

OPTIONS AND FUTURES: A TECHNICAL APPRAISAL

by

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The past fifteen years have seen a remarkable expansion in the extent and depth of financial markets generally and nowhere is this more clearly demonstrated than in the areas of options and futures. These developments reflect the gradual deregulation of many financial markets during this period together with a trend towards a more free market oriented approach to economic policy. As a result certain economic variables such as interest rates and foreign exchange rates have become more volatile, creating new trading opportunities and a demand for new risk management vehicles.

Whereas fifteen years ago options and futures were esoteric and specialised instruments whose secrets were known only to a select few on the periphery of the financial community, they are today an integral component of our financial markets. Whereas fifteen years ago bank and institutional participation in these markets was only the subject of brochures produced sanguinely in anticipation by exchanges, and articles written enthusiastically by academics, today's reality is that banks have futures and/or options divisions or subsidiaries which, not uncommonly, are members of organised exchanges on which these instruments are traded; and institutions, while not as committed as bankers, are frequent participants in these markets.

A further feature of this development is its international character. Financial futures and options have sprung up in a diversity of financial centres around the world. While there is a certain amount of mimicry about this phenomenon, it remains the case that, as international financial markets have become more integrated, successful innovations in one centre are found to meet a need in other centres. This development has reached the stage where international linkages between options and futures markets are now being established (of which the existing link between the Sydney Stock Exchange and the International Options Market in Amsterdam,

Montreal and Vancouver, and the imminent link between the Sydney Futures Exchange and Comex are two outstanding examples). These linkages have highlighted the apparent similarities between options and futures and have reinforced the view of many people that options markets and futures markets are essentially in competition with each other.

Another recent development is the breaking down of what had once been seen to be natural dividing lines between options markets and futures markets. This began with the intrusion by futures markets into the stock index area and this has been followed by the development of options markets on physical currency, bullion and debt instruments, and by the introduction at futures exchanges of traded options on futures.

The objectives of this paper are threefold. Firstly to provide an overview of the instruments that presently exist or whose introduction is imminent. Secondly to draw out the fundamental differences which exist between the more important of these instruments. Finally to comment briefly on the extent to which these various instruments compete with or complement each other.

The paper will focus on options and futures based upon financial instruments, broadly defined to include currencies, debt and equity instruments and precious metals. This is not to say that the issues to be addressed do not relate to other areas: there are for example, a number of interesting and important questions in the area of agricultural commodity options versus agricultural commodity futures. However, there are few, if any, fundamental issues which arise in the financial instruments area which do not have broader application.

The term "option" in this paper will be used to mean exchange traded put or call options on financial instruments. In particular it will not refer to company options or warrants, which are option instruments

written on the capital of a corporation and issued by that corporation for the purpose of raising additional funds.

The Evolution of Options & Futures on Financial Instruments

It is tempting for students of today's developments in options and futures on financial instruments to get carried away with the ingenious features of the new instruments and to overlook the long history of both classes of markets. In fact today's markets are the result of a process of financial genetic selection which is almost certainly not yet finished. It is appropriate therefore to consider briefly the history of these markets in order to better appreciate the relationships between them.

Both futures markets and option markets are derivative markets dependant upon underlying primary markets. They both bring a time dimension to the process of price determination which makes them potentially useful vehicles for hedging or risk management. But the outstanding institutional feature which they have in common and which is fundamental to their success as trading instruments is the clearing house.

Many financial institutions have clearing houses of one form or another but the unique characteristic of the options/futures clearing house structure is that the clearing house interposes itself between the parties to a contract and effectively thereby assumes principal positions itself. By this process transactions costs in options and futures markets are reduced considerably by comparison to those in principal markets and speculative participation is greatly enhanced.

The clearing house system that exists today in both futures and traded options is essentially that which evolved in the Chicago grain markets in the middle of last century. While these markets were originally principal to principal markets, by about 1860 a clearing house system had developed which came to be the principal feature of today's futures markets.

While option markets do not have a long a history as principal to principal markets as do the antecedents of futures markets, such institutional arrangements certainly well pre-date the development of traded option markets. In the 1950's and 1960's for example, an active principal to principal market in common stock puts and calls operated between option dealers in New York, although this was not affiliated with the New York Stock Exchange. Trading in these instruments on a principal to principal basis was also a feature of activity on the London Stock Exchange at this time.

But it was the futures-style clearing house which enabled options markets to evolve to their next stage of development, the traded options market. It was no accident that the first and still the most successful of the traded stock option markets, the Chicago Board Options Exchange (CBOE) was founded in Chicago, the futures capital of the world, rather than in New York or London, the homes of the largest stock exchanges.

The founding of CBOE in 1973 was the turning point in the development of option markets. Similarly structured option markets on common stock commenced soon thereafter in London, Amsterdam, Sydney and elsewhere in North America.

During the 1970's, while the stock option markets were going through their infancies with varying degrees of robustness, the futures markets were themselves undergoing a change of direction which would ultimately turn them towards the new option markets. This was the development of financial futures, first in the form of currency futures launched in Chicago in the early 1970's, and interest rate futures which followed in the mid 1970's.

The encroachment of futures into financial markets was both inexorable and inevitable, given the deregulation then taking place in the financial sector, once the futures boffins had mastered the technique of adapting the traditional futures contract to apply to financial instruments rather than primary commodities.

The roll call of financial futures contracts is impressive, even in retrospect — currencies, mortgage certificates, U.S. government securities, commercial paper, bank certificates of deposit, eurodollar time deposits, and many more outside the U.S. It was clear by the late 1970's that the introduction of equity based futures contracts was only a matter of time.

The process of convergence of futures and options markets was continuing on the options side too, with the development of currency options in the Philadelphia Stock Exchange and bullion options on the International Options Market.

With the development of stock index futures contracts on futures exchanges and traded options on the same stock indices on options exchanges in the early 1980's the markets came into virtual head-on competition, a state of affairs which has only been exacerbated by the more recent introduction by futures exchanges of traded options on futures contracts.

In Sydney we see a microcosm of these international developments. The Sydney Stock Exchange was one of

the first to follow CBOE with the introduction of traded puts and calls on individual stocks. In conjunction with the International Options Markets it now offers bullion options and will, I understand, shortly offer currency options. I understand also that, subject to regulatory approval, the Sydney Stock Exchange intends to list physical stock index options.

At the same time the Sydney Futures Exchange lists futures contracts on currencies, bullion, interest rate and stock indices. It intends shortly to list traded options on these futures contracts.

Details of the Instruments

It is clear then that the potential participant in these markets faces a bewildering array of instruments. Leaving aside for the moment the further complication of differing contract size and transactions costs structures, he may at least be required to choose between a futures contract, an "option on physicals" contract and an "option on futures" contract, in each case on the same underlying asset or instrument.

Initially it would be appropriate to define what is meant by each of these terms:

- A futures contract is an agreement by which the seller is obliged to deliver, and the buyer obliged to accept delivery of, a specified asset at a price at the time of the agreement. Alternatively, as in the case of several important financial futures contracts, the obligations on the parties may be to settle in cash at a cash settlement price determined in an agreed fashion.
- An "option on physicals" is an agreement by which the buyer acquires the right to purchase or sell, depending on whether the option is a call or a put, a specified asset at a fixed price prior to a fixed future date; and by which the seller enters into a corresponding contingent obligation. Alternatively, as in options on stock indices, the buyer's right and the seller's contingent obligation, may be to settle in cash at a cash settlement price determined in an agreed fashion.
- An "option on futures" is an agreement by which the buyer acquires the right to assume a long or a short futures position (depending on whether the option is a call or a put) at a fixed price prior to a fixed date; and by which the seller enters into a corresponding contingent obligation.

In the past it has been common to describe options as "limited risk" instruments in comparison to futures, by virtue of the fact that the maximum loss on a bought option position is the premium paid to the seller at the

time the option is traded. This feature of options makes them particularly attractive to the public or speculative participant, especially in comparison to futures where no corresponding maximum loss can be established in advance.

However it ought to be mentioned that this feature depends solely upon the premium being paid in full by the buyer of the option. There is no reason why this should necessarily be the case; the premium could be leveraged and the buyer subject to margin calls in the same way as a futures trader. The advantage of structuring an option contract in this fashion is that the costs of participation on the bought side are reduced and hence that liquidity is enhanced. The primary disadvantage is that the seller does not receive the premium at the time of trade.

The options on futures contracts due to be launched on the Sydney Futures Exchange next month will include this leveraging of premium feature as will similar contracts to be introduced on the London International Financial Futures Exchange in June. Although its introduction is to be in the context of options on futures there is no reason why it could not be applied to options on physicals. In any event the "leveraged versus unleveraged premium" question represents yet another wrinkle to be taken into account in comparing various instruments.

The fundamental difference between options and futures has to do with their respective potential profit profiles. A futures position is exposed to a price fluctuation in direct proportion to that fluctuation regardless of its magnitude or direction. On the other hand, the buyer of an option is exposed to price fluctuation in the underlying instrument, and in direct proportion to that fluctuation, but the extent of that exposure is limited on the downside by the premium (this is true for both leveraged and unleveraged option structures). The seller of an option is exposed to price fluctuation in the underlying instrument but the potential profit on his position is constrained to be no greater than the option premium.

The effect is that an options trader is effectively unbundling his upside risk from his downside risk, at least in comparison to taking a position in the underlying instrument.

The unbundled risks can in fact be reconstituted by an appropriate combination of option positions. Intuitively, for example, the purchase of a call and the sale of a put at the same strike or exercise price would appear to be equivalent to the purchase of the underlying instrument at that price. More formally, the

prices of puts, calls, the underlying instrument and the risk free interest rate are related in such a way that the values of any three determine the value of the fourth. This is the so-called put/call parity result of the academic literature.

In the context of options on futures this result means that a futures position can be synthesised from an appropriate combination of puts and calls on futures.

The reverse is not true: no combination of futures positions will simulate an option position. Actually a futures position in combination with a stop loss order will simulate an options position, provided the stop loss is properly executed. In volatile markets, however, one can hardly rely on stop loss orders for protection.

The fact that option contracts can be rebundled to effectively create a position in the underlying instrument, whereas a futures contract cannot be unbundled into its component option positions suggests that options are more versatile instruments than futures.

This leads us to a comparison of the various instruments.

Comparison of the Instruments

In comparing options and futures as trading vehicles one must have regard to the type of trader one has in mind.

For the public trader or speculator the three instruments under consideration appear to be very similar. For example, such a trader who wished to take a position in gold or in a currency could do so by taking a position in options on physicals, in futures or in options on futures. In each case he would acquire a leveraged exposure to price movement at relatively low transaction cost. The relevant factors in choosing among the alternatives include:

- contract size: the larger the contract the greater the trader's exposure to price fluctuation. This is true of both options and futures — even in an unleveraged option contract the premium may be too great relative to the trader's capital if the contract size is too great.
- out of pocket transaction costs.
- market liquidity: speculative traders have a great aversion, and rightly so, to being unable to trade out of position once established. They will almost always, for example, prefer a more liquid larger contract size market over an illiquid smaller contract, even if the smaller contract would, on

contract size criteria alone, be the more appropriate.

The overriding consideration for the speculative trader, particularly the smaller speculator, is the extent of exposure associated with each instrument and, in this respect, the options contracts have a clear advantage. By buying an option the speculator or investor can participate in favourable price movements but limit losses in the event of unfavourable price movements to the option premium.

It should perhaps be noted that in practice this advantage of options may be offset by the fact that put option markets are frequently illiquid and difficult to trade in. As a result a trader who wishes to take a short position in the underlying instrument may have little choice but to sell futures or sell call options, in which case the downside risk is not limited.

A comparison of the trading efficacy of the various instruments as hedging vehicles is rather more complex. It firstly requires clarification of what is meant by the term "hedging".

Rather than attempting a watertight definition of hedging the following provides two examples which describe a great deal of hedging activity in practice.

The first is so called "anticipatory hedging" in which a hedge position is adopted in anticipation of a physical market transaction to be undertaken at a later date. For example a share portfolio manager may wish to protect future share purchases, being concerned over the possibility of a market upturn in the intervening period; an exporter may wish to cover future foreign currency receivables against an appreciation in the domestic currency. For hedging of this type futures represent a superior instrument to options, because the hedge transaction is a substitute for the physical market transaction to be undertaken at a later time and because futures simulate the physical transaction better than options.

The second class of hedging transaction to be mentioned is what might be called "inventory hedging". It involves the sale of a call option or future (or possibly the purchase of a put option) against an inventory of securities or other instruments. Such a hedge may be undertaken for protection against a price decline (as in the case of the simple sale of futures or so called "delta hedging" in options) or to profit from price relationships, (as in the case of buying and writing options or "cash and carry" operations in bullion and interest rate futures). It is less easy to rank options and futures as instruments for hedging in this

case than it is in the case of anticipatory hedging. In the inventory hedge case either instrument may be used, with the choice depending as much as anything else on how closely the hedge instrument resembles the composition of the inventory to be hedged.

Finally, one type of hedging activity for which the option contract is clearly superior to futures deserves mention. This is where the physical market position to be hedged is in the form of a contingent transaction; for example participants in a competitive tender may wish to hedge an interest rate or currency risk, but only if their bid or offer is successful. Such situations are tailor made for hedging via options.

The foregoing brief comparison of the alternative instruments for hedging purposes has been cast in terms of options versus futures and as such has glossed over the distinction between options on physicals and options on futures. While this distinction may be of some theoretical importance, I suspect that its significance in terms of practical hedging decisions is limited to being a relatively minor component of basis risk.

The preceding discussion also ignores such matters as transactions cost and market liquidity, which are no less important to the hedger than to the speculator.

Overall, in comparing the instruments for both hedgers and speculators, the rather unexciting conclusion emerges that no one instrument or market dominates the other. This is hardly surprising as the present diversity would presumably not have come about unless the various markets and instruments each had something to offer potential users.

This is not to say that there is not competition amongst these alternatives with the most blatant examples being options on physicals and options on futures, each on the same underlying instrument. In such cases, unless the markets are differentiated by

something like contract size, it is virtually impossible to choose between them.

Otherwise it seems likely that the diversity of markets and instruments will persist, with their relative success depending upon the extent of their respective natural clientele as well as more elusive factors such as accidents of history which often seem to dictate that all important quantity market liquidity.

Importantly also this network of different markets and instruments on similar assets will be linked by arbitrage activities which will help transfer the liquidity of one market to the other.

The following remarks are made as concluding observations.

Firstly, the observations of this paper have assumed away such things as regulatory activities by government. If governments fail to apply an even regulatory hand to alternative markets the conclusions suggested above may not hold true. The same would apply if different countries regulate these markets in substantially different fashions.

Secondly, for all the differences, subtle and otherwise, that exist between options on physicals, futures and options on futures, they share an over-riding commonality in that they are all instruments which facilitate the harnessing of risk capital in a way which enables firms, corporations and institutions who are exposed to particular price, interest rate and currency risks to better manage these exposures. If Australia's options and futures markets are to develop further it is clear that they will have to attract additional risk capital. If, as is presently the case, our tax system can encourage risk capital to particular areas of economic activity, the question might be addressed as to whether consideration ought not be given, as part of the current taxation review, to the important potential role of these markets in the economy.