DRAFT 29 December, 2009

Innovations in Derivative Securities: Successes and Failures

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Abstract

This paper surveys the evidence available on the determinants of new financial product innovation, in order to ascertain causes of the explosive growth in derivatives over the past decade. That discussion focuses upon the incentives for innovation generally and for development of specific products, and examines the process of product development. The focus then turns to the question of what constitutes a successful innovation, and what factors can be identified which explain successes and failures. The paper concludes with some discussion of derivatives which have been successes and failures in the Australian market, and of some proposed potentially attractive derivatives, which have not been brought to market.

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[*] Prepared for the Melbourne Money and Finance Conference, Ballarat, December 1 -2, 1995

Introduction

This paper examines the incentives for development of new derivatives and surveys evidence on explanations for the success or failure of newly introduced derivatives. Such a topic clearly requires a definition of derivatives, and a common definition is that derivatives are financial instruments which have a value dependent upon the value of some other financial or real asset(s). Options, futures, swaps, and the plethora of products tailored upon those instruments are typically viewed as derivatives.

As simple as that definition of derivatives appears, it brings with it some complex problems. For example, if we have three financial instruments A,B, and C, and we argue that C is a derivative because C= A + B, could we not also argue that A is a derivative because A = C - B. In essence, the question arises of which instruments are to be regarded as "basic" or "underlying" securities and which are to be regarded as derivatives.

The literature of finance theory adopts a straightforward approach to this problem[1]. "Primitive" securities are defined as those which pay $1 if a specified state of the world occurs and $0 if it does not. From this perspective, even such instruments as a zero coupon risk free bond promising $1 is a derivative security, since it can be replicated as the sum of all primitive securities promising $1 in each state of the world at that time. Options and futures contracts can be viewed as derivatives based on particular positions in that range of primitive securities.

In practice, the problem with the approach of finance theory is that such primitive securities do not generally exist, and certainly do not exist in sufficient range to cover the infinite number of possible future states of the world. This has two consequences.

First, we find that derivatives are typically defined by reference to some set of standard or common instruments such as company shares or treasury bonds. New derivatives which can be replicated from already traded assets thus do not involve any increase in "market completion", but may enable some market participants to achieve desired positions to cope with certain contingencies at lower cost than previously available.

Second, much financial innovation involves products which are designed to fill in (or complete) the range of securities available to cover all contingencies, not currently met by the range of available securities. While many such innovations are referred to as derivatives, they cannot obviously be replicated from pre-existing securities. A security which, for example, promised to pay $1 if the maximum temperature on some day (at some place) exceeded a specified value, would, in principle, be a derivative security which could be replicated from the entire range of unavailable primitive securities,

[1] Rubinstein (1987) provides a good overview of derivative assets analysis.

although it could not be replicated using pre-existing financial instruments. The term derivative is thus often used in a broader sense to refer to any financial instrument which has explicitly designed contingent payoffs.

The subsequent discussion utilises this broader definition of derivatives for several reasons. First, it encompasses the more specific definition of a derivative, which requires that the instrument can be replicated using other existing instruments. Second, it is fairly generally accepted. Third, many of the societal issues involving the impact of derivatives on economic welfare and the regulatory responses, apply generally to both types of financial instrument - those that can be replicated from existing products and those which increase market completion.

In the subsequent section, the literature on the causes of financial innovation is briefly surveyed, to provide an understanding of the forces which have prompted the growth of derivative products in the last two decades. That literature focuses on the incentives for development of new products without getting down to the level of detail of why specific new products might be created and introduced, and by which market participants. Section 2 thus examines the financial product development process and sources of gains which arise to creators of new financial products. Section 3 then turns to the question of why some new products are successful and some fail, and examines the literature available on this topic to draw some general conclusions. Finally, some notable cases of Australian "failures" and reasons for the persistence of unfulfilled opportunities for products which increase market completion are discussed in Sections 4 and 5.

1. Theories of Financial Innovation and Development

Various authors such as Silber (1983), Kane (1983, 1988) Van Horne (1985), the Bank for International Settlements (1986, part iv), Miller (1986, 1992), Finnerty (1988), Ross (1989), Merton (1992, 1995), Marshall and Bansal (1993, chapter 2), Allen and Gale (1994), have provided frameworks for the analysis of financial innovations.

Any theory of innovations should fulfil a number of criteria. First, it must demonstrate that the innovation satisfies particular needs, and provides opportunities for profit. In this regard, Van Horne identifies two general requirements for a viable innovation. First, there must be some element of value creation, either by making markets more operationally efficient or by involving market completion. Derivatives may enable some market participants to undertake financial transactions at lower cost than might otherwise be possible, may help in overcoming various agency costs by specifying particular types of contingent payoffs, or provide expanded choice to all market participants. A second criterion is that the theory should explain why the innovation occurred when it did.

Silber considers the process of financial innovation from the perspective of a constrained maximization model of economic agents, in which binding constraints provide an incentive to find ways to loosen the constraints upon firms. As the cost of a particular constraint increases, the incentive to expend resources to loosen that constraint increases. Silber, for example, attributes the development of interest rate futures to increased interest rate volatility which can reduce corporate value. Likewise Van Horne suggests that the principal cause underpinning the development of the swap market was the volatility of inflation and interest rates.

The BIS suggests that a framework which distinguishes demand and supply side forces for innovations has merit. On the demand side they categorize innovations according to their functional characteristics such as `risk-transferring', 'liquidity-enhancing' etc.. Since, they argue, price-risk transferring innovations are more likely to emerge when perceptions of volatility are high, their perspective is similar to that of Van Horne and Silber. Credit-generating innovations which mobilize dormant sources of funds or enable new markets to be tapped are more likely to arise when demand for credit is relatively high. On the supply side of the innovation process, changed technology, regulatory pressures, and changed financial competition are all identified, as is the historical dynamics of innovation.

Miller emphasises two factors as principal determinants of financial innovation. The first is differential taxation of different sources or uses of income. The second is the role of government regulation. For Miller, the key test of a successful innovation is whether the innovation survives after the initiating force has been removed. That may be an inadequate test. As Allen and Gale (1995) note, new product development in financial markets appears to display characteristics of *hysterisis*, whereby new innovations become the standard, even when initiating factors have disappeared, and form the basis from which subsequent innovations depart. Merton (1992, 1995) goes even further, arguing that there is a "financial innovation spiral" whereby proliferation of markets in standardised derivatives makes possible the creation of customised, over the counter, products by financial institutions who through their own hedging activities in those markets increase volume and lower transactions costs. This facilitates the development of more new products, expansion of new markets as some customised products become standardised and become distributed via markets, and other new markets are prompted by the success of past innovations.

Merton argues that financial innovation is not a passing phase. With lower transactions costs and lower learning-curve costs (reflecting the growth of financial education) , the expected benefit required to prompt expenditures on developing a new financial product are continuing to fall. If, as seems likely, economic fundamentals continue to change at a similar rate as in years past, innovations are likely to arrive at a more rapid rate than in the past.

Perhaps the most all-encompassing perspective on new product innovation is that afforded by Kane's theory of the "regulatory dialectic". From his perspective, regulation and avoidance are component parts of a tension driven process through which changes in financial structure and markets occur. Regulation, by

imposing constraints (a la Silber) on market participants generates avoidance behaviour, such as through innovation, which in turn induces reregulation. This ongoing game of strategy may eventually lead to some equilibrium outcome, although it is continually being disturbed, and the process reset in motion, by exogenous factors. Changes in technology (enabling lower transactions costs or introducing economies of scope) and economic conditions (such as increased volatility of inflation, interest rates and exchange rates) are examples of such factors.

Kane's perspective provides one explanation for the tendency for hysterisis to occur, since it depicts the financial markets as a dynamic evolutionary structure rather than one in which some static equilibrium is likely. Kane also raises two factors fundamental to current discussions of regulation of derivatives. First, problems experienced by regulators and regulatees must, through the process by which the current state has been reached, be based in prior history. Second, to survive in the long run, patterns of regulation must be efficient - in the sense of anticipating and being capable of adjusting to consequent avoidance behaviour.

Finnerty provides a listing of eleven factors conducive to innovation, including technological improvement, need to lower agency costs, need to lower transactions costs, reallocation of risk, increasing liquidity, volatility of interest rates and prices, regulation, accounting, advances in financial knowledge. Merton (1995) argues that the breakthroughs in financial theory in the 1960s and 1970s, allied with the subsequent development of mathematical models and financial databases plus technological and communications developments enabled virtually instantaneous pricing of complex financial products not previously feasible.

Ross raises the conceptual problem that most innovations are treated as derivative securities, implying that they can be priced by reference to other existing assets' prices. In this case, an argument of market completion cannot be used to justify the emergence of the innovation. Ross instead proposes that it is important to recognise the role of financial institutions in financial markets (typically ignored in asset pricing theories) and the agency problems thereby created. Innovations can emerge to solve moral hazard problems, even though they appear to offer little new in the way of contingent payoff structures. Ross argues that the structure of marketing costs then plays a significant role in determining the precise structure of the innovation.

Shiller (1995) introduces a new element into the discussion of financial innovation and creation of new products and markets. Referring to the "behavioural finance" literature which draws on the work of psychologists questioning the rational optimising behaviour of participants in financial markets, he points out the role of pyschological barriers to creation of new financial products and markets. This reinforces the role of marketing and careful product design if financial innovations are to be accepted and used.

Summarizing the message of the innovation theories, the following trends appear. One of the most common explanations for financial innovation is that of regulatory arbitrage. Where regulation prevents

market participants from undertaking profitable activities, a clear incentive exists for innovative activities designed to avoid that regulation. Changes in some part of the regulatory structure, or in economic conditions which alter the cost-benefit tradeoff from avoiding regulation may then prompt innovation. However, where differential regulation affects the risk - return characteristics faced by participants in different markets, it is not clear that scope for arbitrage exists.

A second common theme is that of tax arbitrage. Where taxes distort returns, innovation to take advantage of those distortions can be expected. Such arbitrage need not wipe out the originating profit opportunities, thus providing a continuing stimulus to the innovation.

A third message is that innovations reflect changes in the most cost effective method of overcoming market imperfections such as transactions costs. Advances in technology which alter the cost structure of financial production are relevant here.

A fourth common explanation of innovation is that of market completion. Since the future is uncertain, and a complete set of contingent securities is unavailable, market participants are unable to avoid all exposure. Innovations can provide particular payoff structures which reduce the range of exposures.

A fifth explanation relies upon changes in the demand for financial services induced by changes in the economic environment. Increased volatility of financial prices, and or unprecedented levels of particular economic variables (such as inflation) are obvious candidates. An alternative possibility is that of changes in the industrial structure, altering the demand for particular services.

Sixth, the cumulative progress of knowledge which increases the range of possible financial products available is also relevant.

Finally, a tendency to "hysterisis" (whereby new financial products become the standard even when factors initiating their development disappear) or even a "financial innovation spiral" (whereby new innovations provide conditions amenable to further innovations) appears to exist

2. The Creation of New Products

Any analysis of the creation of specific new derivative products needs to take into account the distinction between consumer demand for financial characteristics or services and the supply of those characteristics in some package in the form of a specific financial instrument. In the financial services markets, customers demand characteristics such as return, risk sharing, liquidity. Institutions supply products (contracts) which package those characteristics in a variety of ways. Determining which, if any, new packaging of characteristics is, or will be, demanded, and be profitable, is the driving force behind the creation of specific new derivative contracts. And because there is an infinity of future contingencies out there in an

ever changing world, assuming greater or lesser importance at different times, there will always be scope for new derivatives to be created offering superior packages of characteristics to those currently available.

Such new derivatives do not emerge by chance (although some may). Rather, they are increasingly the outcome of explicit product development strategies within financial institutions. Scheuing and Johnson (1993) outline a product development process involving stages of: *managerial direction* (formulating strategy and product objectives, generating and screening ideas); *design* (from concept development through product design and testing to personnel training); *testing* (involving pilot runs and test marketing); *introduction* (product launch, post launch review).

Behind such efforts and expenses lie the hope of generating profits, either directly from the new product or indirectly from spillover effects onto other business. Scheuing and Johnson , for example, classify these profit opportunities into: *share building* (increased offerings of existing services to existing customers); *market extension* (offerings of existing services to new customers); *line extension* (offerings of new services to existing customers); *new business* (offerings of new services to new customers).

In practice, profit generation from product innovation involving financial derivatives is by no means certain. One problem is that spillover effects can be negative as well as positive, when a new product cannabilises demand for an existing product. A more fundamental problem is that there is only limited protection from competitor imitation available to innovators of financial products. Trzyna (1993), for example, outlines (from a U.S. perspective) the problems faced by financial innovators. Copyright does not extend to ideas (although it can be used to protect underlying software) while patents grant exclusive rights to machines, processes or articles - but not financial contracts (which is all a financial instrument is). Since financial products must be explained to customers and can be easily “re-engineered”, it is simple for competitors to imitate. Moreover, the costs face by imitators in duplicating a new product are typically considerably less than those incurred by the initiator. (Tufano (1989) states that imitators typically invest 50-75 per cent less than innovators in introducing a new financial product). While some marketing protection can be gained through use of trademarks, and common law misappropriation suits can be used to protect against some imitators (such as some U.S. cases involving attempts to use specific stock indices), the *first-mover* advantages may generally be easily and quickly dissipated.

Tufano (1989, 1992) has examined in some detail the nature and extent of first-mover benefits from financial innovation. His study focused upon 58 examples of securities markets innovations by U.S. investment banks between 1974-86, and compares the returns to innovators relative to imitators. *A priori*, first mover advantages might be expected in the form of: ability to charge higher prices (at least prior to imitation); lower costs; larger quantities; and spillover effects.

Tufano finds that first movers have no apparent pricing advantages (even prior to imitation) and indeed charge lower prices than imitators over the long run. While first movers typically maintain some larger

market share in the product, the existence of competition and absence of entry barriers makes it difficult to see how that translates into higher profits which are sufficient to offset the first movers larger product development costs. Tufano argues that first mover advantages directly associated with the product arise from the possible lower marketing costs associated with being a product innovator, as well as from possible economies of scale involved in operating in that product. Indirect first mover benefits may also occur from the spill over effects onto other products, and Tufano indicates that investment bankers believe that knowledge gained about initial customers, information derived about potential customers from market making activities, and market perceptions that innovating institutions have unique and valuable abilities, are all sources of these spillover effects.

While marketing benefits may flow to institutions which introduce successful innovations, it is by no means the case that all derivatives introduced prove to be successful, and significant adverse reputational consequences (as well as unrecouped costs) can be felt by innovators of unsuccessful derivatives. In the next section, we thus look at the evidence on the causes of success and failure of derivative products.

3. Successes and Failures

Most of the literature on determinants of success versus failure in derivative constracts has focused upon futures markets innovations and examined whether contracts have proved popular, as measured by volume of trades. Before reviewing that, and other literature however, it is appropriate to ask the question of what constitutes success or failure.

The success of a derivative can be viewed from several perspectives. From that of the innovator, the critical measure of success is whether or not it generates adequate profit (either directly or indirectly) to compensate for costs incurred in development, including risks incurred from entering into contracts with customers. From that of the user, a successful derivative will be one which enables the user to better satisfy its demands for various financial services (such as risk management, increased liquidity, lower transactions costs, higher returns).

From these different perspectives, particular products could be viewed differently. One reason is that in a world of imperfect information, institutions without particular concern for long run reputation could gain short term profits from introducing new derivatives with pricing or other characteristics which exploit unsophisticated customers. While it might be argued that customers aware of the information asymmetry and consequent agency problems would thus select only to deal with “high - reputation” firms, and so avoid this problem, that view is clearly not shared by government supervisors nor validated by experience.

Van Horne (1985) for example, argues that many financial innovations have no substance behind the veneer, and points in particular to innovations whose prime motivation appears to involve altering

accounting measures of income and wealth.That such innovations can be "successful" is a concern to Van Horne, which he asserts is partly due to the existence of "herd mentality" in financial markets.

Another reason for differing perspectives on success or failure can arise in situations where a derivative product is tailormade for a specific customer's needs, but proves to be unsuitable for use by any subsequent customers. From the customer perspective, the product may be judged to be a success. But if the product is developed with an expectation of spreading the development costs over a subsequent number of customers, the innovator would regard it as a failure.

An alternative perspective, yet again, is that of the overall social benefits and costs from introduction of specific derivatives. Newly introduced derivatives may have effects on market participants other than those directly engaged in using those products. In line with the (old) economics literature, one distinction is between *pecuniary* and *non pecuniary* externalities. The former category refers to the effect of transactions by one individual upon the market price. Since derivatives are, in essence, a package of underlying financial instruments, pecuniary effects would relate to price changes in any of those instruments. As noted earlier, one incentive for an innovation might be to create a change in the price of an underlying security in which the innovator has a preexisting position. The latter category refers to situations in which there are inadequate property rights, so that markets do not exist to enable trading in compensatory claims for gains or losses arising from spillover effects[2]. In this context, such externalities can be viewed as the effect of the introduction of a derivative on price volatility, transactions volume, bid-ask spreads in the underlying market etc., some of which may be of concern to governments. Merton's (1995) view of new innovations providing an enhanced environment for the development of further innovations can also be interpreted as involving such an externality effect.

As noted previously, most of the available literature has focused upon success or failure of futures contracts from the perspective of the innovator. In these circumstances, contract volume provides a ready measure of success, since owners of organised exchanges (the members) will benefit from increased activity. The most comprehensive study of futures success and failure is that of Black (1986), who identifies two analytical approaches.

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[2] This introduces a fascinating area for study addressed by Amihud and Mendelson (1995) concerning the allocation of property rights for transfer of ownership of financial instruments. They examine the previously unaddressed question of whether institutions issuing securities should have property rights enabling them to limit the markets in which ownership is transferred. The absence or existence of such property rights is likely to be important in determining the possible structure of secondary markets for securities trading. Since many derivatives are based upon securities issued by insitutions, property rights which gave such institutions power to deny or agree to third parties drawing up contracts based on those securities would have significant impacts upon derivatives development.

One, which she terms the *commodity characteristics approach*, examines the characteristics of the underlying security, and argues that successful futures contracts will be based on items which are durable, homogenous, have large volume, low delivery costs, and for which forward markets do not operate well. This approach, she argues, does not provide significant explanatory power for identifying potential successes and failures. The alternative approach, the *contract characteristics approach*, focuses upon the economic services provided by the contract, in order to assess whether it is likely to be viable. Underpinning this approach is the identification of the reasons for participating in that market. Hedgers will be attracted if the contract specifications conform to standard commercial practices, and if the reduction in residual risk from using a new contract outwiegh increased liquidity costs associated with (initial) low volume. For a contract to attract hedgers it must be prefereable to any available cross hedge. Speculators will be attracted if the contract volume is large, there are opportunities to offset positions in other markets, and both parties will be concerned that the contract is free from possible manipulation.

Using measures of residual risk, relative liquidity cost, cash price volatility, and cash market size as explanatory variables, Black is able to explain between 55 and 85 per cent of the variation in volume and open interest achieved in 26 new futures contracts (9 of which were delisted in less than 3 years) . Moreover, the model used is useful in predicting out of sample successes and failures.

A number of other studies have examined specific cases of contract success or failure. Johnston and McConnell (1989) focus upon the failure of a futures contract on GNMA CDRs (Collateralized Depository Receipt) which, after some initial success, failed through lack of volume. Underpinning the eventual failure of the contract was the existence of delivery options associated with the contract, highlighting the paradox confronting product innovators. While delivery options may increase the appeal of a contract, by reducing the possibility of squeezes, they reduce the effectiveness of the contract as a hedging vehicle.

Flood (1992) examines two derivative innovations. One, a failure, was the IMM's futures contract on bagged Canadian silver coins introduced in 1973. Flood demonstrates how the existence of the CBOT's silver futures contract provided hedgers and speculators with an accessible alternative close substitute with a highly correlated price and with far greater liquidity, thereby making the IMM contract redundant.The second contract studied by Flood was the successful innovation of market index mutual funds. Even though it too could be regarded as redundant, in that the price of the fund closely tracked the underlying index, the inability of most investors to trade in the underlying index without incurring significant transactions costs helps explain this contracts success.

Esposito and Giraldi (1994) examine the concurrent success of an Italian Bond Futures contract on LIFFE and its failure on MATIF. They argue that an important determinant of success is that a contract trade on an informationally efficient marketplace. Where certain participants have superior access to certain information, their trading on that information will signal the information to other traders who in turn will act in other related markets. The diversity of interest rate futures contracts at LIFFE they thus see as an

important part of the explanation for the contracts success on this exchange and failure on MATIF. Global trading strategies of participants is better undertaken when related markets are concentrated in a single place.

Nothaft, Lekkas, and Wang (1995) examine the failure of the mortgage backed futures contract introduced in 1989 on the CBOT, as a successor to the failed GNMA CDR contract.They attribute failure of the contract to the existence of good cross hedges in the form of Treasury Bond and Note futures contracts, a lack of liquidity, and the existence of an active GNMA forward market.

4. Some Australian "Failures"

Over the years, the organised exchanges and financial institutions in Australia have introduced many derivative products which have failed to prove popular, and many which have proved successful. It may be instructive to list some of them and provide some comments on reasons for their failure or success, in the light of the evidence surveyed in the previous section.

Greasy Wool Futures: This original contract which provided the origins of the Sydney Futures Exchange fell into disuse with the advent of the wool price support scheme provided by the government until the early 1990s. Since that scheme provided wool growers with an alternative (subsidised) hedging mechanism, the wool futures contract was made redundant

Currency Hedge Market: Prior to the full deregulation of the AUD in December 1983, Australian financial institutions developed a forward hedge market for the AUD/USD involving settlement in AUD and thus avoiding exchange control regulations. This market provided hedging facilities for those transactions excluded from official forward cover, but quickly disappeared once the more cost effective forward forex market was permitted.

AUD/USD currency futures: The SFE's attempts to introduce currency futures have never proved successful and able to coexist with the interbank forward forex market (even though interest rate futures and interbank interest rate forward (FRAs, swaps) markets coexist).

Victorian Equity Trust/TasCorp Sharemarket Linked Bonds: These products which are equivalent to a "straight" bond plus a call option (or options) on the All Ordinaries Index, failed to attract significant investor interest. The VET units, in fact, traded for most of their life at a substantial discount to their theoretical value, reflecting the investing public's inability to understand the complex nature of the product. However, from the issuer's perspective or that of the underwrited, they may have been regarded as a success. It will be interesting to see how index-linked deposits introduced by banks in recent years (which are essentially similar) eventually fare.

Semigovernment Futures Contract: This contract on the SFE failed to attract significant investor interest despite the large growth in the physical semigovernment market relative to Treasury Bonds. Two major sources of failure can be noted. First, the diversity of issuers in the physical market meant that no one contract specification would provide a close hedge to bonds issued by all particular authorities. Second, a liquid market providing at least as good a cross hedge (although still involving basis risk) was available in the Bond futures market.

Capguard Securities: This trust aimed at the retail market was launched in 1993, and was to purchase 57 mill Coles Myer Shares each costing $4.65 , funded by subscribers to 57 mill "capguard units" at $3.46 per unit, and what was effectively an option premium payment of $1.2964 per Coles Myer share from Premier Investments. The option (described as a deferred purchase scheme) gave Premier the right to buy the Coles Myer shares from the trust on 31/12/98 at a price of $3.4935. Dividends received from Coles Myer shares were to pass through to the unit holders up to a maximum amount per year. Any dividends in excess of that amount were received by Premier Investments. The trust failed to attract significant investor interest, and a large proportion of the units were taken up by Macquarie Bank on terms negotiated with the trusts promoters. Several reasons can be advanced for the failure of the scheme. First, the complexity of the scheme seems likely to have deterred most retail investors. Second, the option to have been provided by unit subscribers to Premier, which had a time value of around 10 cents for a five year expiry, appears extremely underpriced. Third, the fact that stakeholders in Premier were also in a position of control of Coles Myer and thus able to influence the mix of coles Myer returns between dividends and capital growth, possibly to the advantage of Premier and disadvantage of unit holders, meant that investors faced a severe agency problem.

Individual Share Futures, Share Ratios, and Index Futures: Currently these three products coexist in the Australian market. In essence, one is redundant, since given any two the third can be replicated. Whether all will survive remains to be seen.

All Ordinaries Index Options: The ASX has attempted to promote options on the All Ordinaries Index, but these have not been successful. In contrast, the SFE's options on the SPI futures contract have proved successful. Again, one product is almost redundant - since an option on a futures contract is, under certain conditions (including expiry on the futures settlement date), equivalent to an option on the underlying physical position. Given that costs of replicating via SPI futures is lower than using a physical position in stocks, and that the hedge of an All Ords option using SPI futures would involve some basis risk, it is not surprising that the SPI futures options are more successful

5. Unfulfilled Promises

The history of derivatives is littered with innovations which failed and with those that succeeded. But of at least equal significance is the category of those potential innovations which have been recognised but never

(seriously) tried. Over the years, various analysts have proposed the need for specific derivatives to fill identified market gaps, or to enable financial services to be provided at lower cost, and yet many of those proposals have come to naught. It is instructive to examine a small selection.

Residential Housing

Given the relative size of the asset class of residential housing, the significance of this asset in the wealth portfolio of individuals, and the volatility of residential housing prices, it surprises some commentators that derivative contracts enabling individuals to hedge exposures to this market have not been forthcoming. Shiller (1993) is one to have argued the need for such contracts. As Shiller notes, one problem arises from the specificity of the asset in question. Homeowners are concerned about the market value of their house, but from a third party's perspective, the ability of owners to influence the property's value by their decisions creates a major agency problem, while the specificity limits the ability to hedge value movements using other assets. Some derivatives involving partial hedging have arisen in the form of loan contracts such as shared appreciation mortgages. More general derivative products would involve futures and options contracts on residential property indexes, leaving the home owner subject to some basis risk. The problems of constructing acceptable indices are one factor impeding development of such products. Moreover, as Shiller points out, individual homeowners are unlikely to have the expertise to be willing to trade futures contracts on property indices. It would thus be necessary for some over the counter hedging products to be offered to retail investors by institutions, who would want to hedge exposures created on some organised futures or forward market. Alternatively, government provision of some hedging product (such as the home equity assurance program introduced in Chicago in 1990) might be warranted.

Inflation Hedging

An obvious omission from the range of futures products on offer in all countries is a contract on some aggregate price index (or its rate of change) such as the Consumer Price Index. Given the argued importance of price level movements on economic decision making and the economic costs engendered by uncertainty over the future price level, it is surprising that such derivatives have not appeared. Friedman and Friedman (1984) and Barro (1986) are among authors to have raised this question. As Barro notes, there must be equivalent and offsetting positions between holders of fixed value assets and their issuers, providing a ready source of market participants in addition to those concerned about unanticipated inflation for other reasons.

Barro notes that demand for indexed securities provides some information on the demand for CPI futures, since the purchase of an indexed bond is equivalent to the purchase of a standard fixed rate bond plus purchase of a CPI futures contract. In both cases, the investor is exposed to real interest rate risk, but protected against the impact of CPI changes. While indexed bonds have been of significance in some markets at some times, the general lack of interest in such securities suggests that CPI futures would not

attract a great deal of interest. Given that conclusion, the extent of government and business concern with the costs of inflation and the impact of these views on macro economic policy formulation need to be questioned.

Supershares and Superfunds

Haakanson (1976) first proposed the introduction of *superfunds* which would invest in assets and finance these by the issue of different categories of *supershares* which have the property that at expiry, the value to the holder is a specified proportion of the superfund's assets, provided that the value of the assets lies between some lower and upper value. Otherwise, that supershare expires worthless. Supershares can be thought of as state-contingent claims, in which each "state of nature" is an outcome where the underlying asset portfolio has a value in some specified region. The asset portfolio could, for example, be the All Ordinaries Index, and supershares could be constructed to span all possible states, by having one category which pays off for AOI values between 0 and 500, another for values between 500 and 550, another for values between 550-600 etc. It would be possible to exactly fund the asset portfolio and ensure ability to honour promised payments by issue of an appropriate number of each category of supershares.

Cox and Rubinstein (1985) describe "[t]he superfund [as] an exciting financial concept. Its successful introduction might dramatically alter and streamline existing financial markets. We would be delivered from the chaos of existing securities to their natural building blocks". That the proposal has never come to fruition can be put down to one major reason. Supershares can be virtually replicated by butterfly spreads on index options, making the superfund concept redundant unless it involves lower transactions costs, greater liquidity, or less risk of inducing manipulation. When Haakanson proposed the concept, such alternatives did not exist, and the subsequent introduction of index futures and options has removed the rationale for the proposal.

6. Conclusion

This paper has covered a wide range of literature ranging from the determinants of financial innovation in its broadest sense to discussion of specific derivative products which have failed following introduction. No single factor explains financial innovation and the explosive growth in financial derivatives of the last two decades. However, regulation, growth in knowledge, improvements in technology, are important factors, and there are sensible reasons to believe that the process of financial innovation will continue to build upon itself - as new contingencies warranting new products emerge, and as new successful products increase the ability of innovators to introduce further products.

Many new derivative products fail, despite the care taken by innovators in structuring and marketing those products. With hindsight it is possible to explain the reasons for the failure of many derivative products. Redundancy (ie the ability to replicate perfectly) is often a cause of failure, as (perhaps paradoxically) is an

inability to replicate perfectly - causing the product to be unsatisfactory as a hedging device. Many derivative products fail, however, it seems because of the informational and psychological barriers which need to be overcome to induce involvement from market participants.

There is little reason to doubt that there will be a continuing growth in financial engineering research and research into marketing of derivative products in the forseeable future.

References

Allen F and D Gale (1994) Financial Innovation and Risk Sharing, MIT Press, Cambridge, Massachusetts.

Ahimud Y and H Mendelson (1995) "Securities Markets Regulation: A New Approach" Second Annual Asia Pacific Finance Conference, Hong Kong, July

Bank for International Settlements (1986) Recent Innovations in International Banking, Bank for International Settlements, Basle.

Barro R (1986) "Futures Markets and the Fluctuations in Inflation, Monetary Growth, and Asset Returns" Journal of Business, 59, 2, part 2, S21-38

Black D G (1986) "Success and Failure of Futures Contracts: Theory and Empirical Evidence" Monograph Series in Finance and Economics, Salomon Brothers Center for the Study of Financial Institutions, New York.

Cox J C and M Rubinstein (1985) Options Markets, Prentice-Hall, Englewood Cliffs, Chapter 8

Esposito M and C Giraldi "Preliminary Evidence on a New Market: The Futures on the Italian Treasury Bonds" Journal of Futures Markets, 14, 2, 1994, April, 121-146

Finnerty J D (1988) "Financial engineering in Corporate Finance: An overview" Financial Management, 17,4, Winter, 14-33

Flood, Mark D. (1992) "Two Faces Of Financial Innovation," FRB St. Louis - Review, v74(5), 3-17.

Friedman M and R Friedman (1984) Tyranny of the Status Quo, Harcourt Brace, San Diego.

Haakanson N H (1976) "The Purchasing Power Fund: A New Kind of Financial Intermediary" Financial Analysts Journal, 32, November-December, 49-59

Johnson E T and J J McConnell (1989) "Requiem for a Market: An Analysis of the Rise and Fall of a Financial Futures Contract" Review of Financial Studies, 2, 1-23

Marshall and Bansal (1993) Financial Engineering, Kolb Publishing, Miami.

Merton, Robert C. (1992) "Financial Innovation And Economic Performance," Journal of Applied Corporate Finance, v4(4), 12-22.

Merton, Robert C. (1995) “Influence of Mathematical Models in Finance on Practice: Past, Present, and Future” Financial Practice and Education, 5, 1, Spring/Summer.

Miller M (1986) “Financial innovation: The last twenty years and the next“Journal of Financial and Quantitative Analysis, 21, 459-471

Miller, Merton H. (1992) "Financial Innovation: Achievements And Prospects," Journal of Applied Corporate Finance, v4(4), 4-11.

Northaft F E, V Lekkas and G H K Wang (1995) “The Failure of the Mortgage-Backed Futures Contract” Journal of Futures Markets, 15, 5, August

Ross S (1976) “Options and Efficiency” Quarterly Journal of Economics, 90, February, 75-89

Ross S (1989) “Institutional Markets, Financial Marketing, and Financial Innovation” Journal of Finance, XLIV, 3, July 1989, 541-556

Rubinstein, M. (1987) "Derivative Assets Analysis" Journal of Economic Perspectives, Fall, 73-93.

Scheuing E E and E M Johnson (1993) “Product Development”, Chapter 11 in Marshall and Bansal op cit.

Shiller R (1993) Macro Markets, Clarendon Press, Oxford

Silber W L (1981) “Innovation, Competition, and New Contract Design in Futures Markets” Journal of Futures Markets, 1, 1981, 123-155

Silber W L (1983) “The Process of Financial Innovation” American Economic Review, 73, 2, May, 89-95

Stoll H R and R E Whaley (1988) “Futures and Options on Stock Indexes: Economic Purpose, Arbitrage and Market Structure” Review of Futures Markets, 7, 224-48

Trzyna (1993) “Legal Protections for Innovative Financial Products and Services” Chapter 23 in Marshall and Bansal op cit

Tufano, Peter. (1992) "Financial Innovation And First Mover Advantages," Journal of Applied Corporate Finance, v5(1), 83-87.

Tufano, Peter. (1989) "Financial Innovation And First-Mover Advantages," Journal of Financial Economics, v25(2), 213-240.

Van Horne J (1985) “Of Financial Innovations and Excesses” Journal of Finance, XL, 3, July 1985, 621-635