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Financial Innovation:  
The Last Twenty Years  
and the Next

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# **Financial Innovation: The Last Twenty Years and the Next**

## **The Recent Surge of Significant Financial Innovations**

No word is more overworked these days than “revolution.” Yet in its original sense of a major break with the past, the word revolution is entirely appropriate for describing the changes in financial institutions and instruments that have occurred since my last extended stay in Belgium just a short twenty years ago.

As one small example of how far we have come since then, I can still recall the shock and incredulity of my Belgian friends on learning that I, as an American citizen, could not then legally own monetary gold. Nowadays, of course, we can hold and trade not only gold coins, gold bullion, gold futures, and gold options but literally hundreds of other financial instruments that either didn't exist in 1966 or existed only in rudimentary form. A partial list of major novelties would include, in no particular order: negotiable CDs, Eurodollar accounts, Eurobonds, sushi bonds, floating-rate bonds, puttable bonds, zero-coupon bonds, stripped bonds, options, financial futures, options on futures, options on indexes, money-market funds, cash-management accounts, income warrants, collateralized mortgages, home-equity loans, currency swaps, floor-ceiling

swaps, exchangeable bonds, and on and on. The mind boggles.

Can any twenty-year period in recorded history have witnessed even a tenth as much new development? As we review the list—and I remind you again that it is only a partial list—we can only wonder whether and when this unprecedented innovative surge will begin to lose its force. Are even more financial innovations in prospect and where are they likely to arise?

To organize our thinking about likely future financial innovations I propose first to look to the processes that produced the remarkable flood of new instruments and institutions. An understanding of the underlying driving mechanisms may give clues about where the machine is likely to go. You will recognize my approach as the standard occupational response of an academic theorist. But to keep my discussion from becoming too academic, let me restate the question as it was recently posed to me by a reporter from one of our leading financial journals. The journal was considering an award—in the spirit of the Hollywood Oscars—for “the most significant and successful financial innovation” of the last twenty years. Several academic and industry finance specialists were to be invited to submit nominations and, of course, a brief supporting defense of the choice. I, too, have a candidate for the award. And I will get to it in due course, after sketching out briefly the criteria I applied in making my selection.

We must begin, of course, by defining terms. What is an “innovation”? What is a “successful” one? And what is a “significant, successful” one?

As for the term “innovation” and how it differs from just plain improvement, modern statistics provides us with some helpful distinctions. Time-series analysts break into two parts the change over time in the value of any series such as the Gross National Product or consumer prices. One part is the change that could, in principle at least, have been forecasted by extrapolating known past information. The other part is thus the unanticipated, unforecastable change, the “surprise” as it were. It is these surprises that have been aptly dubbed the “innovations” in the time series. And it is to their counterparts among the recent surge of financial instruments and institutions that I will be directing attention.

To say that financial innovations, like innovations generally, are basically unforecastable improvements is not to suggest, of course, that their emergence is merely a matter of chance or of artistic creative impulse. Such creativity does indeed occur in business; and, in the case of some financial innovations, the artist has even left us his signature. But that is certainly not always the case. Many of the financial innovations on my earlier list already existed in one form or another for many years before they sprang into prominence. They were lying, as it were, like seeds beneath the snow, waiting for some change in the environment to bring them to life.

What process stimulated the new and energized the dormant innovations in finance over the past twenty years? I wish I could say that it was the flood of M.B.A.'s out of our business schools over this period. That was certainly part of the story, but not the

decisive part. The major impulses to successful financial innovations over the past twenty years have come from regulations and taxes.

### **Taxes and Regulations as Impulses to Regulation**

The income tax system of virtually every country that is advanced enough to have one seeks to maintain (or perhaps, in view of pending U.S. tax reform legislation, I should say "has sought to maintain") different rates of tax for different sources (and uses) of income-between income from capital and income from labor; between interest and dividends; between dividends and capital gains; between personal income and corporate income; between business income paid out and business income retained; between income earned at home and abroad; and so on. At the same time, modern finance theory assures us, as practitioners have long known, that securities can be used to transmute one form (or use or recipient) of income into another-in particular higher taxed forms to lower taxed ones. These transformations, of course, are not without cost, particularly when pushed to extremes. Were any country actually to leave its tax system unchanged for a generation or so, an equilibrium might emerge in which no incentives were left for further shifting income. The gains from exploiting the remaining rate differentials would be exactly balanced by the costs of transformation at the margin. The total revenue raised would tend to stabilize, subject only to the inevitable slow attrition coming from the normal, extrapolative, trend-related flow of improvements in transactions technology. But, of course, we will never know that Nirvana-like

state of equilibrium. For a variety of reasons—including especially the desire to blunt the force of previous successful innovations by taxpayers—most governments (or, more properly, the shifting coalitions of interest groups using that vehicle for protection and advantage) prefer to keep changing the structure, thereby altering the internal rate differentials and creating new opportunities for financial innovation. This endless sequence of action and reaction has been aptly dubbed by Edward Kane of Ohio State University the “regulatory dialectic.”

Note that changing the tax structure both motivates and defines a “successful” innovation. Each innovation that does its job successfully earns an immediate reward for its adopters in the form of tax money saved. The government is virtually subsidizing the process of financial innovation just as it subsidizes the development of new seeds and fertilizers, but with the important difference that in financial innovation the government’s contribution is typically inadvertent. There are cases, of course, particularly in the politically sensitive housing area, where the U.S. government has been the major pioneer of new financial instruments. For the most part, however, the role of government in producing the pearls of financial innovation over the past twenty years has been essentially that of the grain of sand in the oyster.

Although I have chosen to emphasize tax changes as an initiating force in financial innovation, the same process can be seen at work in any financial area subject to government regulation, which is to say, still virtually everywhere. The pressures to innovate around prohibited types of profitable transactions or around newly imposed, or newly-

become-effective interest-rate ceilings are particularly strong but, as we have come to see lately, even what purports to be deregulation can sometimes trigger changes that go far beyond the intentions of the original sponsors.

We now have definitions for “innovations” and “successful innovations” and some insight into what produces them. But which ones merit the accolade “significant” innovations? Here again, we can get valuable clues from the language of modern statistics. Time-series analysts and economists distinguish between those innovations whose effects are “permanent” and those whose effects are only “transitory.” Similarly with financial innovations. Some have a period of success and then disappear, or virtually so, once the specific tax or regulatory change that fueled their initial success has been removed. Their effects have thus been basically transitory, though they may well continue to sleep on under the snow, ready to spring up once again should favoring circumstances arise.

But a few innovations manage not only to survive but to continue to grow, sometimes very substantially, *even after their initiating force has been removed*. These are the truly significant innovations.

Many instances of such nontransitory, significant innovations can be found among those on my earlier list. The Eurodollar market, for example, owed its origin to a curious U.S. restriction known as Regulation Q. The regulation, among other things, placed a ceiling on the rate of interest that commercial banks could offer on their time deposits. Over much of the postwar period that rate ceiling was, if not actually above, at least

not drastically below the market-clearing level. But that changed in the late 1960s and early 1970s with the rise in U.S. and world interest rates. The U.S. money-center commercial banks soon noticed that the restrictions of Regulation Q did not apply to the dollar denominated time deposits in their overseas and especially Western European branches. (These dollar denominated accounts, in turn, owed their origin to still earlier sets of government restrictions; but that is another story.) The U.S. banks and their foreign rivals could and did bid competitively for short-term dollar denominated accounts; and they continue to do so on a huge scale today even though Regulation Q has long since become a dead letter.

The currently huge Eurobond market was set off by a tax rather than a regulatory change. It sprang up initially in response to our government's institution in the late 1960s of a 30 percent withholding tax on interest payments on bonds sold in the U.S. to overseas investors. The locus of the market for dollar-denominated bonds for non-U.S. citizens thereupon moved from New York to London and other money centers on the Continent. The withholding provision has since been repealed, but the Eurobond market it induced has continued to thrive, in part no doubt because it also served to bypass the cumbersome new-issue prospectus requirements imposed by our Securities and Exchange Commission on public issues of securities by even the best-known U.S. firms. Another adaptation to that same withholding tax by some U.S. banks and firms was the creation of a Netherlands Antilles subsidiary corporation as a treaty-protected withholding-exempt financing arm. That

adaptation, however, appears, at this time, not to be passing the survival test for permanence and hence "significance" by my definition.

In singling out these two particular examples of the innovation process, I did not mean to slight the contributions to innovation of governments other than my own. There is plenty of glory to go around. The current vogue for "swaps," for example, was set in motion some years back by firms seeking ways to avoid British government restrictions on dollar financing by British firms and on sterling financing by non-British firms. Other important innovations have involved the simultaneous inadvertent contributions of two or more countries. The ideal example is the zero-coupon bond. No single innovation epitomizes so neatly the many strange and often unplanned elements that come together to produce a significant financial innovation.

The explosion in the issue of deep-discount bonds by U.S. corporations in 1981 was occasioned not strictly by a tax change but by the recognition of a hitherto unsuspected technical flaw in the Treasury Department regulations that interpret the U.S. tax law. Zero-coupon securities were already in existence, of course, notable examples being Treasury bills and even the Treasury's own Series E Savings Bonds. But long-term deep-discount instruments had rarely, if ever, been issued by taxable corporations until the Treasury's blunder was appreciated. So gross was that blunder—which permitted a linear approximation for computing the implicit interest and hence inflated the present value of the interest deductions—that a taxable corporation could

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actually come out ahead by issuing a zero-coupon bond and *giving* it away!

The Treasury reacted after a couple of years with legislation closing off the avenue, and the supply of new zeroes by U.S. corporations abruptly ceased. But the demanders for zero-coupon instruments that the first innovation had uncovered were still there and begging for more. Much, though certainly not all, of this demand was sustained by the corresponding blunder of the Japanese tax authorities in treating all of the appreciation not as deferred taxable interest, which would have been advantageous enough to the holder, but as capital gain. And capital gains under Japanese law were exempt from tax. Zero-coupon bonds, moreover, were a neat way of blunting the force of Ministry of Finance restrictions on the value of foreign bond holdings by Japanese pension funds. Despite minor adjustments recently, these rules and the demand for zeroes they create still remain. Meanwhile, with the corporate supply dried up, our own innovators have been busily creating a synthetic supply of zero-coupon bonds for Japanese buyers (and for tax-exempt domestic pension-fund portfolio “immunizers”) by stripping the coupons from U.S. Treasury bonds and selling them separately as zeroes.

So much then for my criteria for defining significantly successful financial innovations. Now comes the hard part. Any surviving, successful innovation must have reduced dead-weight transaction costs and expanded the reach of the market. Otherwise, it wouldn't have been successful, let alone significant. But which of the many possible candidates merits the award of most signifi-

cant? And how is relative significance to be scaled? Not, I think, just by sheer volume of business. On that score, the Eurobond and, even more, what is fast becoming the Eurocapital market would be an easy winner. Size is part of the story, but not all of it. To qualify as most significant, an innovation must be important not only in and of itself but must have stimulated substantial further innovations as well. It must have set off a chain reaction, as it were, if that is still a permissible analogy in the light of recent events. By this standard, my nomination for the most significant financial innovation of the last twenty years is: *financial* futures--the futures exchange style trading of financial instruments.

### **Financial Futures: Origins and Early Development**

You may be surprised that I did not single out options trading as the prime innovation. Options are certainly the darling of the academic finance community. They represent the one case where we can translate our underlying theoretical notions into **an exact** pricing relation--the justly famous Black-Scholes formula and its numerous extensions. Options are also more basic and fundamental securities than futures contracts in that with options (and Treasury bills) one can always create synthetic futures, **but** not the other way around. It can also be shown that many of the fancy instruments in my earlier listing are really just options in disguise. But my concern here is with innovation, and that requires getting events into the proper historical sequence. In that sense, financial futures come before options; only a few months ahead, it is true, but still, ahead.

That first truly successful innovation in financial futures can be pinpointed quite precisely, as can the name of its inventor, or at least its prime mover. He was Leo Melamed of the CME (the Chicago Mercantile Exchange), though Leo Melamed himself often modestly gives credit for the original inspiration to Milton Friedman who, at the time, was a member of the Department of Economics at the University of Chicago.

Milton Friedman, for some reason which I don't know but can suspect, came to believe sometime in 1971 or so that the British pound was overvalued. No Chicago bank, however, would accommodate him by allowing him to sell the pound short. He happened to mention this on some social occasion to Leo Melamed, who then, as now, had close ties to the University of Chicago. And that mention registered with Melamed because the symmetry of futures contracts for short and long positions had always been one of the standard claims for advantage of the Chicago style futures markets over the New York style stock markets. No costly borrowing and escrowing of securities were needed to go short in Chicago; no senseless up-tick rules had to be observed before a short sale could be executed. A short in Chicago was just the negative of a long.

This potential cost advantage of futures trading, however, was at that point of purely academic and polemical interest since only futures in physical commodities, and a rather small set at that, were actually being traded. But the Chicago commodity futures exchanges in their drive to diversify had, by the late 1960s amply demonstrated their willingness to experiment with imaginative, new kinds of contracts even though most

were doomed to fail. Some of these experiments, like iced broilers and plywood (and going back still further to live cattle and pork bellies), actually presented far greater challenges to the ingenuity of the contract designers than did foreign exchange, which is after all already a highly standardized commodity.

So with some, but not an enormous amount of, fanfare the IMM (the International Money Market) was inaugurated in 1972 as an offshoot of the CME and the era of financial futures trading began.

(If this were a formal paper, which, of course, it is not, I would attach a footnote at this point noting that while the CME justly deserves credit for being first off the mark with its foreign exchange futures contract, its crosstown rival, the CBT (the Chicago Board of Trade), had actually proposed exchange trading of options on common stocks as early as 1969. Such options, however, fell under the jurisdiction of the SEC (the U.S. Securities and Exchange Commission), at that time a particularly heavy-handed regulatory agency. Setting to rest the SEC's professed concerns about speculation and insider trading in options delayed the opening of the CBOE (the Chicago Board Options Exchange) for more than five years.

The search for the origins of exchange-traded financial futures is complicated further by the exchange trading of options at the CBT as far back as the 1920s. They were options on commodity futures, however, not stocks; and they were banned by Congress in one of its periodic antispeculative convulsions in the late 1930s. That this previous incarnation of options trading is not more widely known may be simply a matter of unfamiliar

terminology. What we now call options were then known as “privileges.” What is perhaps even less widely known is that common stocks were also traded on the CBT in the same era in ways that had at least some elements of futures-style market arrangements. But, to borrow some terminology from the historian David Landes of Harvard University, these early, aborted episodes were “anticipations,” perhaps, but not true innovations in our sense of the term.)

Although I was in Chicago at the opening of the IMM, I am sorry to have to report that I was not caught up with any sense that an event of great historical significance was taking place. I let the occasion pass. One reason I failed to read major significance into the opening may have been my awareness of the already existing and well-functioning market for foreign currencies. It was not an exchange market, of course, with a single trading pit but rather a classic “upstairs” market with telephonic connections between the trading desks of the major banks and between the banks and the large foreign exchange brokers. Each trading bank received (or solicited) orders for foreign exchange from its own customers—either businesses with overseas transactions or smaller banks servicing their own customers. Small orders would be filled directly out of inventory by the desk; in the active currencies, incoming customer orders could be crossed. For large orders, for substantial order imbalances, for rebuilding dealer inventories, or perhaps just for purely speculative reasons, the trader could tap into the telephone market. The trader had the choice either of identifying himself immediately to the bank counterparty on the other side of the trade or, as is

common a result with new contracts. The sand in the oyster turned out to be the abandonment in the early 1970s of the Bretton Woods system of fixed exchange rates—fixed, that is, except for periodic convulsions. Floating rates create precisely the kind of price volatility and hedging demand that futures trading needs and thrives on.

The coming of exchange trading for foreign currencies did not displace the upstairs, interbank market, of course. The really big trades—two or three hundred million dollars or more at a crack—are still likely to be routed upstairs. The IMM's comparative advantage would be in the handling of, say, two hundred trades at around half a million each. This is not to say, however, that only traders in that range have benefited. Evidence gathered subsequently from other financial futures markets shows that spreads in the upstairs, big-player spot and forward markets are significantly smaller when the futures markets are open than when they are closed. And, at the other end of the order-size spectrum, even those of us whose transactions in foreign exchange are confined to airport kiosks are also presumably benefiting. Think how much more sizable dealers' spread would have to be if they didn't have access to reasonably low-cost hedging for their own inventory. It is important to keep that source of benefits in mind because the financial futures I am extolling are not typically products that individuals consume directly. They are essentially industrial raw materials.

Instituting futures trading of foreign exchange, in sum, reduced transaction costs and provided thereby all the classical gains from trade. That alone, however, would not

have earned it my award-nomination, or an honorable mention perhaps, but not the big prize. What earns it that award is its having served as a model and exemplar for trading in so many instruments in addition to foreign exchange.

It is obvious enough now (though it certainly was not so obvious then) that the same conditions that opened the niche for foreign currency futures also were present elsewhere-to wit, a virtually standardized product already heavily traded but in specialized markets to which only a small set of players had direct access. The CBT soon thereafter introduced GNMA (Government National Mortgage Association) futures-a contract that some regard as the first true futures in the strict sense of the term. Its claims for this honor may have to be filed posthumously, however, since current trading of even its much revised contract is down to less than two hundred contracts a day, and falling. Shortly after the GNMA, the CME introduced Treasury bill futures, a contract still very successful, with initial sand in the oyster in that case being provided by some special features of our tax law that gave substantial unintended tax benefits (since removed) to futures trading in T-bills.

From short-term T-bills it was an easy logical step to long-term Treasury bonds. (But the practical step was far from trivial because of the greater difficulty of standardizing instruments with difference coupons and maturities and with less regularity in the infusion of new supplies. The U.S. Treasury, moreover, was anything but supportive.) Long-term T-bonds, traded on the CBT, have now become far and away the leading financial futures contract in terms of daily trading

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volume. From Chicago, government bond futures trading has now spread to foreign money centers such as London where, one suspects, its impact in lowering transaction costs is likely to be even greater than it was in the U.S., given the more heavily cartelized trading structures there. In fact, financial futures must surely be given some of the credit for the wave of deregulation and decartelization now sweeping through the European (and to some extent even the Japanese) capital and money markets.

Had the impulse from the original financial futures innovation stopped at this point it would have been remarkable enough. But then came another extension that created enormous new potential for financial futures, a potential that has only just begun to be tapped.

### **Cash Settlement and the Increasing Abstraction of Traded Commodities**

The extension was “cash settlement.” The typical commodity futures contract gives the holder the right to demand delivery of the commodity at the agreed-upon price and the times, places, and quality grades specified in the contract. And the short, on the other side of the contract, has the corresponding obligation to deliver. In practice, relatively little physical delivery actually takes place. Most short contracts are liquidated by offset-i.e., by going into the market and buying an equivalent (standardized) contract. But some physical delivery does take place, and it can be, all things considered, an unnecessary nuisance. Not only must the physical costs of supporting the delivery system be incurred, but the right to demand delivery at contract expiration can confront

careless or unwary traders with delivery squeezes or corners when the time for contract closeout approaches. Maintaining a regulatory apparatus to deal with such closeout problems is one of the costs of futures trading.

Why then hadn't the delivery option been dropped in favor of cash settlement long ago? In part, and particularly for the traditional agricultural commodities, perhaps no spot prices were sufficiently tamper-proof to serve as an accepted basis for settlement. Cash settlement in such circumstances would change only the form, not the substance, of the squeeze problem. But that surely cannot have been the case for instruments such as foreign exchange or T-bills where large and active spot markets exist.

What prevented cash settlement in those instruments, even if it had been efficient to adopt it, was a provision of law. In many of the states in the U.S., notably Illinois, where the big exchanges are located, a contract settled by delivery, if only in principle, was a futures contract. But a contract that could be settled only in cash was a wager. And in most states (except for Nevada and parts of New Jersey) wagering, even between consenting adults, is illegal (unless, of course, the state owns the casino, as in the state lotteries, or is at least a major partner as in pari-mutuel betting).

These restrictive state laws, however, were superseded in 1974 by the federal regulatory statute setting up the CFTC (the Commodity Futures Trading Commission) as a successor to the CEA (the Commodities Exchange Administration) and giving the CFTC sole jurisdiction over futures markets. Since there

was no federal prohibition of gambling, cash settlement suddenly, if inadvertently, became conceivable.

The notion that the CFTC could contribute, even inadvertently, to innovation in futures trading will, of course, bring a smile to the face of anyone familiar with its subsequent history and reputation. The contribution of the CFTC to progress and innovation in futures markets has almost always been to slow it down and impede it. All new futures contracts must have CFTC approval before trading can begin. Delays in granting approval often run to a year or more; and even when the end is almost in sight and the traders are virtually lined up waiting for the starting bell, contracts have been sent back for further low-order but, at that point, costly revisions. All this, mind you, for new contracts whose potential had previously been studied in depth by the exchanges whose members will bear the risks if the contract fails (as, indeed, most of them do). And the amounts involved in developing new products are too large for frivolity. In the case of just the two recently introduced, and still largely unsuccessful, Over-the-Counter Index contracts, the Chicago Board of Trade and the Chicago Mercantile Exchange invested a combined total of five to six million dollars, an amount on the order of a quarter of the entire CFTC annual budget.

Although the original authorization of the CFTC in 1974 had the unintended side effect of displacing state restrictions on cash settlement of futures contracts, the legal steps that positively affirmed cash settlement were not fully in place until 1981. But once the CFTC had removed the major obstacles to this

innovation (other than itself, of course), two major steps forward soon were taken by the industry.

The first, and by far the more important in terms of current volume of trading, was a futures contract in common stock-not that of one particular company but of a whole portfolio of individual stocks. Since the settlement for the portfolio of stocks was to be in cash rather than by physical delivery, it was natural to focus on those portfolios most relevant for possible hedging purposes in the investment community, especially the institutional investment segment. And that suggested the major market indexes (and possibly also industry subindexes) of the kind already widely used in performance evaluation.

That judgment proved sound, but in some other respects there were major surprises. The problems associated with contract closeouts under the delivery system did not disappear; they only changed their form. The closeout on expiration days now involves not the shorts scrambling to deliver the spot commodity to the longs but the so-called "program traders" scrambling to unwind their arbitrage positions-either short the index futures and long the stocks or long the futures and short the stocks. On some days-the so-called "triple-witching days"-the actions of the program traders are sometimes reinforced by the similar arbitrage-related actions of the option converters and big fluctuations occur in the prices of some of the underlying stocks. If, say, the program traders and the option converters happen to have predominantly short positions in the stocks as the close approaches, then there will be a sudden surge in the demand for

shares to cover those short positions. The same excess demand arising at the opening of trade or during the course of the trading day can often be accommodated without a large price change by delaying trade until enough potential sellers have been notified and solicited. But when the imbalances pile up unexpectedly just before the close, the time is sometimes too short to hunt up additional outside counterparties. Price concessions to those on site may be the only balancing mechanism left before the final closing bell is rung. Alternative closeout procedures that will obviate these occasional wide price moves (and yet not kill the arbitrage demand for futures and options) are currently the subject of much active research and controversy.

The closeout problems, though they have attracted much attention, should not obscure the important economic contribution of financial futures in directly and indirectly reducing the costs of transacting in common stocks. The accomplishment of cash settlement futures on that front has been major, but there was one even more startling contribution of cash settlement to come.

The stock index futures were at least based on potentially tradable baskets of goods. And, indeed, the program traders and other arbitrageurs assemble just such baskets. But the next step in financial evolution was to indexes that were closer to being measures of abstract concepts than to deliverable bundles of commodities. There is futures trading now in ocean freight rates; and, more interesting yet, in "inflation," at least as measured by changes in the U.S. Consumer Price Index.

The CPI contract is, of course, the econo-

mist's dream contract. At last, people will be able to contract with each other in real terms exactly as they do in the price theory part of the textbooks. It is no accident that Milton Friedman, whose ideas helped get the whole thing started in 1972, has also been among the most eloquent champions of this extension as well.

However brilliant its sponsorship and however exciting the prospects of such a contract among professional economists, the CPI contract has not yet proved commercially viable. This failure reflects no lack of marketing skills on the part of the organizing entrepreneurs at the Coffee, Sugar, and Cocoa Exchange. The publicity surrounding the contract initiation and the subsequent efforts to pump up interest and trading volume have been ingenious. The campaign even included a contest whose prize was a free trip to the country with the highest rate of inflation. That was the second prize. The lucky first prize winner could settle for cash!

Nor has the languishing of the inflation futures market been just a matter of the substantial drop in both the level and volatility of inflation in the last two years or so, though that's clearly a major part of the story. Two monetarist economists were overheard recently discussing the fate of the CPI index market. The optimist said: "The trouble with the inflation futures market was that it came too late." "No," replied the pessimist: "Too early." We shall see.

My own feeling is that it did come too early, but not because I am predicting that a new surge of hyperinflation lies ahead. The problem lies rather with the current technology of futures trading. The colorful open-outcry method of futures trading is not just

a relic of the past as even some of the current CFTC commissioners seem to think. It is rather (as Sanford Grossman of Princeton University and I have come to appreciate in the course of a study we are currently undertaking on market liquidity) an extremely efficient way of supplying the service of "immediacy" in those markets, typically inventory-propelled or arbitrage-driven futures market, where the demand for speedy executions of trades is high. In markets where immediacy is less crucial, however, there may be cost advantages in other forms of market microstructure—such as the once or twice per day batch call market of some European stock markets. In those markets, the need is not so much for speed as for making sure that as many transactors as possible on the other side have been informed of an impending desire to trade.

For the CPI index and for the even more abstract follow-on products that have been suggested (such as the industrial production index or the index of housing starts) there is not much demand for immediacy—not enough, at least, to justify a competitive industry of traders standing around all day in the pit waiting to handle urgent, incoming orders. If financial futures in these abstract products are to succeed, some way must be found to separate—or "unbundle"—the futures contract and its clearinghouse infrastructure from methods of trading that have their comparative advantage at higher ends of the volume and urgency scale. Devising such a method of efficient trading of low-urgency contracts is not going to be easy. Important regulatory and competitive obstacles must be overcome. Perhaps the best way to overcome them at this point might be

to start fresh by moving these markets for more generalized hazards out of the U.S. to Britain and Europe where there are already functioning models to draw on, such as the fabled Lloyds of London.

### Financial Innovation: Is the Great Wave Subsiding?

And that brings me to my final theme. Is the great wave of financial innovation of the last twenty years likely to slow down soon? Or must we brace for further and possibly even more rapid bursts of innovation ahead?

The answer to these questions will certainly depend on what actually triggered the recent past surge. That the triggering had at least something to do with tax and regulatory changes is, I hope, clear enough from my admittedly somewhat impressionistic survey. But, of course, those triggers have always been with us. The process of adaptation and selective survival in response to tax and regulatory changes has been going on throughout recorded history, as has been called to our attention by the distinguished economic historian, Richard Sylla of North Carolina State University. Apparently we owe even such fundamental financial instruments as paper money to the same basic process—the sand in the oyster in that case having been the British government’s prohibition of the minting of coins by its then colonial subjects in North America. But something else seems to have happened about twenty years ago that shocked the system into a period of unprecedented rapid innovation.

I must confess that, despite much pondering, I have yet to come up with a completely satisfying first cause. There are certainly plenty of possibilities, both economic and

technological; but with the exception of the great oil shock of 1971-74, most had obvious counterparts at times (and often at several times) in recent past history. And, as for the oil shock, many of the key developments were under way well before it occurred.

Perhaps, then, there was no single, easily pin-pointed cause, but just the coincidental coming together of a whole set of seemingly unrelated (to borrow still another term from statistics) events and circumstances. Most of the critical tax and regulatory frameworks that supplied the motives for the financial innovations I have been describing were put in place in the 1930s. In that depressed and war-scared period, and even more so during the war and slow recovery years that followed, there were better outlets for innovative talents. We were just too poor and too distracted with other, more pressing concerns. The regulatory and tax constraints were not the most seriously binding ones.

By the middle and late 1960s, however, the recovery in world wealth (and trade) had proceeded so far that the taxes, interest rate ceilings, foreign exchange restrictions, security sales regulations, and other anticompetitive controls slapped on in the '30s and '40s were becoming onerous. It was not so much that new tax and regulatory burdens were being imposed (though that was happening too) but more that the existing burdens were increasingly binding-particularly so given the surges in the level and volatility of prices, interest rates, and exchange rates that were erupting in those years. The innovative wave then triggered was much like a snake bursting through its old skin.

If this view is correct, the prospect for the future is for a slowing down of the rate of

financial innovation. Note that I said a slowing down of the rate of innovation, not an end to further progress. Clearly much growth and improvement are still in prospect, especially in the important area of real estate and in market competition across countries and over the hours of the day. Nor should this slowing down in the rate of innovation in the coming twenty years be deplored. It will be good news, not bad, if it means that many of the inefficient tax and regulatory structures inherited from the '30s and will have been driven at last from the scene along with so many of the obsolete economic and political doctrines that gave rise to them.