed in nominal terms and does not vary with the value of the assets acquired by the bank, the saver need not monitor the institution closely as long as it has positive net worth. Moreover, the fact that he can withdraw his funds immediately or at short notice, provides an incentive for the institution to maintain his confidence and to avoid excessively risky and/or highly illiquid investments.

The reason why banks often finance long-term investments by rolling over a series of short-term loans is similar. This allows periodic monitoring and encourages the borrower to perform well. While information on payments habits may provide some information that can be used to assess creditworthiness, the resolution or minimization of the monitoring and moral hazard problem would seem to be a better explanation for the joint provision by banks of payments services (demand deposits) and credit. The need for monitoring and the desire to earn a return on private and difficult-to-verify information gathered by banks also

explains why a large proportion of bank assets take the form of non-marketable claims.

These three intellectual traditions - portfolio theory, transformational analysis and the economics of information - provide some explanation for the existence of the financial infrastructure, with the infrastructure being seen as consisting of various types of financial institutions such as mutual funds, banks and insurance companies. A securities market can also be thought of as a particular institutional structure and the following section applies some of the ideas set out above to explain the particular structure of securities markets.

3. Liquidity and the Structure of Secondary Markets

Because a liquid asset is one that can be sold or converted into means of payment easily and quickly at a price that is highly predictable, anything that helps to augment asset price predictability tends to promote liquidity. Both the nature of the asset and the structure of the market are relevant in this context. The remainder of this section will, after briefly considering the assets suitable for trading in secondary markets, focus on those features of market structure that promote the liquidity of individual instruments and give rise to the externalities which are responsible for systemic liquidity.

3.1 Liquid assets

Negotiable assets with short maturities, low credit risk and standard terms tend to have the most stable and most easily predictable prices and to be the most liquid. Financial innovation has, however, altered the picture somewhat during the current decade by making it easier to hedge risk, to unbundle contracts and to redesign and customize standard contracts.

Negotiability: To be suitable for use in the secondary market a contract should be negotiable. In other words it should be possible to transfer title to the claim, or to specific features of the claim such as its interest rate or currency of denomination, to third parties easily and without hindrance. When a claim is negotiable, it is necessary to have a means by which the debtor can discharge his liability, e.g., through a paying agent or a mechanism enabling the borrower to determine the identity of the holder of the claim.

Maturity: As a rule contracts with a short maturity display greater price stability than ones with long maturities because a once and for all change in interest rate

expectations has a smaller impact on their discounted present values and thus on their current prices than on the prices of assets with long maturities. It is for this reason that secondary market transactions undertaken for liquidity management purposes tend to be focussed on short-term assets. However, the proliferation of interest rate hedging techniques and the uncoupling of the principal and the coupon have reduced the significance of a short maturity.

Credit risk: Although the prices of low credit risk assets need not necessarily be more predictable than those of high risk ones, in practice they are. Issuers of low risk assets tend to be more reliable and solid. They are less likely to go bankrupt and more likely to benefit from implicit or explicit public backing. The government, because of its ability to tax and to create money, is invariably the lowest risk entity of all. The price of paper issued by first class borrowers usually does not change much because of shifts in views about the solvency or liquidity of the debtor but more often because of changes in underlying economic conditions that affect the prices of all financial assets.

Contract standardization: The establishment of certain conventions and understandings concerning the nature of the financial contract is of considerable significance for the smooth functioning of the secondary market. A standardized contract is much easier to sell than one specifically designed to meet the particular needs of the individual debtors and creditors.

Standardization helps to promote liquidity by facilitating the pricing of the asset. First of all, prices need not diverge because of trivial and unimportant differences among contracts which are not easily understood by market participants. More importantly, by increasing substitutability between different contracts, standardization makes markets for different assets deeper. When all assets have common terms, one contract can easily be replaced by another. The markets for them tend to merge and thereby become

much deeper than if the various segments were isolated one from another.

Standardizing the denomination of the contract also affects liquidity. If there are only a few normal denominations, there will be more potential buyers and sellers. In addition if the standardized denomination is small, private agents with limited wealth can participate in the market. However since transactions costs are often higher for small trades, there is a limit on the extent to which liquidity may be augmented by reducing the size of the minimum denomination.

By and large market forces will be sufficient to ensure that terms are standardized. Even though borrowers often confront costs when they issue a liability that does not accord completely with their needs, there are compelling reasons for them to make sure that the paper they issue has conventional terms. Probably the most important is that they can then avoid paying the sometimes exorbitant premium demanded by creditors for holding illiquid paper.

3.2. Market structure

Abstracting away the specific features of financial assets, liquidity in the secondary market depends upon the ease, speed and cost of finding a counterparty and executing a transaction. As a minimum condition, there must be a way of communicating among potential buyers and sellers information about the asset and the counterparty's integrity or lack thereof. In addition, a mechanism for establishing the asset's price and suitable arrangements for settlement should exist.

Traditionally, these prerequisites have most easily been met by the geographical and temporal concentration of transactions at a fair, in a market or on an exchange. This increases the likelihood that buyers and sellers can find one other and assess each other's propriety and reliability. It also facilitates clearing and settlement. Over time, the

development of communications technology has reduced the need for geographical concentration of transactions in secondary financial markets but has at the same time augmented the importance of temporal simultaneity, the availability of information on prices, and clearing and settlement procedures.

Taking a cue from the economics of information and incentives, the point of departure of the following discussion is that the existence and structure of financial markets, contracts and institutions are the outcome of the varying and sometimes inconsistent objectives of individual economic agents and of "imperfect information", i.e. of the fact that information is asymmetrically distributed, costly to collect and difficult to verify. Consequently, there will be value associated with information that is not publicly available, and it will often be possible to earn a return on that proprietary information.

3.3 Assessing the liquidity of secondary markets

A natural way to gauge the liquidity of a secondary market for financial assets is to compare cash management costs in it with the costs of managing liquidity needs in more traditional ways, i.e. by holding bank deposits. In the benchmark case, the cost of holding cash balances and non-remunerative demand deposits consists of foregone interest and the encashment costs associated with the withdrawal of deposits before maturity.

It is noteworthy that bank deposits are nominal claims and that an agent satisfying his liquidity needs by holding sight deposits does not bear risk associated with changes in the nominal or money price of the asset. In the presence of inflation, however, he faces the losses associated with the decline in the purchasing power of his nominal claim. It is more than coincidence that the propensity to use secondary asset markets as a means of managing liquidity increased after a period of prolonged and high inflation which caused

attention to be given to the erosion of the real value of nominal assets.

It will become attractive to manage liquidity needs by holding marketable assets if the cost of using the markets for these claims falls below the opportunity costs of holding cash and bank deposits. Costs in a secondary market consist of three elements:

- (i) fees, commissions and stamp duties,
- (ii) the difference between the bid and the ask price, and
- (iii) the cost associated with the risk that the nominal price of the asset will change.

There are several reasons why the lowering of transactions costs in secondary markets will generate a greater volume of transactions in the secondary market, which may in turn lead to a virtuous circle of greater liquidity, more trading and still lower transactions costs. Firstly, *ceteris paribus*, marketable assets become more competitive with bank deposits, so that there will be an incentive to shift the focus of cash management to the secondary market. Secondly, and as a partial result of the first factor, there will be more transactions in the market and it will be easier for a buyer or seller to find a counterparty without changing prices. Thirdly, *ceteris paribus* the likelihood that speculative gains can be made by taking a position in a security rises as the spread between the bid and ask price falls. In order to be able to close out a long position at a profit, the selling price must rise above the purchase price and the chance that this will occur increases as the spread declines. A similar argument applies to closing out a short position. However the scope for making speculative gains may be reduced if the cut in spreads leads to increased trading and greater asset price stability.

3.4. Price formation in secondary asset markets

In order to be able to focus on the interaction between demand and supply, many standard theories of the operation of markets pay little attention to the exact way in which prices are set. The implicit paradigm underlying much of the analysis is an auction system or the traditional town or village market. However even in auction markets price determination is not completely costless since the auctioneer must be paid. And the law of one price will not necessarily prevail even in a village market.

It is possible to identify four types of price determination in secondary asset markets: negotiated pricing, "fixing", open outcry and market-making. This categorization is not exhaustive nor are the methods confined exclusively to asset markets, but it does embrace most of the pricing conventions used in secondary asset markets.

Negotiated pricing: This type of price determination is characteristic of markets which are thin. A typical example is the market for developing country debt. The line between firm quotations by market-makers and negotiated pricing is not always hard and fast. In volatile market conditions, market-makers sometimes increase the spread between their bid and ask prices, reduce the size of lots for which they quote firm two way prices and even switch to indicative quotation. In addition large deals may often be on a negotiated basis even when they pass through an exchange where different pricing conventions prevail.

"Fixing": Price "fixings" are found in markets and exchanges where the volume of trading is comparatively small either because the number of traders is limited or because the product in question is not part of a large homogeneous class. The principal advantage of this price determination method, which is essentially the same as the one used at auctions, is that it promotes the concentration of buy and sell orders that have accumulated over the course of the day (or other period) so that the price settled upon at the fixing is more

representative of underlying demand and supply conditions than if it were determined in thinner market conditions. It also serves as a reference for deals that are concluded at other times during the day either between major traders or between wholesale market participants and others. The twice daily fixing of the price of gold in the London bullion market is one example of "fixing". This way of determining prices used to be fairly common in minor securities markets where the volume of purchase and sale orders was small, but has receded in importance as the scale of business has expanded.

Open outcry pricing: This type of pricing is characteristic of exchange floors where continuous trading takes place. Despite the seemingly chaotic conditions, this arrangement allows those who have access to the trading floor to observe order flow, the reaction of both supply and demand to changes in price, and general market sentiment.

Market-making: This is not so much a way of setting prices as a market structure which affect price quotation. Its significance has been growing both because of the increase in the volume of transactions and because of technological changes which has made screen based quotation trading systems more competitive with exchange floors. In a "made market" firm purchase and sale prices are quoted by market-makers, and disparities between demand and supply often lead in the first instance to changes in stocks, with price adjustment occurring only when an imbalance is large. Examples of markets where prices are determined through the action of market-makers are those for Treasury bills and other government-issued paper, markets in actively traded shares, and futures and option markets.

It may be useful to discuss this last way of determining prices in securities markets - market-making - in somewhat more detail because it has become more widespread and because it has considerable implications for liquidity. Because the market-maker deals on both sides of the market, prices do not have to change for the market to clear, but

rather changes in the market-maker's stock - or in his open position - help to equilibrate supply and demand.

3.5. Market-making

A market-maker is distinguished from ultimate agents and other dealers by being ready to both buy and sell specific quantities at pre-announced prices. As such he provides liquidity or, as some observers call it, "immediacy" to the market by obviating the need for ultimate agents and dealers to alter the price or to wait until a counterparty willing to take an equal and opposite position is found.

By undertaking to buy and sell to any and all comers, a market-maker runs the risk that he will be compelled to take a position - long or short - in the security in which he makes a market. To be sure, he may be able to "cross" orders, i.e. to match buy and sell orders from third parties, so that he does not have to alter his own holdings. This crossing is most likely when the volume of orders is substantial, which helps to explain why market-making tends to be undertaken by large houses with a considerable volume of business in the security in question. It is also an argument for the specialist system found in some markets (e.g. the New York Stock Exchange) where there is only one market-maker for each security. Since there is generally some risk associated with taking an open position, crossing will be advantageous. It will allow the market-maker to economize on the inventory that must be held and on the capital that must be dedicated to the assumption of an open position. Crossing may also be profitable if the bid-ask spread contains a premium compensating the market-maker for the risk associated with taking an open position.

A market-maker may hold an inventory (trading portfolio) of the security in question in order to satisfy orders which cannot be crossed. Whether he does or not depends on his (a) ability to obtain the security at short notice by

purchasing it in the primary market or borrowing it from those who are naturally "long" in the particular claim, and (b) beliefs about changes in prices of that security and of alternative investments. If the market-maker holds an inventory largely as a by-product of his activity as a market-maker and not because of views about likely shifts in the price of the asset, his earnings will have to compensate him for the risk associated with this enforced "long" position. On the other hand, if his constant dealing in the market gives him information to which others are not privy, he may be in a position to adjust his inventory in a profitable manner.

A market-maker can be seen as confronting three types of costs:

- (i) the fixed costs associated with being prepared to buy and sell at any moment;
- (ii) the variable costs associated with carrying out the transaction;
- (iii) the costs associated with having sometimes to accept an open position owing to his undertaking to deal on both sides of the market.

The income that a market-maker can expect to derive from this activity consists of fees and commissions, the bid-ask spread on crossed transactions, the difference between buying and selling prices relating to the assumption and closing out of open positions, the rents associated with privileged access to information such as that relating to order flows and limit orders, the profits arising from the management - or manipulation - of the price of the security, and earnings from ancillary business obtained as a consequence of making markets (e.g. lead managing new issues in the primary market). This latter source of income may be quite important. It also explains the cross subsidization of securities market activity that is frequently encountered.

Given this complex skein of costs and income, it is hardly surprising that the pricing of market-making services is neither easy nor transparent. It is also something that is complicated by the interrelationships between the different cost and income components. For example, stabilization of the price of the asset in the secondary market by the market-maker may enable him to win new mandates in the primary market. Market-making and price stabilization tend to lower the borrowing costs encountered by issuers because they then do not have to compensate the lenders for holding illiquid paper or paper whose price fluctuates wildly. The issuer may feel inclined to place new securities of a similar type through the same securities house in partial compensation for, and further inducement to provide, the stabilization and market-making services that lower borrowing costs.

The externalities which are associated with market-making and underwriting and which lead to the cross subsidization of these two activities can cause a conflict to emerge between the provision of liquidity through market-making and the promotion of efficiency through correct pricing when market-making and underwriting are handled by one and the same securities house. The line between legitimate price stabilization that promotes liquidity and market manipulation where prices are kept away from their "natural" level by the actions of a dominant trader is by no means clear. Market manipulation in the form of short-selling, bear squeezes and ramping can and does occur. Not only does this cast doubt on the explicit or implicit contractual relationships between market participants but it also may undermine confidence in the efficiency of the market.

One way to deal with this problem is to reduce the scope for market manipulation by increasing the number of market-makers. However, the greater the number of market-makers is, the lower the likelihood of cross trades, which raises the probability that the market-maker will have to accept an unexpected and unwanted open position. Since this

in turn may augment risk and the need for capital, market-makers may be inclined to raise fees and margins which could lead to a vicious circle of lower volumes, fewer cross trades and further increases in costs.

3.6. Quotation, contracting and counterparty integrity

Technology had done much to alter the nature of the exchange. Before the advent of electronic systems, the concentration of trading in a single place and often at a single time (the "fixing") promoted liquidity by increasing the number of potential counterparties and limiting the scope for price manipulation by a sly broker or a dominant trader.

With the advent of advanced telecommunications and computer technology, the exchange floor has lost many of its earlier advantages relative to the screen in a dealing room. This seemingly small shift in the locus of trading has considerable implications for stability, price formation and liquidity because it makes it possible to "unbundle" the three main phases of secondary market trading: price dissemination, contract establishment and settlement.

Confirming the integrity of the counterparty takes on new importance in these conditions. When trades take place exclusively on an exchange floor, the fact that only members who must meet certain standards are able to trade on the floor, ensures a certain minimal level of counterparty integrity for wholesale market transactions. The member of the exchange in turn vets counterparties to retail trades, thereby assuring their integrity. When trading takes place 24 hours a day with counterparties located around the world, traditional methods may cease to be sufficient.

A counterparty may fail to perform for a variety of reasons: bankruptcy, deceit, negligence. Reducing credit risk is one way to promote counterparty integrity, and the earliest and most extensive secondary markets emerged in paper with the lowest credit risk. Moreover, active markets in higher risk

paper, such as mortgaged backed securities, only arose after guarantees had been provided.

Another way to promote counterparty integrity is to place an exchange between the ultimate counterparties. For example in the United States all futures contracts must be traded on recognized exchanges. The exchange in fact stands between the ultimate agents and lays down rules that ensure that the various counterparties are able to meet their obligations, the most important one being margining. In these circumstances, the reason for the existence of the exchange has little to do with improving price formation through the spatial and temporal concentration of orders.

In some cases the relative advantages of screen based trading systems may be overwhelming. Here it is useful to distinguish between

- (i) systems which provide information only *ex post* after conclusion of various deals,
- (ii) systems in which the prices are only indicative, and
- (iii) systems where the quotations reflect firm commitments to buy and sell at the prices shown.

In all cases there will have to be proper contracting (order confirmation) and settlement procedures.

The reason why these differences are important is that they have different implications for the diffusion of information about demand and supply and for the ability of a market participant with such information to use it to his advantage. When there is little diffusion of this information, the market-maker has more scope for using his knowledge of order flow to set prices for his own benefit. He may also set different prices for different trades and expropriate the consumers' surplus.

One way to avoid this is to lay down rules and regulations regarding the type of information that can be shown in a screen quotations system. Traditionally open outcry pricing on exchange floors has ensured that at least some

other major market participants have much of the same information so that market-makers have been constrained in the extent to which they could exploit their information on market conditions.

Limit orders: Another way to deal with this problem is to mandate or encourage the use of limit orders. In this way the normal market participant is pitted against the market-maker who is then prevented from making super-normal profits by the trading activities of other entities.

A limit order is a standing order given to a broker by some agent, generally not a market-maker, to buy or sell a security when it reaches a particular price. Although an ultimate agent cannot make a profit by arbitraging if the price of the security does not move outside of the band given by the spread between the bid and ask price, once it does he can earn a profit by placing buy and sell orders astutely. Such a strategy, however, presumes that the agent is willing to go long or short on a security when he believes that the price will tend to move up or down. If he believes that the price is merely fluctuating around its current level but with an amplitude outside that given by the bid-ask spread, his position will be only transitory.

Although the existence of limit orders reduces the scope for market manipulation by the market-maker, it may provide him with the opportunity to make a profit without assuming particularly high risks. When the market-maker has limit orders on his books, he has privileged information on the strength of demand and supply at different prices and more scope for executing crossed trades.

3.7. Clearing and settlement

When the volume of transactions increases and secondary markets are used for managing liquidity needs, it is essential to have efficient clearing and settlement systems. In some countries it has taken weeks for securities transactions to be

settled and only recently have steps been taken to improve conditions.

In addition when the volume of transactions grows so large that different counterparties have cause to net various transactions one against another and only settle for the difference, the stability of the clearing system may come to have systemic implications, particularly if the netting arrangements are not simply bilateral but are multilateral, extending to many participants in the market.

3.8. The role of the authorities

There are a number of ways in which the authorities can foster systemic liquidity in the secondary market. They can influence the terms on contracts traded in the market; they can affect transactions costs by imposing or abolishing stamp duties and rules regarding minimum commissions; they can influence the amount of competition in the market through their policies towards entry and collusion; they can influence the stability of asset prices by the way they choose to implement monetary policy; and they can affect the attitude of market participants and the public at large to the integrity of the market through the regulations they lay down regarding disclosure, insider trading and self dealing.

Although market forces will do much to promote standardization, the authorities can still help. As important issuers of high quality paper, their decisions about the terms on their own debt greatly influence those on other securities entering the market. Interest rates on government debt often serve as a benchmark for paper issued by other entities. Moreover, as a neutral arbiter the government can encourage the market to employ reference rates such as LIBOR to which other rates are linked or to reduce the size of the minimum denomination.

Active encouragement of standardized terms may be needed in markets dominated by banks which feel that the emergence of a deep secondary market will undermine their position as the dominant suppliers of liquidity in the form of low interest demand deposits. It is perhaps no coincidence that active securities markets have been much slower to develop in countries like Germany and Switzerland where underwriting and brokerage are controlled by universal banks which benefit from the fact that households and companies manage their liquidity needs by holding funds in comparatively low interest deposit accounts. In Germany even the establishment of common conventions for quoting bond interest rates was a slow and laborious process.

Decisions on stamp duties and minimum commissions greatly affect the volume of transactions in the secondary market. If, as was argued above, there are positive externalities associated with a deep and active secondary securities market, collecting revenue through the imposition of what appear to be fairly innocuous stamp duties may in fact be counterproductive. They may reduce or even eliminate the positive externalities associated with a well functioning secondary market. In addition, because exchange control is now being dismantled in the handful of industrial countries that have not already abolished it, such duties may drive business to other financial centres.

Policies with respect to entry and collusion are particularly important in shaping the structure of the secondary market. One argument for restricting the number of market-makers is that this fosters the positive externalities associated with a deep and active market. Market-makers will then be able to earn sufficient profits to quote firm two way prices, and markets will clear with less price volatility than would otherwise be the case.

Although there may be some social justification for imposing restrictions on entry, there are also some obvious dangers. If the secondary market is controlled by a few major

houses, the threat of price rigging grows. In addition, spreads may be larger and commissions and fees higher, not simply because securities houses must earn sufficient profits to justify committing capital to market-making, but also because competition is lax. Market-makers themselves will lobby for restrictions on entry which enable them to earn quasi-monopoly profits. Since there is a long history of concentrated interests succeeding in capturing bureaucracies and winning political battles, a strong case can be made for liberal policies towards entry. In this case the amount of market-making will ultimately be determined by the return on the capital devoted to this activity. This in turn will depend on two factors which the authorities can influence: the volatility of interest rates and the ability of market-makers to predict them.

Interest rate volatility is greatly affected by the procedures used to implement monetary policy as well as by the exchange rate policy being pursued by the country. The experience in the United States between 1979 and 1982 demonstrated that using reserve aggregates as operational targets makes interest rates fluctuate much more than using interest rates or an interest rate proxy as the principal operational target. Similarly a number of countries' experience shows that large fluctuations in short-term interest rates may sometimes be needed to keep exchange rates stable. Consequently, one of the many factors that should be taken into account when deciding upon the best way to implement monetary policy or on what exchange rate policy to pursue is the implications of these decisions for continuous market-making and the preservation of the positive externalities associated with a deep and efficient securities market.

The access of market-makers and other market participants to information which can be used to divine changes in market sentiment can be influenced by rules regarding disclosure and price quotation. Although price

quotations systems are often privately provided, the authorities frequently vet or sanction the systems and sometimes are actively involved in their design. In addition, because of the externalities associated with the continued functioning of the market, there may be a case for the public provision of clearing services or at least for the determination of minimum standards in this area by the authorities.

Finally, general attitudes of the public and of market participants toward the markets will influence their propensity to manage liquidity in them. If it is generally believed that insider trading is rampant and that the market is being manipulated, market participants will be reluctant to turn to these markets. For this reason measures designed to protect the investor may indirectly promote systemic stability.

4. Conclusions

Secondary markets for financial assets have become so important that their continued efficient operation in the face of shocks is now essential for the maintenance of the stability of the financial system. The rationale for maintaining confidence in these markets is the same as for ensuring the soundness of the banking system. Substantial real economic losses will be incurred if the integrity of either the banking system or the securities markets is seriously compromised.

Just as the confidence of the public in their ability to withdraw deposits at any time allows banks to fund medium and long-term loans with short-term deposits, so does confidence in the ability to sell a financial asset easily, quickly and cheaply make it possible to hold marketable claims of varying maturities to satisfy short-term liquidity needs. A well-functioning secondary market, like a well-functioning banking system, augments the availability of investment finance, thereby fostering economic growth. Preserving these externalities is a principal aim of maintaining systemic stability.

Although the authorities may in some circumstances be well advised to step in and act as a "market-maker of last resort" for the secondary securities markets, moral hazard makes it counterproductive to announce before the fact the exact conditions on which such support will be provided. It is, however, possible and useful to consider what market structures are robust and what can be done to promote their emergence.

Because market depth will be greatest when there are a limited number of negotiable, standardized, low credit-risk assets of short maturity that are highly substitutable one with another, the issuance of such instruments should be allowed and even encouraged. Market forces will often be

enough to achieve this, but the authorities can assist by judiciously choosing the terms they set for their own issues and by preventing excessive collusion in concentrated markets.

Since the use of the secondary market to manage liquidity needs depends on transactions and related costs, anything that reduces these costs tends to promote liquidity. Three factors that are relevant in this context are stamp duties, the organization and structure of the market and the underlying stability of interest rates.

Although stamp duties are a long-established, relatively obscure and sometimes important source of revenue, it may be counterproductive to levy them. First of all, if such duties reduce the volume of transactions in the market, they may undercut the potentially substantial positive externalities associated with a well-functioning secondary market. Secondly, given the trend towards the abolition of capital controls and the ease with which transactions can be conducted in foreign markets, such taxes may simply drive business to other financial centres.

Policies towards market access, collusion and the exploitation of proprietary information by securities houses will greatly influence fees, spreads and the amount of market-making. Sufficient competition is needed to keep fees and spreads low, but securities houses should be able to earn enough to justify committing capital to market-making. This latter activity increases liquidity by ensuring that adjustment first takes place in the market-maker's inventories or open position rather than leading immediately to changes in prices. Seemingly insignificant conventions and rules will affect the propensity to make markets. For example, securities houses will be more inclined to make markets if price quotation systems are "indicative only" and they are able to exploit their information on consummated trades, order flow and the activities of particular counterparties. One way to prevent use of such information from undermining confidence in

the market is to allow or encourage the placing of limit orders by outsiders.

The general volatility of interest rates has a considerable bearing on whether the position-taking associated with market-making is profitable. Some degree of fluctuation will increase demand for a market-maker's services but excessive volatility may augment risk so much that it ceases to be feasible to quote firm two way prices. The type of money market operating procedures adopted by the authorities as well as the exchange rate regime and the overall stability of economic conditions will therefore affect the amount of market-making.

Table 1

**MARKET VALUE OF EQUITIES OF DOMESTIC COMPANIES LISTED ON THE WORLD'S
MOST IMPORTANT STOCK EXCHANGES**

(in billions of US dollars)

	1982	1983	1984	1985	1986	1987	1988
New York	1,259	1,522	1,758	1,883	2,128	2,132	2,366
Tokyo	417	546	644	948	1,794	2,726	3,789
Osaka	370	468	545	803	1,549	2,348	3,299
London	196	226	236	353	473	680	712
Germany	69	83	78	184	258	218	251
Toronto	104	141	135	157	185	219	241
Paris	30	38	41	79	153	156	223
Zürich	39	44	40	84	129	133	140

Source: Fédération Internationale des Bourses de Valeurs (FIBV).

Table 2

**MARKET VALUE OF BONDS AND DEBENTURES LISTED ON THE WORLD'S
MOST IMPORTANT STOCK EXCHANGES**

(in billions of US dollars)

	1982	1983	1984	1985	1986	1987	1988
New York	766	898	1,022	1,339	1,458	1,621	1,561
Tokyo	306	361	371	513	772	1,052	1,139
Osaka	297	350	358	492	739	1,016	1,101
Luxembourg	-	154	252	338	428	567	677
London	234	242	241	339	448	529	558
Paris	116	118	128	200	290	364	365
Zürich	62	62	57	81	118	158	147

Source: Fédération Internationale des Bourses de Valeurs (FIBV).

Table 3

**VOLUME OF TRADING IN EQUITIES OF DOMESTIC COMPANIES LISTED
ON THE WORLD'S MOST IMPORTANT STOCK EXCHANGES**

(in billions of US dollars)

	1982	1983	1984	1985	1986	1987	1988
New York ¹	488	765	765	970	1,389	1,874	1,356
Tokyo	147	231	285	388	948	1,734	2,228
Osaka	18	35	52	62	128	240	269
London	33 ¹	43 ¹	48 ¹	76 ¹	113	427	290
Germany	14	33	30	83	117	373	350
Toronto	14	24	20	32	35	84	55
Paris	7	8	8	17	44	79	66

¹ Domestic and foreign equities.

Source: Fédération Internationale des Bourses de Valeurs (FIBV).

Table 4

**RATIO OF TRADING VOLUME TO THE MARKET VALUE OF EQUITIES
LISTED ON THE WORLD'S MOST IMPORTANT STOCK EXCHANGES**

	1982	1983	1984	1985	1986	1987	1988
New York	0.39	0.50	0.44	0.52	0.65	0.88	0.57
Tokyo	0.35	0.42	0.44	0.41	0.53	0.63	0.59
Osaka	0.05	0.07	0.10	0.08	0.08	0.10	0.08
London	0.17	0.19	0.20	0.22	0.24	0.63	0.41
Germany	0.20	0.40	0.38	0.45	0.45	1.70	1.39
Toronto	0.13	0.17	0.15	0.20	0.19	0.38	0.23
Paris	0.23	0.21	0.20	0.22	0.29	0.51	0.30

Sources: Tables 1 and 3.

Table 5
CROSS-BORDER TRANSACTIONS IN SECURITIES (a)

	1980	1986
1. Net purchases of foreign securities by residents of:		
France	7.9	10.3
Germany	15.1	19.8
Japan	3.9	48.4
Netherlands	- 6.3	161.2
United Kingdom	26.8	124.3
United States	2.2	0.6
TOTAL	6.1	16.9
2. Non-resident net purchases of domestic securities issues in:		
France	9.1	13.4
Germany	1.7	71.1
Japan	13.5	0.3
Netherlands	111.6	41.4
United Kingdom	12.5	48.9
United States (b)	5.1	13.5
TOTAL	8.9	14.5

- a) Ratio of cross-border transactions in securities to net issues on domestic securities markets. Data include new issues and redemptions as well as secondary market transactions.
- b) Excluding net purchases of US securities by foreign official institutions, i.e. central banks, etc.

Source: OECD.

Table 6
TRANSACTIONS TAXES IN SELECTED COUNTRIES

Belgium	Stamp duties ranging between 0.07% and 0.35% levied on transactions in bonds, shares and government stock.
Canada	None
Denmark	1% stamp duty on transactions in shares, normally one half paid by seller, one half paid by buyer.
France	Stamp duty levied on transactions not conducted through authorised exchanges. Rates: - value of transaction \leq FFr 1,000,000 : 0.30% - value of transaction $>$ FFr 1,000,000 : 0.15% 18.6% value added tax levied on brokers' fees and commissions.
Germany	Transactions in securities, even when not executed on an exchange, are subject to a transfer tax. Rates: - shares, domestic corporate bonds, foreign bonds 0.25% - investment certificates 0.2% - certain domestic bonds (gov't, mortgage banks) 0.1% Only half the tax is levied on transactions with non-residents. No tax levied on transactions: - between banks and brokers, - on public authority book entry bonds.
Greece	None
Ireland	1% stamp duty on transactions in shares, paid by the buyer.
Japan	Levied at varying rates on seller of securities; rate set as a percentage of the value of the securities transferred.
Luxembourg	None
Netherlands	1.12% with a maximum of NLG 1,200 per transaction. Revenue: NLG 90 million.
Sweden	2% tax shared equally between buyer and seller is levied on trading in shares, convertibles and options.
Switzerland	Levied on transactions taking place in Switzerland when one of the contractual parties is a domestic securities dealer. Stamp duty: domestic paper securities: 0.075%, foreign securities: 0.15%. Cantonal tax: 0.01%.
United Kingdom	Stamp duty: 0.5% charged on market value of the transactions in shares and paid by the buyer. Stamp duty reserve tax: charged on certain transactions which do not attract stamp duty (when no physical delivery takes place). Government securities do not attract the above taxes. 15% value added tax levied on commissions and fees when the transaction is executed by an agent for an individual or institution which is a UK entity or an individual resident in the EEC.

Source: International Society of Securities Administrators Handbook.
Committee of Stock Exchanges in the European Community.

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