Swaps and Financial Derivatives: Risks and Returns*

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1. Introduction

In recent years "derivative" financial products have experienced a large expansion. New contracts are continuously being structured, offered to final users, exchanged among financial operators, serving the scope of risk diversification, while contributing to enhance the completeness of financial markets.

Also as a direct consequence of the low transaction costs involved in derivative transactions, these have reached and often surpassed in volume the underlying instruments that are traded in cash markets. According to BIS estimates, the outstanding notional principal of swaps in international markets was more than 4 trillion US$ by the end of 1991. By the same period, the *open interest of futures and options* contracts was equal to 1.7 and 0.7 trillion US$ respectively.[1] The total of derivative instruments traded both on organized exchanges and over-the-counter, at the end of 1991, outpaced the total of cross-border claims of BIS reporting banks (*cf.* Table 1). These statistics on open interest of futures and option contracts and on outstanding swap principals tend, however, to amplify the underlying economic dimensions of derivative markets, since underlying notional amounts are larger than position *values* at any given time.

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[1] The open interest in organized exchanges is defined as the sum of outstanding long (or equivalently short) positions of authorized members with the clearing house. The long (short) position of any agent in a given future or option contract is the positive (negative) difference between the cumulative total of contracts purchased minus contracts sold.

TABLE 1

MARKETS FOR DERIVATIVE FINANCIAL INSTRUMENTS

Notional principal amounts outstanding at end-year, in billions of US dollars equivalent[1]

	1986	1987	1988	1989	1990	1991
(a) Exchange traded instruments	583	725	1,300	1,762	2,284	3,518
Interest rate futures	370	488	895	1,201	1,454	2,159
Interest rate options[2]	146	122	279	387	600	1,072
Currency futures	10	14	12	16	16	18
Currency options[2]	39	60	48	50	56	59
Stock index futures	15	18	28	42	70	77
Options on stock index futures	3	23	38	66	88	132
(b) OTC traded instruments	500	867	1,330	2,402	3,451	4,709
Interest rate swaps	400	683	1,010	1,503	2,312	3,188
Long-term currency swaps[3]	100	184	320	449	578	822
Other derivative instruments[3,4]	–	–	–	430	561	699
Total of derivative instruments (a+b)	1,083	1,592	2,630	4,164	5,735	8,227
Memorandum item: cross-border plus local foreign currency claims of BIS reporting banks	4,031	5,187	5,540	6,498	7,579	7,497

[1] The notional principal of swaps corresponds to the hypothetical underlying amount on which swap payments are based. The notional principal of outstanding interest rate swaps in each non-dollar currency at end-year is translated into US dollars by using a twelve-month average of individual exchange rates against the US dollar.

[2] Including calls plus puts.

[3] Interest rate and currency swaps between ISDA members (interbank swaps) are adjusted for double-counting.

[4] Caps, collars, floors and swaptions.

Source: BIS, ISDA.

Given the sheer size of derivative markets, it has now become of paramount importance to understand, both from a micro and a macro point of view, the risk/return profiles of the different products, which are complex and require careful consideration. The analytical formulas that are required for pricing still create significant – although declining – profit opportunities; on the other hand, one has to be aware that it is not easy to appreciate all the risks, including "systemic risks", involved in the new transactions and that accurate risk management systems are therefore a prerequisite for a satisfactory development of such new instruments.

Recently R. Farrant, Deputy Head of Banking Supervision at the Bank of England and Chairman of the Sub-group on off-balance sheet risk of Basle Supervisors' Committee, remarked: "....The acid test which we generalists in supervision and I hope your general management will demand of you is that you should be able to explain in

simple understandable terms what is the economic and financial benefit of what you are doing....; what the risks are, and how they can be measured, priced, and controlled....".[2]

I will try to address some of these questions in the remainder of the paper, which is structured as follows. After a brief review of some key innovative products, it outlines the effects of derivative financial instruments on economic efficiency. The third part of the paper is devoted to a discussion of the risks involved and of related regulatory issues. Finally it draws some tentative, practical conclusions: in particular, with respect to swaps, it makes the case for a European clearing house, with a view to containing credit risks, standardizing contracts, mark-to-market and capital adequacy evaluation and facilitating netting.

2. The Innovative Elements of Derivative Products

"Financial innovation" is a somewhat imprecise term. I shall take a rather broad perspective and suggest that competitive pressures, technological advances and deregulation have interacted in accelerating the pace of financial innovation in the past three decades. The most important examples of financial innovation in the recent history of capital markets have been, on the one level the development of the Euro markets and on the other, the introduction of swaps, financial futures and other "derivatives". It is interesting to note that their origin had, in fact, some common ground, such as the need to respond to regulatory changes tending to vary the size and scope of financial allocation, and the need to reduce the moral hazard risk involved in other similar operations.

The Euro markets are generally acknowledged to initially have been developed as a means of circumventing U.S. regulations and tax restrictions.[3] However, contrary to some simplistic "monetarist"

[2] *Cf.* R. Farrant, "BIS-based capital guidelines", address to ISDA Annual General Meeting, Paris, 13 March 1992.

[3] It is worth recalling that, after 1974, a new boost to the Eurodollar market was paradoxically given by the removal of the restrictions introduced in the 1960s which had created the first impetus to the market. After their removal US banks could freely arbitrage between the domestic and the Eurodollar markets, leading to a greater integration of the two segments of the dollar market. The removal of capital market

critique, the growth of the Eurodollar market is basically due to the narrower spreads offered by the Eurobanks:[4] its efficiency, in other words, is only in part to be explained by a less costly regulatory environment.

The origins of one of the most widely used innovative products in more recent years, financial swaps, can also be seen as an answer to an existing regulatory regime. Swaps can be traced back to the parallel and back-to-back loans that were arranged between British and American entities in the 1970s to circumvent capital controls imposed in the UK, following the breakdown of the Bretton Woods system. The true innovative element of the currency swap was to reduce the default risk inherent in these operations by limiting the creditors' exposure, as the separate loan agreements were substituted by a single contract in which one counterpart could be released from its obligation upon the nonperformance of the other. Currency and interest rate swaps have now become a major element of global financial transactions often accompanying traditional banking activities. By the end of 1991 it is estimated that the currency swap market had a notional outstanding principal of US$ 822bn while interest rate swaps reached almost US$ 3,200 bn.

The reduction of moral hazard risk constituted the innovative element of the first financial futures on currencies. Even before the introduction of futures a forward market in currencies between banks existed. The advantage of futures was essentially to make such a forward market accessible to the wide financial community by establishing a standardized product handled by clearing houses and traded on liquid markets. In addition, deep futures markets provide a price reference and basis hedging mechanism for customized over the counter derivative portfolios generated by market makers. Similar

controls in West Germany in 1974 and in the UK in 1979 similarly integrated the EuroDM and the Eurosterling markets with their respective national markets. During the late 1960s and 1970s, the main innovations in international financial markets were developed in the Eurocredit market: roll-over credits, FRNs, revolving underlying facilities and syndicated loans are all examples of instruments whose introduction allowed a more complete diversification of risks among banking institutions. On this see R.B. Johnston, *The Economics of the Eurocurrency Market*, Macmillan, London, 1983 and H. Gibson, *The Eurocurrency Markets, Domestic Financial Policy and International Instability*, Macmillan, London, 1989.

[4] *Cf.* R.S. Masera, "The Euro-currency markets: their development, the problem of their control and their role in the International Monetary System", in G. La Volpe, *Mercati monetari internazionali e inflazione*, Facoltà di Scienze Politiche, Università di Roma, 1981.

features were also characteristic of the first options traded on organized markets. In terms of open interest, the futures and options traded on principle exchanges were approximately $3,500 bn by the end of 1991.

After the first wave of financial innovation which was concentrated on process innovation, the 1980s witnessed an explosion of product innovation (even if the products were sometimes less innovative than it was claimed). An economic environment characterized by high inflation and large volatility of interest and exchange rates, together with the rapid advances in technology, created both the need and the means to develop products which were able to fulfil ever more specific tasks, for instance: index/basket securities, mortgage-backed bonds, options on indexes, caps, floors, swaptions and so on.[5] From a technical point of view these products are usually more or less complex combinations of already existing instruments, such as futures, options and swaps, and of already existing markets like the national stock exchanges. What was innovative about these products was less the basic idea than the way in which the technology permitted their development and trading (financial products engineering).

As in industry, product and process innovation have now become inescapably interwoven. Despite the apparent predominance of product innovation, financial innovation of the process type continues to play the fundamental role. The whole area of institutional de-specialization among the intermediaries and the emergence of the global financial services groups are major instances of process innovation in recent years. They would not have taken place without the concurrent development of new techniques and instruments. Let us recall but two examples of this. Banque-assurance – a key feature of the past few years and a major driving force of the 1990s – could hardly have developed without the creation of new financial products and instruments which combine insurance and savings.[6] The same combination, although at a more sophisticated level, characterizes the

[5] For an exhaustive survey of innovative products and of the underlying motivations behind their development, see M. Miller, "Financial innovation: the last twenty years and the next", *The Journal of Financial and Quantitative Analysis*, Vol. 21, No. 4, December 1986.

[6] Let it be noted here that a direct analogy can be drawn between swap and insurance contracts. The mark-to-market of the former can be likened to the mathematical reserve (with negative sign) in the latter. See on this A. Longo, "Similarità tra tecniche assicurative e finanziarie", mimeo, IMI, Rome, June 1992.

asset allocation process of institutional investors such as pension funds which are now able, through the use of innovative techniques, to hedge more effectively their future liabilities.

3. The Impact of New Financial Instruments on Economic Efficiency

The two main functions of financial markets are the efficient allocation of capital and the intertemporal sharing of risks in an uncertain environment. To ascertain efficiency we need to investigate how capital markets fulfil their role in the process of transmitting information and allocating risks.

Following economic theory, two necessary conditions can be identified for the financial markets to be economically efficient. Firstly, they must ensure the lowest possible transaction costs for economic agents subject to intertemporal budget constraints. Secondly, they have to be complete, *i.e.*, they must offer a sufficient range of instruments correctly priced, such that economic agents are able to write contracts on possible contingencies. Informational efficiency can be viewed, in this respect, as a corollary of the latter condition which implies that prices reflect all available information at any given time. I do not address here the issue of asymmetric information among market participants.

In practice, however, these conditions cannot be met, which is, perhaps, the main reason why financial markets may be technically efficient but often fail to reflect economic fundamentals correctly. Hence our purpose is to investigate whether and to what extent new financial instruments can help to overcome some of the inefficiencies that are inherent in existing markets.

If we consider the two instruments we have previously identified as key innovations, *i.e.* financial futures and swaps, we can see that they both meet the two efficiency criteria, since they contribute to the lowering of transaction costs and to complete the markets from an informational point of view. They provide forward benchmark pricing upon which suitably minded market participants can act in order to fix important financial variables in transactions of relatively long tenor.

The role of forward markets for the efficiency of the economic system was clearly underlined by Hicks in *Value and Capital*, where he stressed how forward transactions may help to stabilize the economy as a result of the improved intertemporal allocation of risks.[7] In his last work, Hicks emphasized in a lucid passage the advantages of futures markets with respect to forward markets: "It is easy to see that [the operator] will be able to hedge himself with lower costs by using futures rather than forward contracts, as futures are easily transferable. In order for such transfer to be made possible, it is necessary, however, that market participants agree on some defined standard characteristics; the futures market needs therefore to be an organized market".[8]

The experience of the last decade has proven the validity of this assertion. In fact, it has only been with the development of the futures markets with their clearing house systems and subsequent margin requirements, that a reduction in transaction costs and in risks linked to moral hazard has been achieved. This has had the benefit of creating a liquid and easily accessible market for forward transactions, thereby enhancing their signalling role in the price formation mechanism.

The second example concerns the issue of sub-optimal risk sharing. The severe informational difficulties in assessing the creditworthiness of geographically and institutionally separated markets could create large price discrepancies and resulting distortions in the allocation process. The introduction of swaps, in this respect, bolsters market completeness in the sense that it enables financial and non-financial institutions to exploit the relative comparative advantages they enjoy in their respective markets.[9] Each firm is able to borrow in the market in which it has a relative cost advantage and then swap the cash flows either with the direct counterpart or with a financial

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[7] On this argument see also K.J. Arrow, "The role of securities in the optimal allocation of risk-bearing", *The Review of Economic Studies*, vol. XXXI, April 1964, pp. 91-96.

[8] *Cf.* J.R. Hicks, *A Market Theory of Money*, Clarendon Press, Oxford, 1989, p. 16. In this respect an important methodological distinction has been made by Merton. He classifies an organized derivative-security exchange as an intermediary, rather than a market. This is argued on the grounds that such an exchange performs the *intermediary* function of guaranteeing traded contracts. On this point see Robert C. Merton, "Operation and regulation in financial intermediation: a functional perspective", *Working Paper*, Harvard Business School, September 1992.

[9] Some authors have argued that lowering borrowing costs by a synthetic transaction involving a swap would not be possible in a complete, integrated market (*cf.* S. Turnbull, "Swaps: a zero-sum game?", *Financial Management*, 1987, pp. 15-21); according to others, agency costs yet provide the most plausible explanation for the continued growth of the swap market (*cf.* Wall and Pringle, "Interest rate swaps: a review of the issues", *Federal Reserve Bank of Atlanta Economic Review*, 1988, pp. 22-40).

institution. In doing so the parties attain their desired mix of finance, increasing their welfare beyond the level that would have been achieved had they attempted to provide for all their needs in their own markets. In this respect, swaps may provide an extension of the Ricardian theory of comparative advantage, from the goods and services market to the capital market.[10]

When the main motivation behind the use of swaps is hedging and asset/liability management, both transaction costs and the level of risk exposure are sensibly reduced with respect to those involved in alternative cash or bond market transactions. In the most liquid markets (such as the market for interest rate swaps in the US) activity has tended to shift away from the cash markets to the swap markets because they provide the more cost-effective means to manage interest and exchange rate risks.[11]

A more general point deserves to be made here with respect to the issue of transaction costs. Only 20 years ago one of the main obstacles to efficient risk sharing, risk hedging and global capital and information flows was constituted by the available technology. Many instruments and markets could either not exist or be efficiently arbitraged simply because of the high costs which had to be incurred in order to price the instruments and undertake the necessary transactions. Rapid advances in technology, especially with respect to data processing and telecommunications, have been of paramount importance in the abatement of such costs which have, over the two decades, been reduced by a factor of 99%. This has allowed effective diffusion and development of innovative new products, offering the individual investor/borrower an even greater choice between different risk/return combinations and efficient asset/liability management of both households and firms. The globalization of these techniques has increased the interdependence of national markets, thereby enhancing the volume and flexibility of financial flows.

[10] The efficiency gains are evident in the case of market imperfections or price discrepancies bred by differences of liquidity and/or fiscal rules across markets. Whenever different credit standing perceptions are the main driving source of swaps, efficiency gains can be realized through the reduction in agency costs brought about by the artificial linkage of previously separated markets; on the other hand, *efficiency losses* may be generated should the firms' true credit quality be misjudged by the parties to the swap.

[11] For a thorough discussion of the main transaction cost advantages inherent in swaps, see "Swaps: versatility at controlled risk", *World Financial Markets*, April 1991.

The standardization of the new products and the increasing volume of contracts traded, has led, in turn, to more liquid markets and lower bid-ask-spreads, ultimately further reducing the costs of financial intermediation to the consumers of financial products and services. Finally, contemporary communication networks between different markets allow for more information to be incorporated into prices and thereby enhance the informational efficiency of the whole economic system.

4. Swaps and Derivatives: Risks and Regulation

The growth of the markets in derivative products, which we have witnessed in the most recent years, is creating serious concerns about the possible need to strengthen the control and supervision on off-balance sheet activities.[12] Because of the sheer pace of innovation, both financial institutions and regulators are now under constant pressure to refine techniques to evaluate the potential risks implied in more and more sophisticated products. In addition to market (or position) risks, *i.e.* risks deriving from movements in market rates, these risks also involve credit (or counterpart) risks, settlement risks, regulatory and legal risks.[13]

From a general perspective, one of the most relevant issues concerns the problem of recurring misperceptions of risks involved in the transactions. Highly complex analytical and mathematical problems are involved in the correct evaluation of risk/return charac-

[12] Recent articles published in the financial press testify to the increasing attention devoted to these issues in the marketplace and in regulatory forums. See for example: *Euromoney* ("Nightmare on Wall Street"), February 1992, pp. 23-27; *Risk* ("Swap and think"), vol. 5, March 1992, pp. 29-37; *International Finance Review* ("Derivative instruments: swaps to expand, dangers ahead"), March 14, 1992, pp. 90-91; *The Wall Street Journal* ("Regulators are expressing growing concern about risks of global derivatives markets"), March 30, 1992; *The Economist*, ("Taming the derivatives beast"), May 23, 1992, pp. 85-86; *Business Week* ("Swap fever: big money, big risks"), June 1, 1992, pp. 42-45.

[13] One important example of legal risks is illustrated by the recent U.K. finding that local authorities are ineligible to enter swaps under current law. In January 1991, the House of Lords held that the London Borough of Hammersmith and Fulham exceeded its powers "ultra vires" by entering interest rate swap contracts during the 1980s, imputing *speculative* character to these deals. Local authorities were therefore not deemed liable for up to $600 million of mark-to-market losses reportedly incurred with banking institutions. According to some reports, the "ultra vires" argument could be applicable also to contracts undertaken by insurance companies!

teristics of many such new instruments.[14] It is important to see that it is not only the technical complexity of the single product itself which creates the difficulties in the pricing process of new instruments, but also the sometimes very subtle shifting of price and market risk among the various economic agents resulting from the simultaneous use of different instruments. This may often not be fully appreciated by the users of the instruments themselves.

Systemic risk can be particularly acute in financial derivatives as their net re-hedging in circumstances of extreme market imbalance or volatility can contribute to loop-back effects engendering aggregate destabilizing effects for important financial markets as a whole. An example is the highly controversial role of "portfolio insurance" in the 1987 U.S. stock market crash.

As was pointed out before, efficiency gains of financial innovation do not stem from the elimination of risk, but from its optimal allocation. This, however, does not guarantee that market participants are always able to evaluate the specific products correctly or, more importantly, that the possibility of "systemic risk" is taken into proper consideration.

In this respect, regulatory intervention can be justified on the ground of externalities, *i.e.*, the divergence of private and social benefits arising from certain actions and behaviours. Competitive pressures together with the complexity of correct risk assessment may tend to erode the margins and profitability of financial intermediaries. An extreme consequence could be the incidence of market failures, with their subsequent chain reactions resulting in the original consumer surplus, initially created by the lower margins, being transposed into losses for the whole economy. Persistent mispricing and underestimation of risks may hence undermine the stability of the economic system.

I will not explore these broad issues[15] here but rather, as an example, I shall focus narrowly on some problems relating to swaps. A typical feature of a swap is that an initial user finds himself with the need to cover a market (interest or currency) risk. The swap allows

[14] "Barrier options", which are activated or cancelled if the underlying market reaches certain thresholds, are a typical example. Risk/return characteristics are especially difficult to evaluate on equity swaps, equity-related fixed income products, over the counter options on stocks, baskets of stocks or indices.

[15] On these points, see R.S. Masera, "Issues in financial regulation: efficiency, stability, information" in D. Fair, C. de Boissieu (eds.), *Financial Institutions in Europe under New Competitive Conditions*, Kluwer, Dordrecht, 1990 and S. Shafer, "Financial regulation: the contribution of the theory of finance", mimeo, April 1991.

him to shift this risk to other market participants, by paying a corresponding premium. The process need not, however, represent a zero-sum game since in the hedging process the original market risk is transformed to some extent into a complex chain of reciprocal obligations, which ultimately take the form of credit risk. The downside of this chain is that the default of one link may affect all the others; and in the extreme case, the default of one participant may lead to a chain reaction. Moreover, in view of the off-balance sheet nature of these transactions, the single participant would find it difficult to evaluate the credit-worthiness of his counterpart, as the latter will also depend on the (undisclosed) links with other financial intermediaries.

In a paradoxical way this risk transfer mechanism can exacerbate the severity of systemic risk by shortening the period in which its mark-to-market effects hit aggregate balance sheets even while reducing the aggregate amount of risk in the system as a whole.

There is an implicit assumption that the short-term balance sheet effects will be more than offset by the greater spread of the risk assumption function. This is an empirical question which will vary from market to market and legal regimen to legal regimen. It would seem more likely to be true in consumption commodity markets where the natural balance of producers and consumers would lead one to believe that intermediaries can substantially offset risks with industry counter-parties if they can properly structure the derivative mechanisms to meet credit, risk control, tax accounting and regulatory needs of diverse counter-parties.

Here again a comparison with the Euromarkets may be useful. In its analysis two views have been put forward: according to the first one ("house-of-cards approach") the very close links between banks stemming from the importance of interbank transactions signifies that the market is vulnerable to systemic failure. The opposite ("net approach") view holds instead that the very nature of closely knit net allows the system to overcome widespread shocks in a satisfactory way. On the whole, I would tend to subscribe more to the second view, barring of course major market failures, which would however be primarily due to major economic policy mistakes.

It has become increasingly important for financial institutions to consistently evaluate and monitor their exposure to credit risks stemming from derivative instruments. To enable financial intermediaries to include the off-balance sheet operations into the more general

system of asset/liability management, the main challenge is now to quantify a more sophisticated "credit equivalent" for off-balance sheet operations. At the operational level, a correct evaluation of the potential exposure and, most importantly, a correct pricing must go further than the mechanical application of the capital adequacy rules as proposed by the BIS.

It is possible that sufficient derivative volumes in a market may affect the pattern of volatility. Extensive cross-hedging may tend to stabilize markets until some fundamental change in underlying conditions or exogenous policy event creates a paradigmatic change. At that point markets may prove to be far more discontinuous with a highly perturbed pattern of market volatility until a new paradigm has been developed by taking empirical market data and fitting it into a new quantitative model whose back-test once more allows traders and analysts comfort in the relative predictability of market behaviour.

The "rules-of-thumb" assessments used for credit risk involved in swap-transactions, such as the BIS-rules, may not be sufficient for a proper evaluation. The two alternative methods, proposed by the Basle Committee to evaluate the credit equivalent factor for swaps, *i.e.* the "Original Exposure" and the "Current Exposure" methods, both suggest the application of some standard coefficients in the measurements of potential exposure as a percentage of notional capital. They differ, however, in the fact that while the first criterion establishes fixed parameters in relation to the original maturity of the swap, the second evaluates the credit equivalent factor as the sum of two components – the current replacement cost (which is the positive value of the mark-to-market) plus the add-on factors that allow for future exposures arising from interest rate and exchange rate related contracts.[16] Alternative evaluation systems measure the potential exposure in relation to the different volatilities of exchange rates and interest rates and the residual maturity of each contract.[17]

[16] It is important to note that such add-on factors – always expressed as percentages of notional principal – are determined as fixed parameters (0.5% for interest rate related contracts and 5% for exchange related contracts), irrespectively of the specific nature of each contract (in the various currencies) and of its residual maturity.

[17] Several methodological approaches have been proposed in the literature for this purpose: see, among others, M. Arak, L. Goodman, A. Rones, "Defining credit exposures for risk management products", *Review of Research in Banking and Finance*, vol. 3, pp. 60-72, 1987; D. Giberti, M. Mentini, P. Scabellone, "The evaluation of credit risk for swaps: methodological issues and empirical evidence", forthcoming, *The Journal of Fixed Income*.

Some of the drawbacks of the BIS rules have been recognized by the regulators themselves. Farrant challenged the appropriateness of overall standards by affirming: "Given the number of variants on plain vanilla instruments, I wonder whether such a simple methodology as that contained in the Convergence Agreement really continues to be appropriate. For example, since 1988 many longer-term interest rate swaps have been entered into; is it still wise to apply a uniform capital requirement to all deals over one year? ... Are statistical reports used to measure capital adequacy properly identifying the more esoteric deals involving, for example, caps, collars, swaptions, draw-down swaps and roller-coasters?". With regard to credit exposure evaluation for off-balance sheets instruments, Farrant goes on by saying: "The add-ons for potential future exposure in the Basle Convergence Agreement were based on a portfolio view of a bank's exposure, and assumed that higher risk items would be balanced by other lower risk ones. That is a much less comfortable assumption when determining the basis for measuring worst case exposure to a single counterpart...".

A common, satisfactory, approach to exposure evaluation is clearly required: it should be set by regulatory authorities after close consultation with market operators.

The interaction between clearing house vehicles and over the counter vehicles is a crucial feature of the process. In the absence of regulatory constraints, it would seem that over the counter volume is likely to be a major impetus to exchange development. Exchanges, on the other hand, may create "re-insurance capacity" and cross-hedging vehicles which may well enhance the profitability of those institutions with sufficient skills, distribution and capital able to generate a proprietary edge through sheer critical mass.

Among the issues that deserve a particular attention, the problem of netting[18] is now at the forefront of discussions between operators and regulatory authorities. A recent paper, produced by a group of experts from G10 country supervisors,[19] explores such issues

[18] The only type of netting that is currently recognized in the Basle Convergence Agreement is netting by *novation*, which is defined as "a bilateral contract between two counterparts under which any obligation to each other to deliver a given currency on a given date is automatically amalgamated with all other obligations for the same currency and value date, legally substituting one single net amount for the previous gross obligation" (footnote 6 of Annex 3).

[19] *Cf.* "The supervisory treatment of netting under the 1988 Basle Accord on capital standards: an issue paper", BIS, Basle, April 1992.

in detail. In particular, it tries to identify how bilateral and multilateral netting for off-balance sheet instruments might be recognized in setting capital requirement. As for bilateral netting, the paper takes the position that recognition of netting should be confined to the more standard products. Furthermore, it would apply only to the current replacement cost part of the exposure's calculation (to produce a single net credit or debit position for each counterpart), while the existing add-on factors ought to be retained, based on gross-notional principal amounts.[20] In regard to multilateral netting, the technical paper outlines the main problems of its application, problems which are mostly related to the functioning rules of a central clearing house.[21]

Without disregarding these technical problems, I believe that for certain well-developed products like standard swaps the multilateral approach should be more convincingly pursued. Not only the regulatory authorities, but also the operators have an interest in the establishment of central market places and regulatory bodies which could help to determine a consistent approach to risks evaluation and monitoring, while allowing a sensible reduction in the level of their respective exposures through multilateral netting schemes.

5. Concluding Remarks

In this paper, some of the main reasons why derivative financial instruments can improve economic efficiency have been outlined: in essence, they can be taken back to two features: (i) they can improve the informational content of capital markets and (ii) they lower transaction costs.

For the lasting success and overall efficiency of new financial techniques and instruments, it is, however, essential to fully appreciate their risk/return profiles in the present environment characterized by increasing sophistication and globalization of financial

[20] This procedure would imply that the "original exposure method" would not be suitable in a netting environment, since the method does not envisage any separate calculation of current and potential exposure.

[21] The main problem is seen as the assessment of provisions for sharing losses among clearing house members in the event of default of one or more members of the multilateral scheme.

markets. In this regard, the *form* in which the instruments are traded and settled should be considered with particular attention. Many financial products have begun their life as over-the-counter products. However, o.t.c. markets have drawbacks which can, sometimes, undermine their efficiency. When the volume of operations becomes large a certain degree of regulation is needed to ensure stability and transparency. Organized markets, as we have seen in the case of the financial futures markets, can improve efficiency since they provide market participants with price certainty and the opportunity of continuous trading. The benefits of large economies of scale are apparent, both as a direct result of lower physical transaction costs and indirectly through lower bid-ask-spreads, because of the enhanced liquidity. Finally, they also permit efficient regulatory activity and, being centralized markets, ease the execution of the regulations.

In this respect, no contradiction exists between regulated markets and the continuous growth of new financial instruments; on the contrary, the two processes can be self-reinforcing. This point is clearly evidenced by recalling again, as a relevant analogy, the case of the Euromarkets whose growth was further enhanced by the definition of a set of rules that, rather than introducing new restrictions, provided a stimulus to market forces.[22] Traditional "off-shore" markets now account for a minor value of international bank activity, which is centred on operations of banks in G10 countries.

In the same way, it is important to see that the supervisory authorities do not attempt to slow down derivative markets activity simply through higher capital requirements on off-balance sheet activities or by imposing obligations by which all derivative transactions should be routed through centralized exchanges.

The ideal regulatory framework is, in my view, one where market practices for well-developed products such as standard swaps could find a formal recognition and certainty of application. This framework would require: *a*) the definition of clearer "rules of the game" for the operators (concerning in particular the resolution of legal uncertainties in different jurisdictions and the harmonization of

[22] It is worth recalling that after the attempts of the 1970s to impose reserve requirements on Eurodollar borrowings on US banks had proved to be unworkable, the creation of International Banking Facilities (IBF) in December 1981, which allowed banks (either US or foreign) to conduct their international business free from interest rate restrictions, reserve requirements, and FDIC insurance, strengthened New York's position as an international banking centre with respect to mere off-shore centres. Tokyo followed the same course with the creation of the Japan Off-shore Market (JOM).

fiscal rules); *b*) the pursuing of multilateral netting schemes enhancing product standardization. Under present circumstances, I would, in particular, advocate the creation of a European swap exchange.

The development of a swap clearing house at European level might apply credit enhancement techniques similar to those developed in futures markets, such as margin calls and deposits.[23] The clearing house would be used mainly for interbank swaps and would facilitate the netting of the exposures,[24] resulting eventually in a reduction in capital requirements. Through the margin requirement system, it would also reduce the problems inherent in a consistent evaluation of credit risk exposure of the clearing house towards swap parties. In this respect, deposit and margin requirements graded according to the credit rating of members might represent an appropriate way to foster the credit intermediation role of the clearing house. A threshold credit criterion would naturally represent the precondition to become member of the house. This would of course reduce the problems inherent in the loss sharing provisions among members in case of major defaults.

As for the most innovative products which will continue to be traded mostly over-the-counter, financial operators are now more forcefully stimulated than in the past to evaluate and monitor all the complex and interrelated risks involved in their use. Adequate risk-management systems, with self-imposed position and credit limits by banks and security houses, are in this respect essential not just to assess the profitability of the new lines of business but, most importantly, to preserve the financial soundness of each institution. The

[23] *Cf.* R.S. Masera, "The development of new financial instruments and techniques and their implications for economic efficiency", paper presented to an informal group chaired by Vice President Leon Brittan, EEC, Bruxelles, June 1991. It is to be recognized that for long-term forward contracts like swaps whose maturity extends to more than 1-2 years, the determination of initial deposits is complicated by the intrinsic difficulties of estimating long-run volatilities of both interest and exchange rates. This, in my view, is an added reason to have a European approach, with commonly agreed "rules-of-thumb" procedures.

[24] If the clearing house is established in a jurisdiction where netting is allowed in the case of insolvency of a counterpart, then the swap parties would effectively have a reduced credit exposure. Though the swaps are in fact multi-jurisdictional, the official intermediating counterpart for each swap would be the clearing house, against which the swap parties would be able to net their positions in case it became insolvent. The establishment of a clearing house would require prior solution of some key problems such as withholding taxes and bilateral netting from the clearing house point of view.

pendulum here may have swung already too far in the direction of risk taking, without sufficient return for the market as a whole.

It is in the interest of both market operators and regulatory authorities to promote, also through a constant exchange of views, a system of rules whereby the trade-off between profit opportunities and efficiency gains which can be realized through off-balance sheet activities is properly weighted with the risk of failure and market disruption.