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Financial Innovation: Macro-economic and Macro-prudential Consequences¹

By Andrew Crockett, Basle²

I. Introduction

Capital market innovation is not, I suspect, a subject that generates a great deal of interest or excitement in the Konstanz seminar. This is probably because the focus of attention here is unashamedly macro, and market structure issues are generally viewed as heavily “micro”.

Coming from a macro background myself, I have a certain sympathy with this reaction. I have never been able to summon up a great deal of enthusiasm for the painstaking analysis of micro foundations, important though these undoubtedly are. But my new responsibilities at the BIS have made me forcefully aware of how much macro-economists take for granted in market behaviour that perhaps we ought to examine more closely. For example, while we generally assume that new market instruments may improve market efficiency or liquidity, we rarely ask whether they can change the price formation process or alter the response of the economy to policy measures or external shocks. And we do not see changing market structures, by themselves, as creating potential new systemic risks that may have implications for macro-economic policies.

This enables monetary economists to continue to work within familiar paradigms relating, for example, to the stability of the demand for money and the constancy over time of the transmission mechanism of monetary policy. I do not want to argue here that these paradigms are necessarily wrong. But I do want to suggest that financial innovation has potential implications that extend well beyond its impact on efficiency within individual markets.

¹ A paper presented to the 25th Konstanz Seminar on Monetary Theory and Monetary Policy, Insel Reichenau, 26th May 1994.

² General Manager, Bank for International Settlements, Basle. Thanks are due to colleagues, particularly Svein Andresen, for helpful comments on an earlier draft.

The past two or three decades have seen accelerating change in financial markets. Financial centres are now more tightly bound together by instruments that link market centres and segments. The combination of financial innovation and dramatically lower transactions costs have enormously increased the volume of financial transactions relative to real economic activity. They have also increased the ratio of actual and contingent claims within the financial system to underlying levels of saving and investment.

These trends have clear implications for issues such as the safety and soundness of the financial system, and the manner in which financial markets transmit price signals to the real economy. It is these issues that I intend to deal with here. I will not, however, focus on prudential matters that arise at the level of the individual firm. These are very important, but are already well recognised and are the subject of much study and debate.³ I will concentrate instead on two broad issues of a macro-economic character: whether financial innovation risks leading to systemic instability in the financial system; and whether innovation has brought about changes in the ability of central banks to achieve and maintain price stability.

I begin by reviewing some of the factors that have contributed to financial innovation and how this innovation has manifested itself. This is the *factual background*. I go on to consider the implications of new market structures for the transmission of financial disturbances among institutions and markets. These are the “*macro-prudential*” aspects of financial innovations. And I conclude by examining the ways in which new financial instruments might affect the operation of monetary policy. This is the “*macro-economic*” element of the title. In the course of my remarks, there will be a number of suggestions for further work. At the risk of revealing the story ahead of time, I should admit at the outset that there are more suggestions for further work than there are firm conclusions.

II. Background

For over thirty years, the process of capital market integration has been driven by mutually reinforcing trends of deregulation and innovation. They have been mutually reinforcing because deregulation has

³ “Derivatives: Practices and Principles”, Report of the Global Derivatives Study Group of the Group of Thirty, Group of Thirty, July 1993; “Derivatives: Report of an Internal Working Group”, Bank of England, April 1993.

made new financial instruments possible, while financial innovation has undermined controls by enabling market participants to get round existing regulations or making them very costly to maintain.

The first such example was the growth of the Euro-dollar market in the 1960s. The motivation for the early growth of the market was to avoid actual or potential restrictions on US dollar holdings in the United States. Once the market had started to grow and spread to other currencies, it became clear that capital market regulations in domestic markets were no longer having the intended effect, but were serving mainly to drive business offshore.

Another potent driving force behind financial innovation has been the growth of financial uncertainty. Uncertainty generates the search for financial instruments to hedge against the attendant financial risks. With the passing of the post-war period of low inflation and interest rates and stable exchange rates, financial conditions have become much more uncertain. Since the late 1960s, inflation has been at higher rates and more volatile than it was in the first two decades of the post-war period. Flexible exchange rates have been the norm among major currencies since the breakdown of the Bretton Woods system in the early 1970s. And interest rates too have become more volatile, as monetary policy has been more actively used as the central tool of macro-economic stabilisation.

Coincident with growing financial uncertainty, the growth in institutionalised savings and in the share of wealth held in marketable form has also increased the demand for risk management tools. Securitised investments, by their very nature, are more directly exposed to financial uncertainty than traditional savings vehicles. As financial institutions have grown increasingly aware of the range of risks that affect their balance sheets and the performance of their clients' holdings, they have sought ways of managing this risk. Initially, this process was reflected in the rapid growth of the interbank market and in the trading of primary assets. Interbank claims and liabilities, taken on to manage funding mismatches and market risk, grew much faster than banks' final lending, and turnover in securities markets increased greatly in relation to issuance in them. But interbank claims have a number of drawbacks. First, they inflate the balance sheet and lead to an accumulation of credit risk against which capital must be held. And second, where the hedging of complex risk requires the simultaneous purchase and sale of a number of primary assets, it may involve sizable transactions costs and place pressure on liquidity in the relevant cash markets.

The increasing sophistication of risk management was given further impetus by the development of capital adequacy standards for banks in the late 1980s. Since risks that are not hedged have to be covered by capital, and since capital is the ultimate scarce resource for a financial institution, risk management techniques which minimised credit exposures moved to centre stage of banks' activities.

All the above factors have provided incentives for the development of derivative instruments. Derivative instruments are a means of unbundling risks into their elemental components, and then pricing and trading them separately or in specially tailored combinations. Derivatives do not, for the most part, provide brand-new risk characteristics or hedging properties. But they are a much cheaper and more targeted way of enabling agents to hedge against risk elements they wish to avoid, while accepting positions in which they feel the returns outweigh the costs. Moreover, they can be constructed in a way that minimises credit risk and the associated need to hold capital.

There can be little doubt that financial innovation has contributed to a greater awareness of risk characteristics, both inside the financial community and beyond, and thereby improved risk management practices. At the same time, the lower costs of hedging and position-taking has increased the ability of the financial system to respond to the desire of economic agents to manage their risk profiles.

There are no very reliable statistics on the size of derivative markets. Figures collected by the BIS show that the nominal value of outstanding derivatives contracts had risen from about \$2.6 trillion in 1988 to over \$10 trillion in 1992.⁴ This figure is likely to exceed \$13 trillion in 1993. While these figures give a fair impression of the rate at which the market has expanded, notional values are a misleading indication of economic significance, since they are far in excess of the market values of contracts. (Indeed, apart from options, most contracts generally have a zero value at their inception, since they involve an exchange of claims of equal present value.) A reasonable guess might be that the market value of outstanding derivatives contracts was not more than 2% of the total notional value. Nevertheless, even this much reduced figure is now quite significant in relation to the capital of financial institutions. Moreover, as the well-documented recent experience of a number of specialised investment vehicles (such as hedge funds) has shown,⁵ it is not impossible

⁴ BIS Annual Report, 1993.

⁵ Financial Times, 15th and 21st April 1994.

for losses to mushroom quickly even in circumstances where the portfolio manager thought his exposure was well hedged.

The significance of all this for the points to be made in the remainder of this paper is as follows: first, the volume of contingent liabilities and claims used to manage risks in financial portfolios has grown very large in relation to the capital of the institutions concerned. This is not necessarily a source of systemic risk in itself, but it places a high premium both on the prudent management of individual portfolios, and also on the maintenance of safeguards against systemic contagion. Second, the great increase in the ease of hedging and position-taking may well have changed the response of the private sector to the kinds of monetary policy stimuli the authorities have used hitherto to steer the economy.

III. Macro-prudential Considerations

Macro-prudential risks can be distinguished from micro-prudential risks in the following way: micro-prudential risks are those that arise at the level of the individual firm, threatening the interests of individual stakeholders in the firm; macro-prudential risks are those that facilitate the transmission of disturbances among firms, and thereby threaten a crisis at the level of the system as a whole. Put more precisely, macro-prudential or systemic risk is the risk that an individual disruption (whether at a firm, in a market segment or in a settlement system) might cause widespread difficulties at other firms, in other market segments or in the financial system as a whole.

A systemic crisis can be defined as a disturbance that severely impairs one of three key functions of the financial system: credit extension, settlements or the pricing of financial assets.⁶ A systemic crisis of this sort would have wide-ranging potential consequences for the real economy as well. Not only would the resultant uncertainty directly reduce economic activity, the relationship between monetary policy instruments and economic responses would be disturbed, thus hampering, possibly for a prolonged period, the process of monetary policy formulation.

Systemic risk can, in principle, arise from a variety of sources. It need not be preceded by an easily identifiable shock. Threats of systemic risk have arisen in the past when longer-term financial trends became unus-

⁶ A systemic crisis may or may not be the result of a market failure; however, in a systemic crisis, a failure of markets will generally be present.

tainable, revealing positions that once appeared profitable to be unprofitable and illiquid. (The stock market crash of 1987, and the bond market setback of early 1994 are two examples of this, although in neither case did the emergence of systemic risk develop into a full-scale crisis.) However, systemic risk can also arise from the sudden default of a key market participant, or any development that causes liquidity difficulties for one or more important market participants.

Clearly, one source of systemic risk lies in a generalised inadequacy of the risk management practices of individual firms. This is an important subject, but it has been well aired in much previous writing on the subject, and I will not consider it further here. Rather, I will be concerned with the possibility that apparently prudent behaviour on the part of individual market participants may be insufficient to ensure stability at the level of the system as a whole. If this were found to be the case, it would constitute a market failure calling for countervailing official action.

I will group the concerns that have been raised about the functioning of derivatives markets under seven heads. Each of these represents a possible source of risk that is hard or impossible for an individual market participant to avoid through adapting its own behaviour. They are not, it should be stressed, sources of immediate threat to the market; rather they are potential sources of strain that call for attention to ensure they are well under control.

A first concern relates to liquidity. Complex financial instruments require active hedging strategies on the part of market-makers which in turn are predicated on continuous liquidity in the market for underlying risk. This indeed is a reasonable assumption for an individual intermediary under most circumstances. However, market-making in a number of market segments is concentrated on a small number of participants. A temporary retrenchment by one of these market-makers could therefore have a significant impact. In unsettled circumstances market-makers could also be affected by “one-way” market movements that resulted in price breaks. Liquidity weaknesses to date have been most apparent in options markets, which seem more susceptible to supply/demand imbalances than other derivatives markets.

Sudden erosions of liquidity in derivatives markets can leave participants with unintended market risk exposures, thus putting pressure on otherwise well conceived risk management strategies. In extremis, this could force a liquidation of underlying positions and thus propagate volatility across markets. An impaired ability to manage exposures

during episodes of market illiquidity could also make firms more vulnerable to other shocks. This is important because, as the experience of several recent episodes has taught, periods of illiquidity can often be associated with broader episodes of financial stress.

A second area in which the development of derivatives markets raises questions for market functioning is the potential for *increased price volatility and disruptive price dynamics*. Although most empirical evidence⁷ suggests that derivatives contribute to a reduction in price volatility in normal times, this may not hold true when market conditions are unsettled. The low transaction costs and relative ease of establishing leveraged positions in derivatives markets, when combined with the general lack of information on aggregate positioning undertaken in them, can heighten the possibility that institutions may collectively and unknowingly build exposures that cannot in the aggregate be adjusted without a disruption to liquidity and price formation in both derivative and underlying markets.

Disruptive price dynamics can also arise from the dynamic hedging of aggregate options positions. Dynamic hedging of short options positions can accentuate price movements by requiring sales (potentially on an increasing scale) of underlying assets into a falling market, and their purchase in a rising market.⁸ If there is a high degree of concentration of the strike prices in underlying options positions, an initial price shock can be accentuated and propagated by positive feedback effects associated with dynamic hedging. The role of portfolio insurance strategies during the decline in US equity prices in the October 1987 crash has been seen as an example of the destabilising potential of dynamic hedging. Further examples can be found in the events surrounding the September 1992 turbulence in the ERM and the February 1994 decline in bond markets.

Third, *lack of transparency* in derivatives markets means that firms do not necessarily have an accurate picture of counterparties' exposure profile, or indeed even of the qualitative nature of their risk management practices. This leads to dangers of two sorts. One is that unfounded

⁷ A useful survey, although confined to the effects of exchange-traded markets, is Damodaran and Subrahmanyam, "The Effects of Derivative Securities on the Markets for the Underlying Assets in the United States: A Survey", in *Financial Markets, Institutions and Instruments*, Vol. 1, No. 5, 1992.

⁸ Genotte and Leland, *American Economic Review*, Vol. 80, No. 5, 1990; Grossman, *Journal of Business*, Vol. 61, No. 3, 1988; Leland, *Risk Magazine*, November 1992.

rumours will lead to an unwillingness to deal with an institution whose position is sound. (This situation threatened to arise with a major market participant in February - March 1994 and was averted only by recourse to unusual measures.) The other is that exposures will remain in place for too long while the capital of a troubled institution ebbs away. The lack of transparency of firms' derivatives activities can be blamed in part on accounting standards. Only limited guidance for the recognition and measurement of derivatives exposure has so far been provided by the accounting profession. Moreover, accounting standards vary greatly across countries, as do philosophies regarding the extent of information that should be publicly disclosed. This has made it difficult to compare the derivatives exposure of firms headquartered in different countries.

Fourth, systemic risk could arise from the closer *market linkages* that capital market innovations have created. New instruments have facilitated strategies that straddle market segments, both domestically and internationally. This produces more efficient arbitrage and therefore greater market integration. Greater linkages between markets should in normal times diffuse the effects of price shocks and thus reduce their disruptive potential. In times of major stress, however, closer linkages could cause shocks to originate from, and be transmitted to, a wider range of markets than in the past. Cash liquidity requirements, which may reflect margin or collateral requirements arising from credit concerns, could be another source of market linkages.

A fifth concern is the presence of *unregulated players* as important participants in OTC derivatives markets. The recent episodes in which important losses have been made by large and well-known industrial companies, as well as by unregulated entities such as hedge funds, is a reminder of potential dangers in this area. Systemic risk, of course, only arises if key institutions in the financial system are endangered as a result of their exposure to companies making trading losses. However, with leverage high and transparency low, it is not surprising that the loss potential of unregulated players should be regarded with concern. Moreover, the fact that some of the most important market participants, the specialised derivatives products companies (DPCs) set up as subsidiaries of banks and investment houses, are in practice regulated only by the rating agencies cannot be regarded as satisfactory in the longer term.

Beyond these potential concerns about market functioning, a sixth potential weakness relates to the *legal environment* underlying derivatives markets. Enforceability risks became apparent in the wake of the House of Lords' ruling in the United Kingdom that swap transactions

undertaken by local authorities were ultra vires. Most enforceability problems have now been identified and steps have been taken to deal with them. Nevertheless, derivatives are still a relatively new phenomenon; as with any new activity, the legal environment has yet to be fully tested and developed.

Seventh, and last, questions can be raised about the robustness of *settlement systems*. Payments, clearing and settlement systems provide the infrastructure necessary to support financial activity and are important conduits through which stress at one firm or in one market may be transmitted to others. Settlement flows associated directly with derivatives are probably small in comparison with those arising from cash market transactions. Moreover, clearing houses for exchange-traded products have risk management systems to minimise the likelihood of individual defaults and limit knock-on effects. Nevertheless, the individual failure of a large clearing member, or a large price shock causing liquidity problems for several such members or their clients, could accentuate settlement problems in these markets. Moreover, certain aspects of risk management in exchange-traded markets (such as trading halts and margin calls) may impede the price discovery process and erode liquidity at times when these features of centralised markets are most needed. Finally, the spread of cross margining provisions (whereby the gain on one exchange can offset the loss on another) both nationally and internationally can contribute to the propagation of default risk.

I have catalogued these macro-prudential issues in some detail not because the financial system is in any imminent danger, but because they constitute the agenda for efforts to understand the behavioural features of new markets and to strengthen their underpinnings.

IV. Macro-Economic Considerations

This brings me to a subject that is perhaps of more direct interest to the Konstanz seminar – namely the macro-economic consequences of new instruments and market structures. There are, in principle, four ways in which the emergence of new financial instruments could have macro-economic consequences. *First*, the availability of additional hedging and position-taking instruments could affect the behaviour of economic agents, and their reaction to traditional price signals. *Second*, new instruments could affect the behaviour of markets, changing the speed and volatility with which prices respond to “news”. *Third*, capital market innovations could affect the reliability of monetary policy indica-

tors; making existing indicators more or less useful, and providing new indicators which may contain relevant information. *Fourth*, new developments may have implications for monetary policy instruments, through affecting the efficiency of existing instruments and possibly putting new instruments at the disposal of the authorities.

This is a wide menu of effects to investigate, and one that should provide a rich quarry for PhD theses in the years ahead. So far as I am aware, relatively little attention has so far been paid to these issues, either in the academic or the policy communities. What follows, therefore, constitutes little more than initial reflections on subjects that deserve much further research.

1. Implications for the behaviour of economic agents

The purpose of derivative products is to facilitate the assumption and transfer of risk. As noted earlier they do this by making it easier to decompose composite risks into their constituent elements, then to trade them separately or repackage them. For the most part, derivatives do not permit operations that could not be achieved by a combination of purchases and sales of primary assets. But they do enable such operations to be conducted at lower cost. Moreover, by heightening awareness of risk management possibilities, the development of derivatives markets has contributed to a change in behaviour on the part of economic agents.

Why should trading in risk among entities in the private sector affect macro-economic aggregates? It can be argued that the financial consequences of derivatives transactions are zero-sum for the private sector as a whole. This is true in the limited sense that the financial gains of those who make profits are the counterpart of losses elsewhere. But macro-economic consequences can arise from two features of these transfers. First, the trading of risk should increase the utility derived from a given expected stream of income (or, equivalently, reduce the economic cost of an expected payment stream). Second, given the heterogeneity of counterparties in terms of their risk preferences and the constraints they face, the economic responses of gainers may not be symmetric with those of losers.

The more efficient distribution of risk has two macro-economic consequences. The first is of a static character, affecting the distribution of resources at a given point in time. Those activities that had previously been limited by their riskiness should increase in importance relative to

those that are less risky. This should be particularly true for activities subject to interest rate and foreign exchange risk, both of which have become much easier and cheaper to hedge against with the advent of new instruments. Concretely, since risk is a characteristic of any forward contract, the reduction of risk should lead to a higher level of investment for a given level and volatility of interest rates than when risk reduction instruments were less available. The second macro-economic consequence is more dynamic in nature. To the extent that new instruments make it easier to hedge against unexpected developments such as changes in short-term interest rates, or currency depreciation or appreciation, they are likely to make private sector behaviour less responsive to such developments. On the one hand, this may make economies more stable in the face of outside disturbances; by the same token, private sector behaviour may become less responsive to traditional macro-economic policy instruments.

2. Implications for Market Behaviour

This changed responsiveness to the use of policy instruments may be reflected also in the behaviour of markets. Two aspects can be distinguished: the response of individual markets to “news”, and the extent to which different markets become integrated. It is not yet clear whether the development of derivatives markets enhances the efficiency with which markets move to a new equilibrium price level following the receipt of news. On the one hand, the lower transaction cost in derivatives make it cheaper to incorporate news into prices. Derivatives also add liquidity by bringing a greater range of participants into the market and making it easier to arbitrage inconsistencies between spot and future prices. This should help establish and stabilise prices at their new equilibrium more rapidly. On the other hand, certain instruments have potentially destabilising features. For example, as noted above, hedging strategies for option products can, under certain market conditions, have dynamic consequences that amplify price volatility. In the end, the balance of forces is probably an empirical matter. The relationship could be non-linear, however. It is conceivable that stabilising properties predominate under normal market conditions, but destabilising properties come to the fore when conditions are disturbed.

The second aspect in which derivatives may affect the behaviour of markets concerns linkages across market segments. There seems little doubt that derivatives, by increasing the scope for arbitrage operations,

help to unify markets. This has two macro-economic consequences, which again may work in opposite directions. First, disturbances in one market are more likely to be diffused. They may therefore have less marked effects than when they are “bottled up” in a single market segment. Second, in circumstances where confidence is fragile, it is conceivable that the increased capacity for shocks to be transmitted from one market to another could intensify their impact on the financial system and economic behaviour more widely.

Changes in the behaviour of markets, brought about by financial innovations, have obvious implications for the transmission mechanism of monetary policy. One can think of the transmission mechanism as having two major legs: the impact of policy instruments on other financial variables, and the impact of financial variables on real economic behaviour. The growing integration of markets has increased the linkages between short-term money markets and markets in other financial assets, but it has also made them more complex. Changes in the official policy stance no longer have direct and unambiguous effects on other markets, if indeed they ever did. An increase in short-term interest rates can produce either an offsetting or a sympathetic move in longer rates, depending on markets’ interpretation of its significance for the future stance of policy and inflation prospects.

Derivatives can also affect the leg of the transmission mechanism linking market interest rates to final expenditure. To the extent that monetary policy previously relied for its effectiveness on market segmentation, the increased linkages can moderate its impact. For example, if bank lending is predominantly at variable rates, an increased capacity to swap variable rate payments into fixed payments will reduce the impact of changes in short rates. More generally, of course, economic agents can protect themselves against uncertainties in the financial environment by “locking-in” interest rates and exchange rates for the time horizon that is relevant to their saving and investment decisions.

These developments could blunt the effectiveness of monetary policy, whether it operates through the interest rate channel or the credit channel.

3. Implications for Monetary Policy Indicators

Like all financial innovations, the growth of derivatives markets has implications for the relationship between financial variables used as indicators or intermediate targets of monetary policy, and the ultimate

economic variables which the authorities seek to influence. It is hard to be sure in advance either about the direction of any effect of financial innovation on the demand for money balances and even less on its magnitude. On the one hand, the growth in the volume of transactions that need to be settled might seem to imply a greater need for money balances. On the other hand, the greater capacity to hedge risks, and the ability of derivative instruments to transfer risks with minimal holding of underlying assets should make for economies in settlement balances.

This means that, at least in the transition period during which financial innovations are being incorporated into private sector behaviour, pre-existing relationships between money and credit aggregates and GDP will become less reliable. In principle, stable relationships should re-establish themselves once the period of innovation is over. In practice, however, it is possible to doubt whether such an “innovation-free” period is likely to persist for long enough to allow stable relationships to become again a practical guide for policy. At any rate, this is an issue that bears further study.

What of other indicators used by policy-makers? Financial prices, such as interest rates and other asset prices contain useful information about expectations and the user cost of capital. Knowledge of the manner in which these prices are determined, and about the quality of the information they convey, is of great importance to central banks. The growth of sizable derivatives markets alongside cash markets has in some cases shifted the locus of price formation and, as mentioned earlier, entailed possible changes in the dynamics of price adjustment. As yet, we do not know enough about the precise nature of these changes to understand whether they have meant that these prices contain more relevant information or whether, at times, excess volatility or misalignments have become more common. If the latter is the case, traditional price indicators will provide less valuable information for policy purposes.

Derivatives markets also provide opportunities to study the behaviour of new prices, and their predictive power over the variables which the authorities are anxious to influence. For example, swap and futures prices may present useful measures of directional expectations; option prices provide information on expected volatility; and changes in the relationship between put and call prices can indicate changes in market sentiment.

4. *Implications of Derivatives for Monetary Policy Instruments*

In principle, the development of new market instruments could influence the practical implementation of monetary policy in two ways: by changing the effectiveness of the traditional instruments of monetary policy; and by offering new instruments and markets in which the authorities could intervene.

The fact that intervention effects are more widely diffused has clear implications for the effectiveness of policy instruments. Specific effects in particular markets, which may have resulted from market segmentation, will be softened. On the other hand, the fact that monetary policy actions are more generalised may make it easier to apply monetary measures more forcefully, without fears for adverse effects in particular sectors.

What of the policy of intervening directly in new instruments? This has certain attractions, as the authorities can influence the risk portfolio of the private sector without generating unintended liquidity effects. For example, foreign exchange market intervention is typically sterilised in order to limit domestic liquidity effects. There is considerable debate about how effective sterilised intervention is.⁹ To the extent it has any effects, however, it must be because of changes in the foreign currency risk to which the private sector is exposed. It would be possible to achieve the same result through a derivatives transaction that presently requires a foreign exchange purchase accompanied by a sale of local currency securities to absorb the excess liquidity.

The danger in such an expanded use of derivatives is that it tends to conceal the costs of a policy that turns out to be unsustainable. Given the experience that exchange rate policies can sometimes be driven by political objectives, it is not obviously desirable to facilitate resistance to market pressures.

⁹ "Report of the Working Group on Exchange Market Intervention", January 1983, US Treasury, Washington; P. Catte, G. P. Galli and S. Rebecchini (1994) "Concerted Interventions and the Dollar: An Analysis of Daily Data", in P. B. Kenen, F. Papadia and F. Saccomanni (eds), *The International Monetary System*, Cambridge, 1994.

V. Conclusion

The purpose of this paper has been to open up issues for discussion, rather than to seek resolve them. The pace of change in financial markets has implications not just for the efficiency of financial intermediation, but more widely for macro-economic policies. Policies operate *through* markets. The changes that are taking place in markets justify a re-examination of some of the fundamental propositions on which macro-economic policy analysis has hitherto been based.

Summary

Financial Innovation: Macro-Economic and Macro-Prudential Consequences

The past two or three decades have witnessed accelerating change in financial markets, driven by the interaction of deregulation and innovation. The most recent series of innovations have been in the market for derivative financial instruments.

These developments raise questions for monetary authorities of both a macro-prudential and macro-economic character. Macro-prudential or systemic risk is the risk that an individual disturbance (whether at a firm, in a market segment or in a settlement system) might cause more widespread difficulties. The avoidance of systemic risk requires strengthened risk management practices in individual firms, as well as actions to improve the resilience of markets to outside disturbances.

Macro-economic issues arise from the possibility that the increased ease of position-taking resulting from derivatives will complicate the task of formulating and implementing monetary policy. Derivatives could influence the behaviour of individual economic agents or market dynamics. In addition, they could have implications for the reliability of economic indicators and instruments.

Relatively little is known about the precise channels through which derivatives can affect the efficacy of monetary policy. Even if there is no presumption that they hamper its implementation, additional research is desirable.

Zusammenfassung

Finanzinnovation: makroökonomisch und vorsorgerelevante Konsequenzen

Die letzten zwei oder drei Jahrzehnte waren Zeugen von sich beschleunigenden Veränderungen auf den Finanzmärkten als Ergebnis eines Zusammenwirkens von Deregulierung und Innovation. Die jüngsten Innovationsserien sind auf dem Markt für derivative Finanzinstrumente zu beobachten.

Diese Entwicklungen werfen für die Währungsbehörden Fragen auf, die sowohl für eine umfassende Vorsorge als auch makroökonomisch relevant sind. Bei umfassenden Vorsorge- oder systemischen Risiken handelt es sich darum, daß einzelne Störungen (durch ein Unternehmen, in einem Marktsegment oder in einem Abstimmungssystem) zu weiterreichenden Schwierigkeiten führen können. Die Vermeidung systemischer Risiken erfordert eine Stärkung der Risikomanagementpraktiken in einzelnen Unternehmen sowie Maßnahmen für eine größere Reaktionsflexibilität der Märkte auf Störungen von außen.

Makroökonomische Fragen können sich daraus ergeben, daß das durch derivative Finanzinstrumente begünstigte Beziehen von Positionen die Aufgabe komplizierter macht, Geldpolitik zu konzipieren und durchzuführen. Derivative Instrumente könnten das Verhalten von einzelnen Marktteilnehmern oder dynamischen Marktkräften beeinflussen. Darüber hinaus könnten sie Folgewirkungen für die Zuverlässigkeit von Wirtschaftsindikatoren und -instrumenten haben.

Man weiß nur relativ wenig über die genauen Wege, auf denen derivative Finanzinstrumente für die Wirksamkeit der Geldpolitik schädliche Folgen haben können. Auch wenn keine Behinderungen durch derivative Finanzinstrumente zu vermuten sind, ist zusätzliche Forschung zu diesem Thema dennoch wünschenswert.

Résumé

Innovations financières: conséquences macro-économiques et macro-prudentielles

Au cours des deux ou trois décennies précédentes, les changements sur les marchés financiers se sont accélérés, conduits par l'interaction de la déréglementation et de l'innovation. La série d'innovations la plus récente concerne le marché des instruments financiers dérivés.

Suite à ces développements, les autorités monétaires font face à des questions de caractère macro-prudentiel et macro-économique. Le risque macro-prudentiel ou systémique est le risque qu'une perturbation individuelle (que ce soit dans une firme, sur un segment de marché ou dans un système réglementé) puisse entraîner des difficultés plus générales. Pour éviter des risques systémiques, il faut renforcer les pratiques de gestion de risques dans les firmes individuelles, de même qu'améliorer la capacité d'adaptation des marchés aux perturbations extérieures.

Des conséquences sur le plan macro-économique émanent du fait qu'une plus grande facilité de réaliser des prises de position résultant des dérivés pourrait compliquer la tâche d'élaboration et d'application de la politique monétaire. Les produits dérivés pourraient influencer le comportement des agents économiques individuels ou la dynamique des marchés. De plus, ils pourraient avoir certaines implications sur la crédibilité des indicateurs et des instruments économiques.

On sait relativement peu sur les mécanismes précis à travers lesquels les produits dérivés peuvent affecter l'efficacité de la politique monétaire. Même s'il n'y a rien qui fasse supposer qu'ils entravent leur application, il n'en est pas moins souhaitable de faire des recherches supplémentaires sur ce sujet.