An Inquiry Into Recent Financial Innovation

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During the 1980s there has been an explosion in financial innovation, first in the United States and now in Europe and the developed countries of the Far East. The numbers and variety of financial innovations today exceed by orders of magnitude those which have gone before. Much more is likely to come, particularly in countries deregulating their financial services industries. For the most part, these financial innovations will make more efficient the flow of savings in society, while at the same time they expand the choice set and the ability to shift risk.

In this paper the theoretical foundations for financial innovation are investigated, as are the environmental changes necessary to move the system from steady-state equilibrium and to cause such innovation. Recent financial innovations having international applicability are explored as to why they occurred. As we will see, many are linked to common underlying causes. This is followed by an assessment of what the future has to hold with respect to financial innovation.

I. The Role of Financial Markets and Financial Innovation

The purpose of financial markets is to efficiently allocate savings in an economy (current income less current consumption) to ultimate users of funds, whether it be for investment in real assets or for consumption. Costs necessarily are involved in bringing together ultimate savers and ultimate users of funds either directly or indirectly through one or more financial intermediaries. There are transaction costs, information costs, pooling-of-savings costs, administrative costs, and diversification costs. To the ultimate saver and ultimate user of funds, these costs are reflected in the difference, or spread, between what the one party receives in expected return and what the other pays, holding risk constant. This notion is simply the divergence between borrowing and lending rates in the *Fisher*ian model of interest determination.[1] It can be shown that the less the divergence, the closer one

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[1] See *Fisher* (4). For an illustration of model, see *Van Horne* (11), Chapter 3.

comes to a production optimum.[2] In addition to divergent borrowing and lending rates, costs are reflected in fees that are charged and, indirectly, in any inconvenience experienced by either or both parties.

Thus, financial intermediation is not a costless process.[3] In addition to having to be borne by consumers of financial services, these costs impede the equilibration process. In this setting, financial innovations come about in order to exploit profit opportunities arising from inefficiencies. New financial products and processes are introduced to do a more effective job of channeling savings in society, thereby reducing the operational costs of financial intermediation. One of the signs of efficient financial markets is that when opportunities for profit exist or arise, financial innovations come into being to exploit the opportunity. With competition among providers of financial services, the divergence between buying and selling prices is narrowed and, by definition, the financial markets become more efficient. Thus, one of the economic foundations of financial innovation is to make the market more efficient operationally.

The second foundation is to exploit an incomplete market. A complete market is said to exist when a distinct marketable security corresponds to every time-state contingency. To illustrate, assume a one-period model and a situation where there are n possible states of the world at the end of the period. Assume further the existence of *Arrow-Debreu* primitive securities, where P_j is the market price of a one mark claim in state j. Each primitive security pays one mark in state j and nothing in other states of the world. The existence of such securities in sufficient quantities will make the market complete. Consider now a risky, more complex security that will pay X_j in state j.[4] Assuming this security is traded in markets, its value is

$$V_j = \sum_{j=1}^{n} X_j P_j$$

Similarly, other risky securities would be valued in this manner. Arbitrage would assure that the market value of a security equalled its present, certainty-equivalent value, and that equilibration across securities prevailed.

Incompleteness of financial markets, where all time-state contingencies are not spanned by marketable securities, affects the equilibrium prices of securities determined in the manner above. In essence, the P_j, or market

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[2] See *Hirshleifer* (6), Chapter 7.

[3] For analyses of transaction costs and the costs associated with financial intermediation, see *Demsetz* (2), *Leland* and *Pyle* (8), and *Van Horne* (11), Chapter 1.

[4] This line of reasoning follows *Hirshleifer* (6), Chapter 9.

prices, for various states not spanned would be different. For the multi period situation, they would be the P_{tj}, where the subscript refers to state j at time t. With incomplete financial markets, it may be possible to tailor a security to the unfilled desires of market participants. By so doing, certain contingent time states not previously spanned will be partially or wholly filled with securities. Assuming there is a desire by investors to have this gap filled, the P_{tj} should increase and the issuer will affect a gain vis a vis other securities that might be issued.

In reality, there simple are too many time-state contingencies in the world for financial markets ever to be truly complete. It is a question of moving toward completeness, not eliminating incompleteness. Moreover, inefficiency and incompleteness are interrelated. Imperfections often will make the market less complete as well as less efficient. Therefore, it is a matter of degree by which the financial markets become more efficient and more complete through financial innovation.

In what follows we assume that the economic foundation to financial innovation is making the markets more efficient operationally and/or more complete. While we would expect ideas without underlying economic substance to quickly languish in a competitive market environment, some continue surprisingly long with rather handsome fees to the promoters. In another paper (12), I explore irrational behavior on the part of market participants at least some of the time.[5] In such an environment as well as one where speculative excesses prevail, it is possible for financial products and processes to be introduced which do not have economic substance and for them to survive for a longer period of time than would seem rational. While ultimately corrected by market forces, these excesses have a cost in promoter fees and dislocations in resource allocation. As the marketplace becomes better informed, the response to new ideas will become more rational and effective in discriminating among those with economic foundation and those without. Although we should be mindful of certain excesses, the focus of this paper is not upon them. Rather it is on financial innovations making the markets more efficient and/or complete.

[5] Among the products promoted which lack partially or wholly in economic foundation, I listed defeasance, certain interest-rate swaps, issuance of put options against bond holdings in order to alter accounting income, equity-for-debt swaps, the sale of high yield "junk" bonds to savings institutions, and leveraged buyouts.

II. The Catalyst for Change

In steady state equilibrium, the financial markets would be highly efficient, though not perfectly so because of certain remaining imperfections. In addition, they would be reasonably complete in the sense of there being little or no unfilled desires of investors when it came to the characteristics of securities being offered. Characteristics include such things as maturity, coupon rate, call feature, sinking fund provision, protection or lien, default risk, marketability, option component, and tax feature. In steady state with competition, the securities that should have been offered and the operational efficiencies that should have been achieved already will have happened. As a result, there will be no financial innovation – no new financial products and processes.

For financial innovation to occur there must be change in the environment. What are some of the changes? 1) Regulatory change; 2) tax law changes; 3) technological advances; 4) changing interest rate and currency levels as well as volatility; and 5) changes in the level of economic activity. With a change in one or more of these factors, the equilibrium is upset. Profit opportunities arise, and new financial products and processes are introduced to exploit the opportunity. Although all of the factors mentioned are important, perhaps the most important today is regulatory change. We briefly explore the other four factors and then concentrate on this factor.

When tax laws change, the equilibrium structure of risk versus after-tax return is changed. As a result, new financial products often emerge as do revisions in existing products. New technology in computer-based information and funds transfers prompts changes in the delivery of financial services. The changes here tend to be process changes directed to making the market more efficient operationally. To remain competitive, efficiency is crucial and those that do not adapt to new technology are quickly left behind. To survive, a financial intermediary must be cost effective in processing transactions.

Rapidly changing inflation and fluctuating nominal and real rates of interest provoke the introduction of new financial instruments. Volatile exchange rates have a similar effect, so we will consider them jointly. Increased interest-rate and/or currency volatility cause a number of market participants to want to shift risk to others. Examples include the development of interest-rate futures, currency futures and options markets, swap markets across maturities and currencies, and various other hedging devices.

Closely related to volatility of inflation and interest rates is the level of economic activity. In periods of economic prosperity, the focus tends to be on growth, and the thrust of new product development is on achieving this objective. In a sharp recession, such as that which occurred world wide in the early 1980s, the focus shifts to risk reduction. The sharp recession coupled with price declines for export products of less developed countries resulted in an inability to service external debt. In the world debt crisis which has ensued, proposals to link debt service obligations to the foreign exchange earnings or to commodity prices have been discussed.[6] Such financial innovations as commodity or trade linked bonds, index bonds, the use of options and swap markets to limit risk and/or to cap interest rates, bonds hedged in the commodity markets, and other devices hold promise.

III. Deregulation

Last but not least is the change in environment caused by changes in regulations. *Silber* (10) portrays financial institutions as maximizing a utility function subject to constraints. When the constraints are changed, the shadow prices, or dual variables, change. Financial innovation is said to be an adaptive response to these shadow price changes. Whether a linear programming format fully describes financial innovation is questionable, but what is clear is that when constraints to financial behavior are reduced, market participants enter new lines of business possessing previously unattainable profit and/or risk reduction possibilities. In the United States, dramatic deregulation of the financial services industry occurred beginning in the late 1970s.[7] Banking, savings institutions, insurance, securities firms, mortgages, payments mechanisms and many other aspects of financial services have been deregulated. Geographic and product differentiation, once the hallmarks of the financial services industry, are now very difficult to sustain. Barriers to entry have been largely dismantled, competition heightened, and a lower average pricing of services followed. In this atmosphere, financial innovation flourished.

Presently, deregulation of financial markets is occurring in Britain, France, Germany, Japan, Netherlands, Switzerland as well as some other countries. The regulations previously in place in many of these countries were rather rigid. The result was that circumvention of regulations, such as occurred in the United States in the 1970s, was relatively minor. Although

[6] For a discussion of cash flow matching, see *Lessard* and *Williamson* (9).

[7] For an excellent analysis of the effects of deregulation in the United States, see *Gart* (5).

deregulation of financial markets in the countries mentioned above lags that which occurred in the United States, the eventual impact on financial innovation may be even greater.

Whatever the nature of the catalyst – deregulation, fluctuating inflation, interest rates and exchange rates, the level of economic activity, changes in tax laws, or technological advances – financial innovations occur in response to profit opportunities. In turn, these opportunities largely arise from operational inefficiencies in financial intermediation and/or incompleteness in financial markets. In competitive markets, the profitability of a financial innovation to its original promoter will decline over time. The profitability associated with a new product or process does not go unnoticed. Others enter the marketplace with a like product or process. As this occurs, the profit margins of promoters erode and consumers of financial services increasingly benefit from the financial innovation. While initially the promoter takes most of the benefits, this does not last for long with competition. Increasingly, these benefits are realized by the consumer in a lower cost to financial intermediation, greater choice, and in less inconvenience. This occurs only if the financial markets are truly competitive. Temporary monopolistic positions and barriers to entry will allow promoters to hold on to more of the benefits and for a longer period of time than will occur in a completely competitive environment.

IV. Illustrations of Exploiting Inefficiencies and Incompleteness

With these principles in mind, we turn to specific financial innovations and trace through their foundations and why they came about. All but the first will be recent in origin. This discussion will be followed by an assessment of the future of financial innovation.

Perhaps the most dramatic illustration of the foundations of financial innovation is the origin of the Eurodollar market in the early 1950s. At the time, New York banks were offering 2 percent for foreign deposits. At the same time, they were charging approximately 5 percent on prime grade, unsecured foreign loans. The differential of 3 percent was substantial. This divergence between borrowing and lending rates was well in excess of costs borne by the New York banks in the intermediation process. Most of it was profit, and this represented an opportunity. European banks and other financial institutions could gather dollar deposits by offering a higher rate, say 3 percent, than paid by the New York banks. At the same time, they made prime grade dollar loans at a lower rate, say 4½ percent. Operating on a wholesale basis with little overhead costs, these institutions successfully

intermediated between a spread set by the New York banks. In so doing they made the financial markets more efficient operationally by providing higher interest returns to savers and lower interest costs to borrowers. Of course, the Eurodollar market has grown dramatically since the 1950s and the interest-rate spread has been reduced considerably. The origin of this market serves as a dramatic example of financial innovation based on exploiting a market inefficiency. Perhaps the greatest financial innovation of our time.[8]

With respect to exploiting market incompleteness, a good example is the introduction of zero coupon bonds and coupon receipt products in the early 1980s. Beginning in 1981, some U.S. corporations began to offer zero coupon bonds, where the bond's return is expressed entirely in terms of the price appreciation to maturity. In addition to the original issue of pure discount bonds, a process known as coupon stripping – the separation of the coupons from the principal amount of a bond – began in 1982. Once separated, each coupon and each principal payment became a separate zero-coupon bond. Mechanically, an investment bank buys a U.S. Treasury security and holds it in trust. Participations are sold in the coupons and principal payments. When the Treasury makes an interest or principal payment to the trust, it is immediately paid to the holder and the zero coupon instrument is extinguished. These instruments are known as receipt products and a number of investment banks offer them. In 1985, the U.S. Treasury began to offer its own zero coupon product, known as STRIPS, which allowed the investor to strip a coupon bond. Shortly after issuance, STRIPS became a major force in the market and the benchmark against which other zero coupon instruments were judged. Also, in 1985 we witnessed the first non dollar zero coupon bonds. Deutschmark, Swiss Franc and Yen denominated zeros were issued.

So much for what has happened. Why did it happen? The answer is that before their introduction, a gap existed in the instruments available. Thus, an incomplete market was the foundation on which exploitation occurred. Many institutional investors, such as pension funds, dedicate their portfolios so that the likely payment stream from investments approximates some specified stream of liabilities, such as pension fund payments. With coupon bonds, there is both price risk and coupon reinvestment risk. While one can try to balance these two risks against each other, perfect immunization is not possible.[9] In contrast, with zero coupon instruments perfect

[8] Many books have been written about the Eurodollar market and its origin. Among them, see *Einzig* (3) and *Johnston* (7).

[9] See *Van Horne* (11), Chapter 6 for a discussion of bond portfolio immunization and the duration measure used in such immunization.

immunization is possible. The single future payment is known with certainty. An institution can purchase only those bonds that precisely fit its liability needs. Moreover, zero coupon bonds enable one to go out 30 or more years in duration whereas with coupon bonds one is restricted to about 10 years. This is a desirable property when it comes to managing the volatility of a bond portfolio. Thus, there was an unfilled desire by investors at the end of 1980. This desire was accentuated by a volatile interest rate environment. By tailoring a security to the unfilled desires of investors, issuers and investment banks were able to exploit a profitable opportunity. As these securities were offered in increasing quantities and directed to special investor needs, the market became more complete.[10] Zero coupon bonds are perhaps the best example of filling a gap in the market.

V. Other Recent Financial Innovations

Numerous other financial innovations have occurred in the 1980s. Table 1 lists some of the more prominent product innovations. The table is not an all inclusive listing by any means, but representative of what has been happening. Rather than discuss all of them, we will focus only on a few. These, together with the ones already discussed, will give insight into financial innovation and its economic foundation, assuming that such a foundation exists.[11] The examples selected are not specific to U.S. tax laws, but have international applicability. In order, we will take up: interest-rate futures and options; interest-rate and currency swaps; the securitization of assets; and interest cap and floor loans. This will be followed by a summary and an assessment of the future of financial innovation.

An important financial innovation has been the development of interest rate futures and options markets. Futures markets began in the mid 1970s and now include contracts on various Treasury securities, on certificates of deposit, on municipal securities and on Eurodollars. Options on Treasury securities and on interest-rate futures began in 1982, long after the stock

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[10] Initially, tax laws created certain advantages to the issuance of zero coupon bonds. In the United States, corporate issuers were able to realize a small present-value tax advantage because amortization of the discount was straight line. That tax provision was changed in 1982, and now there is essentially no such advantage. For investors in Japan, the appreciation in value of a zero coupon bond was initially treated as a capital gain with favorable tax consequences. That tax advantage has been largely closed. As the tax reasons for zero coupon bonds are transitory, we do not focus upon them.

[11] Again see *Van Horne* (12) for a discussion of ideas posed as financial innovations, but which are lacking in economic substance.

Table 1

Recent Financial Innovations

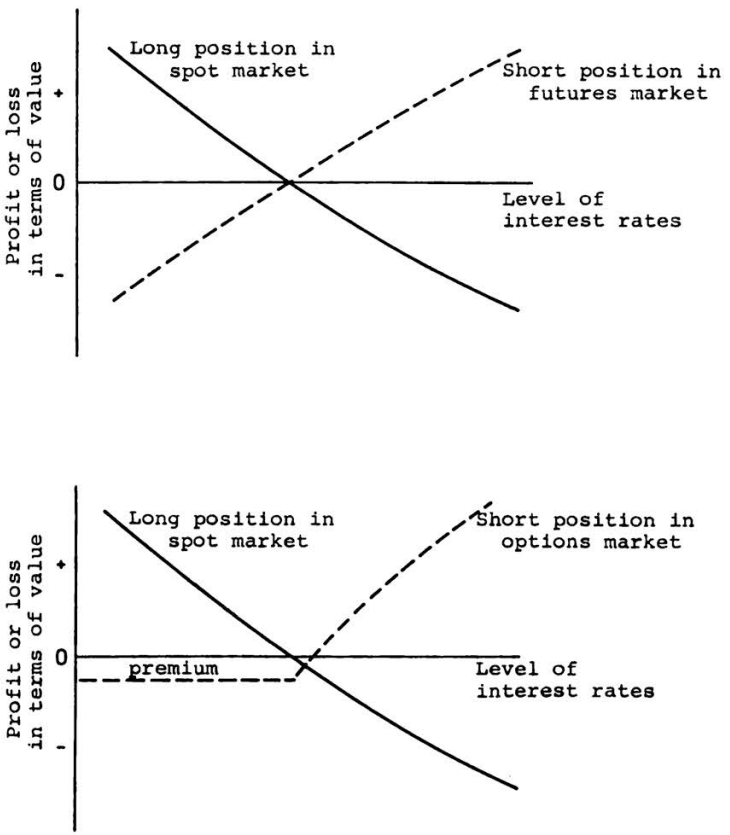
- Interest rate and stock index futures
- Interest rate and stock options
- Zero coupon bonds and coupon stripping
- Adjustable rate and money market preferred stock
- Securitization of mortgages
- Securitization of other assets
- Interest rate and currency swaps
- Loan contracts with caps and floors
- Universal life insurance policies
- Municipal bond mutual funds
- New variations of floating rate debt
- Bonds with put options
- Currency option loans
- Exchangeable debt instruments, often floating into fixed rate
- Yield curve notes whose yield increases when interest rates decline and vice versa
- New variations of note and bond issues in countries other than where the borrower is domiciled
- Indexation of security portfolios
- Issuance of and investment in high yield (junk) bonds
- Bonds with detachable options

options market developed in the early 1970s. Interest-rate futures and options markets are used to shift risk. In the case of the futures markets, hedging involves taking a futures contract position opposite to the position taken in the spot market. As a result, risk is largely neutralized throughout all interest rate movements. This is shown in the upper panel of Figure 1 for a party that has a long position in the spot market (owning it outright) and a short position in the futures markets. Interest rate movements have offsetting effects on the values of these two positions, regardless of the direction of the interest rate change.[12]

[12] Basis, or residual, risk still remains, as it is not possible to achieve a perfect hedge.

Figure 1

Hedging with Interest-Rate Futures and Options



In contrast, options are suitable only for hedging risk in one direction. If a fixed income security were held long in the spot market and a put option were taken out against this position, the investor would be largely protected against interest rates rising. However, for this protection a price or premium must be paid for the option. These relationships are shown in the lower panel of Figure 1.[13] Interest rate options help financial institutions hedge fixed-rate loan commitments. If interest rates go up, a high proportion of

[13] Assumed in this figure is that the value of the option position is the value of bonds minus the exercise price and minus the premium paid for the option, or the premium (negative) value, whichever is greater. The figure illustrates the expiration date value of an option as opposed to the market value of an option prior to expiration. The latter would be concave to the dashed line in the lower panel of Figure 1.

these commitments will be utilized by borrowers. If they go down, many will let the commitment lapse and borrow on more favorable terms elsewhere. A put option protects the institution against this "one-directional" risk.

The futures and options markets described can be combined with currency futures and options to hedge positions in foreign securities. The development of these markets are all part of an expanded ability to shift risk and to create synthetic, or derivative, securities by combining spot, futures, options and currency contracts. As a result, a corporation, a financial institution or an individual can manage interest rate risk more effectively.

The development of futures and options markets illustrates taking advantage of market incompleteness with respect to risk shifting. As interest rates became more volatile in the late 1970s and early 1980s, the desire for risk shifting devices expanded. Volatility in currency exchange rates also contributed to this desire when it came to international transactions. While increased volatility of fixed-income security prices was a principle impetus, deregulation also was a factor in permitting some of these markets to develop more fully. Another impetus was the increased popularity of portfolio insurance where, for a price, downside movements in stock or bond values are protected against. The means for protection involve the markets discussed above.

Finally, the internationalization of capital markets was a factor. For example, the development of Eurodollar futures and options markets was associated with more and more bank loans and bond issues being tied to LIBOR, as opposed to a domestic interest-rate index. The trend towards internationalization of futures and options is likely to accelerate with the deregulation of financial markets in the countries mentioned earlier. As a result, continuing financial innovations in risk shifting devices will occur. The underlying cause for this innovation is taking advantage of an incomplete market.

Closely related to the development of the interest-rate futures and options markets is the development of debt swaps, which involve floating rate for fixed rate and cross currencies as well. Interest rate swaps started in the late 1970s, and the market has developed very rapidly with a large variety of international participants. In a swap, two parties are involved who usually are brought together on a "blind" basis by a financial institution as an intermediary. One party typically agrees to make fixed-rate interest payments, while the counterparty agrees to make floating rate payments. Each party may enjoy an advantage in financing either with a fixed rate loan or with a floating rate loan, particularly when the two parties are from different

countries. Because of market segmentation and incompleteness, it is advantageous to offer a particular type of security – in this case either fixed rate or floating rate.

In the simplest case, the fixed-rate payer simply swaps its obligation with the floating rate payer and vice versa. Therefore, the first party effectively sells a fixed rate security, but takes on a floating rate interest obligation and vice versa. Basically all that is swapped is the interest payment obligation, the principal obligation is not exchanged. In an asset-based swap, an investor may pay a fixed interest rate and receive a floating rate or vice versa. In this way, issuers of securities and investors can transform the nature of the obligation. There are many, many variations of swaps involving complex linkages of different parties, obligations and currencies.

Like the previous financial innovation, the development of the interest rate and currency swap markets is part of the larger market for risk shifting devices. In this regard, it was prompted by the volatile interest rate and currency markets of the late 1970s and the 1980s. In addition, taking advantage of market segmentation across markets and currencies was important. By so doing, interest costs can be lowered with both parties gaining from the swap. Thus, the development of the swap markets makes the financial markets more complete and reduces market segmentation, an imperfection. We can expect interest rate and currency swaps to continue to grow.

Another financial innovation that merits investigation is the securitization of various assets. The securitization of assets first began in the early to mid 1970s with residential mortgages. Various individual mortgages are pooled together into a package, and securities are sold against that package. In the case of a pass-through instrument, the investor receives interest and principal payments proportional to his/her ownership of the package. In other words, as interest and principal payments are made by the mortgages they are passed through to investors after a servicing fee has been deducted. The securitized package also can be guaranteed by an insurance company, by another financial institution or by the government, all of which enhances the credit worthiness of the securities being issued.

In addition to residential mortgages, other assets are beginning to be securitized: commercial mortgages, automobile loans, lease contracts on plant and equipment, commercial business loans, commercial receivables and credit card receivables. In all cases, the idea is to pool individual assets having a common attribute and to sell securities to investors backed by this package of assets. In this way investors do not make direct loans, where considerable expertise and record keeping are required. Instead a security is

bought on the basis of its expected risk and return. Diversification works through the law of large numbers, and the default experience on the pooled assets can be estimated with reasonable accuracy.

The securitization of assets has made more efficient the allocation of savings. In the case of mortgages in the United States it has greatly mobilized the flow of funds into mortgages. In the 1950s and 1960s, the mortgage market was largely an aggregation of local markets with geographical yield differentials. The financial innovation described has resulted in a national mortgage market, considerable marketability, and elimination of geographical yield differentials. As a result, the mortgage market in the United States is much more efficient than before, and the recent spread of this movement to other assets is likely to result in improved efficiencies and marketability for these assets. The securitization of assets serves as an example of taking advantage of market imperfections and incompleteness. It has international applicability, though we have seen little of this so far.

A recent instrument that has found reception in a number of countries is the debt issue with a cap or floor. The idea is that either the issuer or the investor benefits from interest rate movements in one direction, but is protected in the other direction by the cap or by the floor. Focusing on the cap arrangement, which is the most prevalent, the loan itself might be floating rate up to the cap, or ceiling rate. The cap usually is set on the basis of an index: LIBOR, the prime rate, the C.D. rate, etc. If LIBOR for example, the interest rate on the loan will float at the LIBOR rate, or at some differential from LIBOR. In such a loan, the cap level might be 9 percent. In order to obtain this upside interest cost protection the borrower must pay a front-end fee or premium. This fee might be 1½ percent on a three-year contract, and it raises the overall cost of borrowing.

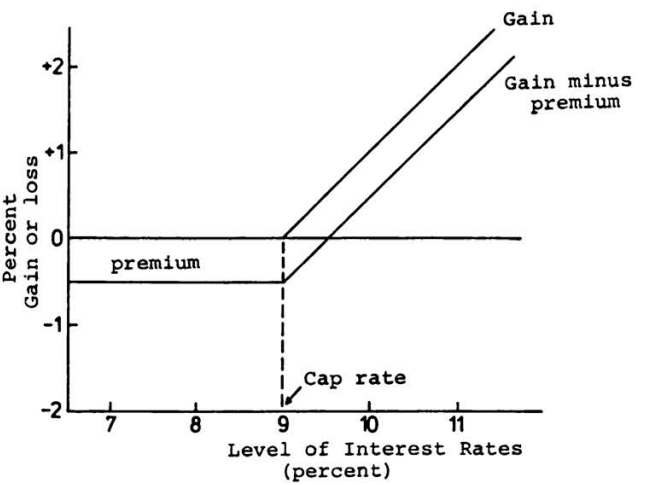
The pattern of payout for the cap loan borrower is shown in Figure 2. This figure assumes a one-year horizon and a single shift in interest rates which remains for the full year. As we see, if the interest rate is 9 percent or less the borrower gains nothing from having the cap feature, and ends up paying an assumed premium of ½ percent. It is only if interest rates rise above 9 percent that the cap takes on value in the sense of saving the borrower money over what would be the case in the absence of this feature. In each situation, the opportunity gain is offset by the amount of the premium. The underlying valuation principle is that of any option, and option pricing theory may be employed.[14] The primary driving factor is the volatility of interest rates; the

[14] The most famous option pricing model, and the forerunner of work in this area, is by *Black* and *Scholes* (1).

greater the variance of future interest rates, the greater the value of the cap option to the borrower. This can be visualized in Figure 2, where the potential saving from lower interest rates is unbounded while the potential cost arising from higher interest rates is bounded. The greater the variance of interest rates, the greater the possibility that the option will have significant value. In the market equilibration process, of course, we would expect the lender to demand a higher premium. Figure 2 looks like the diagram for any call option or instrument of this kind; value depends importantly on the variance in the value of the associated asset.[15]

Figure 2

Interest Cap Loans Gain or Loss to the Borrower



The interest rate cap and floor loan market began to develop in 1983, though such lending arrangements have been around for a number of years. With the volatile inflation and interest-rate environment of the late 1970s and early 1980s, it became increasingly important to find ways to shift risk and to hedge. Similar to the development of options, future and swap markets, the financial markets were incomplete with respect to the risk-shifting devices available. The cap loan protects the borrower, whereas the floor loan protects the lender. To the extent either party wishes to lay off one-directional risk they can do so. The cost to them is the premium necessary to

[15] Other variables include the time to expiration and the short-term interest rate.

entice another party to underwrite this risk. Frequently the other party will hedge their risk either in the futures market or by balancing it against offsetting risk. The premium adjusts with supply and demand conditions which, in turn, are affected by the volatility of interest rates. Thus, the development of the cap and floor loan market permits better risk management, and is a financial innovation prompted by interest rate risk.

VI. Conclusions and Implications for the Future

The financial innovations discussed, as well as many more not discussed, have served to make the financial markets more efficient and more complete. These are the foundations on which any financial innovation must be built if it is to have economic viability and sustainability. For consumers of financial services, innovations have worked to lower the cost of financial intermediation, widen the choice of financial instruments in which to invest and which to issue, and lower the cost of inconvenience in some cases. There usually is nothing proprietary about a financial innovation. Once an economically viable financial innovation appears, other financial institutions quickly follow with copies of the earlier product or modifications of it. These "followers" represent the cleansing forces of competition. Without them, the initial promoter would be able to retain a large profit margin for itself. Only as promotor profit margins erode are the benefits of a financial innovation realized in any meaningful way by consumers of financial services. Initially, most of the economic benefit is captured by the promoter.

The financial markets in the United States are characterized by considerable competition. Much of this is due to deregulation of the financial services industry. With deregulation not only do consumers of financial services benefit with rapidly declining promotor profit margins, but innovation becomes essential for the survival of a financial institution. With the deregulation now taking place in Britain, France, Germany, Japan, Netherlands, Switzerland and other countries, we can expect financial innovation to accelerate. The heightened competition should result in consumers of financial services increasingly enjoying the economic and choice benefits of financial innovation. With the extensive reforms underway, non dollar instruments – Deutschemark, Franc, Guilder, Sterling and Yen – increasingly will be used in financing, and such currencies will enjoy increased use as international currencies. We already are seeing increased financial innovation and competition internationally, and much more will come. As non-dollar currencies and financial instruments increasingly are utilized, the meaning of currency exposure and its management will change.

In addition to deregulation, an important stimulus for change has been volatile inflation and interest rates during the last eight years. As we have seen, several of the financial innovations discussed were responses to this stimulus. While inflation and interest rates are much lower and better behaved than they were in the early 1980s, this can change. Tax law changes, another stimulus to financial innovation, are largely a local phenomenon with an occasional spillover effect internationally. The 1986 tax reform in the United States will cause alteration in existing financial products, and similar things will occur in other countries as tax laws change. While these last two stimuli, as well as the level of economic activity and technological advances, will continue to be important, probably the most important stimulus internationally will be deregulation.

The trends toward more marketable, depersonalized, rate-sensitive financial instruments as well as toward increasing means for risk shifting will continue to accelerate. The essential ingredient for financial innovation, change, is all about us. New hedging strategies and synthetic security creation with spot, currency, options and futures markets will change the face of financial intermediation. In summary, there is every reason to believe that financial innovation will continue to flourish. With these new developments, the avenues for financial and economic research will expand.

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Zusammenfassung

Eine Untersuchung über neue Finanzinnovationen

Finanzinnovationen entstehen, weil Finanzmärkte ineffizient und unvollständig sind. Finanzinnovationen bewirken über eine Senkung der Kosten der Finanzintermediation eine effizientere Allokation des volkswirtschaftlichen Sparkapitals. (Beispiele: Entwicklung des Eurodollarmarktes mit der Folge sich verengender Zinsmargen sowie das jüngste Phänomen der Securitization). Die Finanzinnovationen verringern auch die Unvollständigkeit von Finanzmärkten, an denen die existierenden Finanzierungsinstrumente nicht alle Bedürfnisse der Marktteilnehmer befriedigen können. An solchen unvollständigen Märkten lassen sich für die Erfüllung solcher Bedürfnisse höhere Preise erzielen als im Wettbewerbsgleichgewicht eines vollständigen Marktes. (Beispiel: Einführung der Zero-Bonds in den achtziger Jahren).

Finanzinnovationen, die Effizienz und Vollständigkeit von Finanzmärkten nicht steigern, sind ohne ökonomische Substanz. Sie entstehen aufgrund irrationalen Verhaltens oder spekulativer Exzesse der Marktteilnehmer. Nach Ansicht des Verfassers werden sie stets nur eine kurze Lebensdauer am Markt haben können.

Die Ursachen für Ineffizienz und Unvollständigkeit von Finanzmärkten sind zahlreich. Zum Anstoß für Finanzinnovationen wurden insbesondere: die Änderung aufsichtsrechtlicher Vorschriften, steuerrechtliche Änderungen, Änderungen des Niveaus der wirtschaftlichen Aktivität, Zins- und Wechselkursänderungen und der technische Fortschritt, insbesondere in der Kommunikationstechnik.

Nicht hinreichend leicht und kostengünstig abwälzbare, mit der Volatilität von Zinsen und Wechselkursen enorm gestiegene Zinsänderungs- und Währungsrisiken haben zu einer Reihe bedeutender Innovationen geführt. Zins- und Währungs-Swaps, Zinsterminkontrakte und Optionen haben die Möglichkeiten zur Allokation solcher Risiken erheblich erweitert. Die Unterschiede des Hedging mit Zinsterminkontrakten und Optionen werden im Rahmen der Begrenzung von Zinsänderungsrisiken ebenso behandelt wie variabel verzinsliche Anleihen, die mit einer Obergrenze oder einem maximalen Schwankungsbereich des Zinssatzes ausgestattet sind. Mit Hilfe der Optionspreistheorie wird der Wert der Zinsobergrenze für den Schuldner in Abhängigkeit von der Varianz der zukünftigen Zinssätze dargestellt.

Summary

Study on Financial Innovations

Financial innovations are the result of inefficient and imperfect financial markets. Reduced costs of financial intermediation in the wake of financial innovations help to make the overall allocation of savings capital more efficient. (Examples: development of the Eurodollar market with the consequence of narrowing interest spreads as well as the latest phenomenon of securitization.) Financial innovations also reduce the imperfections of financial markets on which the existing financial instruments are not in a position to meet all the requirements of market participants. On imperfect markets it is possible to obtain higher prices for the satisfaction of such requirements than in perfect markets with balanced competition. (Example: introduction of the zero-bond in the 1980s.)

Financial innovations, which do not increase the efficiency and perfection of financial markets, are without substance in economic terms. They owe their existence to irrational modes of behaviour or excessive speculation by market participants. In the author's opinion, they will always be shortlived.

The causes for the inefficiency and imperfection of financal markets are varied. For example, causes of financial innovations have been regulatory changes, tax law amendments, changes in the level of economic activity, interest and exchange rate modifications, and technological progress, especially in the communications technology.

Enormously increased interest rate and currency risks that cannot be shifted with the requisite ease and cost-effectiveness and are the result of the volatility of interest and exchange rates have resulted in a number of important innovations. Interest and exchange rate swaps, interest rate futures contracts and options have substantially widened the scope for the allocation of such risks. In order to contain the interest rate fluctuation risk, different hedging practices, i.e. interest rate futures contracts and options, are treated in the same way as variable interest rate loans, which carry a maximum interest rate or fluctuate within a maximum margin. With the help of the option price theory, the maximum interest value is reflected as a function of the variability of future interest rates.

Résumé

Une étude sur les innovations financières

Des innovations financières apparaissent parce que les marchés financiers sont inefficaces et incomplets. Au-delà d'une réduction des coûts des intermédiaires financiers, les innovations financières permettent au capital d'épargne d'une économie d'être alloué de façon plus efficace. (Exemples: évolution du marché de l'eurodollar, qui a entraîné des marges entre les taux d'intérêt débiteurs et créditeurs plus étroites ainsi que le phénomène récent de la Securitization.) Les innovations financières réduisent également l'imperfection de marchés financiers sur lesquels les instruments de financement existants ne peuvent guère satisfaire à tous les besoins des participants au marché. Pour y satisfaire, il faut payer sur de tels marchés impar-

faits des prix plus élevés que sur un marché parfait avec un équilibre concurrentiel. (Exemple: introduction des Zero-Bonds dans les années 80.)

Des innovations financières qui ne rendent pas les marchés financiers plus efficaces et plus parfaits n'ont aucune substance économique. Elles naissent du comportement irrationnel ou d'excès spéculatifs des participants au marché. De telles innovations, selon l'auteur, ne peuvent toujours survivre que brièvement sur le marché.

Les causes de l'inefficacité et de l'imperfection des marchés financiers sont nombreuses. Pour les innovations financières, l'auteur nomme principalement la modification de règlements du droit de surveillance, des modifications de droit fiscal, des changements du niveau de l'activité économique, des variations des taux d'intérêt et des taux de change et le progrès technique, spécialement dans la technique de la communication.

Des risques de modification des taux d'intérêt et de change, trop difficilement transférables et ceci, à des coûts trop élevés, et énormément accrus avec les taux d'intérêt et de change volatiles, ont entraîné une série d'innovations importantes. Les swaps d'intérêt et de change, les contrats à terme d'intérêts et les options ont fortement élargi les possibilités d'allocation de tels risques. Les différences de hedging avec des contrats à terme d'intérêts et des options sont traitées, dans le cadre de la limitation des risques de modification des taux d'intérêt, de la même façon que des emprunts à taux d'intérêt variables qui sont munis d'une limite supérieure ou d'un domaine de fluctuations du taux d'intérêt maximal. A l'aide de la théorie des prix d'option, l'auteur présente la valeur de la limite supérieure des taux d'intérêt pour le débiteur en fonction de la variance des taux d'intérêt futurs.