Market Basket Alternatives

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Mark Rubinstein is professor of finance at the University of California at Berkeley and a principal of the firm Leland O’Brien Rubinstein Associates. This paper has benefited from several conversations over the past 18 months with Robert Ferguson, Larry Harris, Hayne Leland, and John O’Brien. In particular, it has benefited greatly from the working paper “The Economics of Cash Index Alternatives,” written by Larry Harris.

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Abstract

Several exchange and governmental sponsored studies of the stock market crash of 1987, rightly or wrongly, pointed to program trading as one of its accessories. At the same time they accepted the growing need for financial institutions to trade large diversified portfolios of assets, and they called for innovation to find some means of preserving this benefit while reducing the potential for these trades to destabilize the market. This paper examines alternative methods to facilitate simultaneous execution of trades of a large standardized diversified portfolio of stocks.

It is assumed that an ideal market basket vehicle would: (1) represent an important component of risk borne generally by investors; (2) have low tracking error; (3) have a continuous market through time; (4) have low creation costs; (5) have low trade execution costs; (6) have low inventory carrying costs; (7) preserve or enhance tax benefits; (8) have full collateralization; (9) pass through voting rights; (10) be offered in small enough unit size to appeal to small investors; (11) have a predetermined long life before forced liquidation or turnover; (12) not provide incentives to illegally manipulate prices; (13) be part of a related system of securities permitting desirable variations in patterns of returns; (14) not be subject to various miscellaneous security regulations; (15) possess a number of desirable trading features; (16) be simply described to potential investors and have readily accessible price quotations; (17) be consistent with existing securities regulation; and (18) remove all basket-motivated trading away from the individual securities comprising the basket.

This framework is used to compare established alternatives -- open-end index funds of either the mutual or bank trust variety, stock index futures, and program trades -- with the recently developed "index participations" traded on the Philadelphia and American Stock Exchanges and with proposals currently being examined by the SEC -- the "market basket securities" of the Chicago Board Options Exchange and the "exchange stock portfolios" of the New York Stock Exchange. In the author's opinion, one or more of these newer basket alternatives is likely to become the most actively traded U.S. equity instrument. Moreover, the winners of this competitive experiment in market innovation will set standards for basket trading of foreign equities and other types of securities.
Program trading has developed a bad reputation. Even before the stock market crash of 1987, newspapers routinely blamed large movements in market prices on programs. After the crash, despite its profitability, the use of programs to facilitate futures-index arbitrage was abandoned by most large investment houses with considerable publicity. Several exchange and governmental sponsored studies of the crash, rightly or wrongly, pointed to program trading as one of its accessories. At the same time they accepted the growing need for financial institutions to trade large diversified portfolios of assets, and they called for innovation to find some means of preserving this benefit while reducing the potential for these trades to destabilize the market.

This unusual unanimous invitation to innovate was eagerly pursued by several exchanges. They not only saw an opportunity to respond constructively to flaws in market structure exposed by the crash, but also saw an opening to enlarge their own competitive turf. The Philadelphia Stock Exchange, known for its successful innovation in currency options, filed the first basket proposal with the SEC to trade "index participations" (IP). This filing was followed quickly by similar proposals of the American Stock Exchange and the Chicago Board Options Exchange. Although the CBOE later withdrew its IP proposal, it filed a second proposal to trade "market basket securities" (MBS). The New York Stock Exchange, the most recent entrant, filed its own "exchange stock portfolios" (ESP) proposal describing a market basket quite similar to the CBOE’s MBS. Under an unresolved squabble over regulatory turf, IPs on the PHLX and the AMEX began trading on May 12, 1989. Although the CBOE and NYSE proposals are continuing to undergo refinement in the registration process, final approval seems likely before the end of 1989.

All these proposals attempt to facilitate the simultaneous execution of trades of a large standardized diversified portfolio of stocks. In this author’s opinion, one or more of these baskets is likely to become the most actively traded U.S. equity instrument. Moreover, the winners of this competitive experiment in market innovation will set standards for basket trading of foreign equities and other types of securities.

As we examine market basket alternatives, we should keep in mind the features we might want. Without further justification, it will be assumed in this paper that an ideal market basket vehicle would:

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1 In this paper, program trading is defined as the simultaneous entry, but separate execution, of orders in stocks in proportion to their relative representation in major indices. During the first four months of 1989, program trades on the NYSE accounted for approximately 10% of daily volume. About half of this volume was due to index arbitrage.

2 Yet another market basket proposal has been filed by a private firm, Leland O'Brien Rubinstein Associates, known for its development of portfolio insurance strategies. This proposal will not be examined in this paper.
1) represent an important component of risk borne generally by investors.

2) have low tracking error with respect to capital gains and payouts. [Tracking error can take the form of discounts or premiums relative to fair value, differential performance due to failure to hold all underlying securities or due to maintenance of cash balances, and differential performance due to non-simultaneous transactions in the underlying securities.]

3) have a continuous market through time for basket sales and purchases. [Such a market would provide reliable cash-out prices prior to commitment to trade.]

4) have low creation costs. [Such costs are increased by a requirement that any long position be matched by an offsetting short position held by another investor. They include trade execution costs incurred in the original purchase of components of the underlying basket, and registration and organization costs of a financial intermediary set up to manage securities underlying the basket.]

5) have low trade execution costs either for the basket itself or for the component securities in the basket. [Execution costs include SEC and exchange fees, brokerage, the effective bid/ask spread, market impact, clearing costs, and rollover costs.]

6) have low inventory carrying costs -- costs of receiving securities into inventory, holding them in inventory, and selling them out of inventory. [These costs include custodial settlement and carrying charges, accounting expenses, management fees, dividend payout expenses, rollover costs forced by maturity of inventoried securities, and basket readjustment costs due to redefinition of the underlying target portfolio.]

7) preserve or enhance tax benefits obtained from positions in the individual components of the basket. [For example, one would hope that a separate basket entity not be taxed as a corporation, that the inter-corporate dividends received deduction be retained on basket payouts, and that there be no taxation of unrealized profits.]

8) have full collateralization. [This implies that there be no risk that a buyer (seller) will default on subsequent obligations to a seller (buyer).]

9) "pass through" the voting rights accompanying direct ownership of the securities underlying the basket.

10) be offered in small enough unit size to appeal to small investors, not just large institutional investors.

11) have a predetermined long life before forced liquidation or turnover.
12) not provide incentives to illegally manipulate the prices of other securities, or provide incentives for investors to time basket transactions to benefit at the expense of other investors holding the same basket.

13) be part of a related system of securities which would permit desirable variations in patterns of returns. [For example, related securities might permit investors to split rights to dividends and interest from capital gains, or to split upside or downside rights to capital gains from the remaining returns of the basket.]

14) not be subject to various miscellaneous security regulations. [Such regulations or industry practice include the short sale uptick rule, inability to earn interest on the proceeds of short sales, special qualifications for investors to trade or brokers to advise trading in the basket, position or exercise limits, and high margin requirements or frequent marking-to-the-market.]

15) possess a number of desirable trading features. [These include quick settlement, block trading facilities, direct hedgeability with the securities underlying the basket, and cross-collateralization with similar basket securities.]

16) be simply described to potential investors, have readily accessible price quotations and prominent newspaper listing, and require minimal revision of back office procedures or computer programs.

17) be consistent with existing securities regulation.

18) remove all basket-motivated trading away from the individual securities or risks comprising the basket.

I. Established Market Basket Vehicles

Currently, the goals of basket trading are primarily accomplished through open-end index funds of either the mutual or bank trust variety, stock index futures and options contracts, and program trades.

Index funds with multiple holders, by centralizing the basket holdings of many investors, reduce execution basket transactions costs whenever separate deposits and redemptions can be matched.3 Using proprietary mathematical models, many

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3 Many large bank trust commingled index funds operate an explicit internal crossing market. Investors seeking redemption indicate their intention to sell, and the index fund manager is requested to postpone the redemption until a matching cash depositor can be found. The largest funds use crosses to handle about 60% of redemptions. Investors, planning to transfer their assets from one index fund to another, are also able to save transactions costs by redemption and deposit in kind.
index funds trade off tracking error against reduction in transactions costs by holding an inventory of cash to minimize trading should the next investor demand a redemption. In so doing, index funds act as their own crossing market, thereby removing some of the burden from stock exchange specialist systems. Index funds may also be able to obtain favored executions through market power created by large size, although this advantage may be offset by the greater market impact of their trades. Index funds also reap any advantages from economies of scale in receiving securities into inventory, holding them in inventory, and selling them out of inventory. Finally, at the cost of some default risk, index funds can enhance their returns through securities lending, an opportunity not open to most individual investors.\(^4\)

But open-end index funds fall short of the ideal basket trading instrument. Unlike closed-end investment companies or exchange-traded stock, they do not provide a ready intra-day market for deposits and redemptions with a continuous series of available transaction prices. Investors may not know with sufficient certainty the cash-out value of a redemption before they must commit to it.\(^5\) They are not given this opportunity with good reason. If they were given this information before they agreed to redeem, they could profit at the expense of the remaining investors in the fund by timing their redemptions when they have reason to believe that net asset values overstate the prices to be realized in subsequent transactions in the individual stocks.

Index funds add fidelity relative to the underlying index by passing through dividends to investors. However, funds with more than one shareholder do not pass through voting rights from holding their component securities.\(^6\) For some institutional investors this is a significant drawback. Some consider the exercise of voting rights to be a social responsibility, and some believe these rights can be used to influence management in a way that would be favorable to their stock price.

To control tracking error at times of change in composition of the underlying

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\(^4\) Securities lending is only practical for index funds of sufficient size and stability. Typically, the fund must reach a size of at least $1 billion before securities lending becomes a worthwhile alternative.

\(^5\) A few index funds are set up to permit intra-day redemptions and deposits for an extra fee. Intra-day deposits are handled by a cash deposit with the fund followed by an immediate purchase in the market of the underlying basket securities, which determines the new investor’s ownership proportion of the commingled fund. But, even in this case, the investor must commit in advance to buy into the fund before knowing the price.

\(^6\) Commingled index funds operated by bank trust departments, due to their fiduciary obligation, by law are not allowed to delegate voting rights to investors in the fund.
index, index funds are forced to incur transactions costs and to impose realized capital gains or losses on taxable investors. Moreover, the performance of index funds will tend to fall short of the index for another reason. To the extent new stocks added to the index immediately rise in value after announcement of their inclusion, index funds usually can only realize at best a portion of this increase.

Index funds also have not met with much success in the market for small investors. Vanguard Index Trust, the largest publicly held index fund available to small investors (minimum initial account size of $3,000), had only $1.399 billion in assets at the close of trading on May 22, 1989.

Stock index futures provide a very liquid intra-day market which index funds lack. Like index funds, they also act as a crossing market, taking much of the burden away from stock exchange specialists. Only when an order imbalance extends beyond the liquidity provided by futures market makers does index arbitrage create a spillover into the stock market to relieve the pressure.

As long as a significant order imbalance does not exist, execution costs in stock index futures are thought to be between 1/6th to 1/10th of a comparable program trade. Execution costs are lower for several reasons. Traders in individual stocks need to protect themselves against both systematic and non-systematic risk. The purely firm-specific idiosyncratic component of non-systematic risk has, by definition, no way of being hedged by holding other stocks. Yet, it is just this source of risk which is most likely to be coupled with information-based trading. On the other hand (apart from changes in the basis), market makers in index futures need only hedge themselves against systematic risk. Effective hedges can be constructed from relatively small diversified portfolios of stock or from other index-related instruments. Market makers also have much less to fear from information traders who are less likely to know something significant about the market as a whole compared to information about a single stock. Market makers in individual stocks may quote larger spreads because their activity forces them to bear an inventory containing significant non-systematic risk. In contrast, the inventories of traders of index futures are automatically diversified. The low margins required for index futures and one-day settlement mean that investors can easily move quickly in and out of the market in size. Trading demand for index

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7 For example, during 1988 the S&P 500 index experienced 62 divisor changes. For exact replication, it would have been necessary to revise the composition of an index fund on most of those occasions. It only becomes practical to hold all S&P 500 securities when the size of the index fund exceeds $50 million.


9 Hans Stoll estimates that 43% of a typical specialist's spread reflects a charge to protect himself against adverse information. The remaining portion of the the spread derives from order processing costs and inventory holding costs. See his paper, "Inferring the Components of the Bid-Ask Spread: Theory and Empirical Tests," Journal of Finance, March 1989.
portfolios is high and concentrated in just a few short-term instruments. For example, the daily trading volume (in terms of the dollars to which the volume is a right) in just one index futures contract, the near-term S&P 500 index future, is comparable to the daily dollar trading volume on the NYSE. The resultant economies of scale and competition among hundreds of floor traders makes this market among the most liquid in the world.

But stock index futures also fall short of the ideal basket trading instrument. Their most serious deficiency stems from being in zero net supply. This means that it is only possible to create a long position in the underlying index if another investor is willing to go short. This seriously limits the size of the open interest. While there are billions of dollars of natural longs, the opposing billions of dollars of natural shorts do not exist. The natural position for an investor is long because we live in a world where assets are in positive net supply. Beyond this simple intuitive observation, we can apply a little standard academic finance thinking to this issue. Suppose we lived in an economy of identical individuals where there were slight economies of scale in trading securities. There would be a huge demand for index funds, but no demand for short selling or index futures. These instruments take on interest to the extent individuals differ with respect to preferences or beliefs. Suppose that differences in preferences tend to be long-term while differences in beliefs are short-lived. Differences in preferences might be partially satisfied by side-bets using futures or by differential positions in the underlying cash assets. Institutions with fiduciary responsibilities, which are accustomed to holding legal title to the underlying assets, are unlikely to maintain semi-permanent positions in futures over the long-term. This means the role of futures in institutional trading will remain limited, as it is currently, to short-term portfolio adjustments.\(^\text{10}\)

Stock index futures also suffer as market basket instruments since they are only tied down to the underlying cash index by their contractual terms at maturity. Prior to maturity, futures prices can have substantial discounts or premiums to fair value which expose holders of open positions to unwanted risk entirely unrelated to their investment objectives. If futures of the desired maturity existed, this uncertainty could be eliminated by closing out the futures position at maturity. Unfortunately, since the futures market is only liquid in the shortest maturities, longer-term investors must roll them over near maturity into new contracts several times in sequence, being uncertain each time in advance about the basis. Moreover, even if the basis were predictable, the futures price reflects anticipated dividends rather than the actual realization

\(^{10}\)On a typical day in the index futures market, May 11, 1989, the volume of trading across all four domestic U.S. exchanges (NYSE, CME, KC and CBOT) was equivalent to $7.2 billion. This was roughly 1/3 that day's open interest of $22.9 billion. Contrast this with the ratio of daily dollar trading volume to outstanding dollar value of shares on the New York Stock Exchange, a number less than 1/200. The much faster turnover in the futures market indicates that index futures are used primarily by investors for short-term trading purposes. Moreover, the outstanding market value of publicly available index funds (including those aimed at both retail investors and large institutions) was at least $175 billion, or more than 8 times the open interest in index futures. This figure does not include the large amount held by private index funds (those with only one shareholder).
of dividends, and hence forces open positions to bear another type of risk (uncertainty about this difference) which is also typically unrelated to the objectives of investors. Finally, even if dividends were predictable and futures always priced at fair value, the purchase of a future would be similar to buying the underlying index financed by borrowing its value at a rate of interest. So a future, in effect, forces the buyer to couple his basket trade with a loan which he may not want, either because he has no desire to borrow or does not find the implied interest rate attractive. We should also remember that stock index futures are not forward contracts. With uncertainty about future interest rates, both the buyer and seller are exposed to another typically unwanted source of risk: the daily resettlement procedure makes terminal values from futures positions dependent on the fluctuating path of short-term interest rates during the holding period.

Current margin regulations for index futures do not allow an institution that holds the stocks underlying the future to use these stocks as collateral directly backing its futures position. In addition, since futures are marked-to-the-market, the institutional hedger who holds the underlying basket and is short futures is faced with the daily problem of finding cash for variation margin. In practice, such a hedger must maintain a cash reserve; moreover, should stocks rise sufficiently, the hedger will be forced to liquidate stock to meet the unfavorable marks -- even though he remains perfectly hedged. At these times, to make matters even worse, the longer five-day settlement procedure normally used for stocks can become a real inconvenience since losses on short futures must be settled the next business day.

Any derivative asset, such as a stock index future which settles in cash at maturity, provides investors with an incentive to illegally manipulate the index value on which the cash settlement is based. For a very large multi-billion dollar investor in index futures, perhaps only a comparatively small amount of capital might be required to move the closing cash index level at maturity by a sufficient amount to bring a substantial net profit.

Collateralization of index futures is only partial, particularly since margin deposits are now only about 2.5%-4% of the value of the futures obligation. Both the buyer and seller rely on the integrity of the clearing back-up mechanism. Even with the remote possibility of default, conservative institutions such as pension funds still find this an important issue and, as a result, do not hold large portions of their assets in the form of cash matched against long index futures, or in the form of stock matched against permanent short positions in index futures. The collateralization issue is more significant in a market collapse than in a sudden market increase. In a suddenly rising market, although losses fall on the shoulders of shorts and sellers of futures, most investors will find themselves suddenly much better off. Thus, the brokerage firms and investment houses which are the members of the clearing corporations, who provide the capital behind the back-up mechanism, should be able to pick up the pieces. Since these firms have a vested interest
in the integrity of the clearing mechanism, they may even be willing to go beyond their contractual commitment to the clearing corporations and provide additional capital if necessary. In contrast, in a market collapse, these very firms may suddenly find themselves in a precarious financial position and be unwilling or unable to go the extra distance to keep the clearing mechanism functioning. In a market crisis, worries about collateralization can have a nasty circular feedback. As the collapse deepens, before the clearing mechanism fails, hedged sellers of index futures are tempted to close out positions by buying back futures and selling stock. In turn, this places further selling pressure on the underlying securities, which further deepens the collapse, etc.

Program trades, with the assistance of the NYSE Super-DOT trading system, provide a reasonably efficient means of trading large baskets of securities. However, with enough demand for trading a standardized basket, it should be easy to make improvements. We now discuss some recent proposals.

II. Index Participations

After two years of development, on February 26, 1988, the Philadelphia Stock Exchange officially filed its application with the SEC to trade a new basket product called an "index participation" (IP). In many ways, an IP transaction is similar to a short sale of stock. The stock underlying a short sale is often listed on a stock exchange regulated by the SEC. In a short sale, the seller borrows stock from another investor and sells the stock in return for cash equal to its market value. As such, short sales are zero net supply positions with a variable open interest which is not directly related to the outstanding supply of the underlying stock. The short seller leaves the proceeds as collateral with his broker and additionally deposits margin usually equal to 50% of the value of the proceeds. The buyer also is usually able to purchase the stock with 50% margin. While the short position is open, the short seller makes up any dividend payments to the lender of the stock; these payments to the lender are not available for treatment as an inter-corporate dividends received tax deduction since they are not dividends actually paid by an issuing corporation. The lender of the stock loses voting rights. Both the short seller and the buyer are subject to additional margin deposits should the stock move against them. The short seller's account is periodically marked-to-the-market similar to a short futures position. While the position is open, the short seller usually does not receive any interest on the proceeds of the short sale, since this interest is commonly paid to the lender (or the lender's broker) as an incentive for the lender to permit his securities to be lent out. The short seller can close out his position by covering (buying back the stock and
returning it to the lender); he may even be forced to do so if his broker can no longer find a source to lend the stock. Although the buyer is never forced to close his position (provided he can finance maintenance margin), he can do so at his option at any time simply by selling the purchased stock.

IPs have two major differences from short sales of individual stocks. First, the asset underlying an IP is not a single stock, but rather a well-defined portfolio of stocks such as the S&P 500 Index.

The second difference relates to the timing and method of delivery of the underlying securities from the seller to the buyer. At the opening of the position as in a short sale, the seller receives cash equal to the market value of the IP (which should approximate the market value of the underlying portfolio). However, in return the seller only makes a promise to deliver the underlying portfolio at the option of the buyer at specific times in the future. This contrasts with an ordinary stock transaction in which the buyer and seller complete the entire transaction at its initiation. It contrasts with a forward contract, where the entire exchange between the buyer and the seller is postponed until a specific date in the future. And it contrasts with a call option contract in which the seller receives the option premium at initiation and possibly an additional amount (the striking price) at a future date. With an IP, the seller receives up front everything he is ever going to receive from the transaction, and the buyer receives nothing until prespecified times in the future.

As if to compensate the buyer for not taking immediate delivery of the underlying assets, only the buyer can decide when and if subsequent delivery is to take place. For example, the AMEX has two index participations (called "equity index participations" or EIPs), on the S&P 500 Index (500 value-weighted stocks) and on the Major Market Index (20 price-weighted stocks). In each case, the buyer can require a cash-out settlement at quarterly intervals (third Fridays of March, June, September, and December) based on the opening value of the index underlying the index participation on the cash-out Friday. In lieu of cash, block buyers can alternatively request physical delivery of the underlying securities. Sellers who are holders of open positions on these Fridays must then face the prospect of an involuntary forced liquidation on very short notice. This feature seems designed as a compromise between the need to have some provision which ties an IP down to its underlying index while at the same time minimizing the risk faced by buyers and sellers of being forced to terminate their positions.  

The second difference from a short sale has some other implications. Since the

11 PHLX index participations (called "cash index participations" or CIPs) are based on two portfolios, not identical to, but nonetheless designed to track the S&P 500 Index and the Dow Jones Industrial Average. In addition to a quarterly cash-out, buyers of CIPs also have the right to a daily cash-out based on closing prices at a sacrifice of a premium of one-half of one percent. The PHLX plans to trade CIPs with "sunshine trading" facilities which will allow buyers or sellers to publicly disclose their identity and size well in advance of trading.
seller does not deliver the securities until a future date, the seller does not need to find another investor to lend him the securities. This means that the seller earns full interest on the proceeds he receives from the sale of the IP. Although an IP uniquely possesses this feature, sellers of futures and calls, indirectly through the pricing of these instruments, also receive most of the interest on the proceeds of their implicit short position. However, unlike a future (or short sales of stock), short IP positions are not subject to uncertain cash inflows and outflows due to marking-to-the-market (apart from maintaining the maintenance margin level above 30%).

Compared to index funds, IPs do not require management fees or inventory carrying costs for the underlying basket of securities. Indeed, because of the contractual arrangements, neither the buyer nor the seller need ever hold the component securities in the basket. However, a hedger who holds the securities in the underlying basket against short IPs may want to revise his stock holdings to reduce cross-hedge risk as the composition of the underlying index changes. IPs also have some advantages over futures. In essence, they come a step closer to providing buyers with legal title to the underlying securities. Realized dividends are passed through; the long-term buyer is not forced to roll over his position since he has full control over maturity; physical delivery of the underlying assets can be requested; and higher margins provide greater assurance that future obligations will be met. Of course, from the seller’s point of view, the buyer has no future obligation since the buyer fully discharged his obligation at the initiation of the position by paying the seller the full value of the IP. Only the sellers have a future obligation. Therefore, IPs are effectively fully collateralized in a falling market since, just prior to a market collapse, sellers must have on deposit with their brokerage house at least 100% of the value of their obligation. Only in a rapidly rising market may this collateral prove insufficient. But, as pointed out earlier, it is precisely under these circumstances when the integrity of the clearing corporation is likely to be assured by its members.

Despite these advantages, IPs have a number of flaws which should cause them to lose out to other market basket alternatives such as futures, exchange stock

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12 There are some other less significant differences between short sales and IPs. During the quarter, dividends on stocks in the underlying index which go ex-dividend during the quarter are accumulated on paper. A cash amount equal to the total is paid by the seller to the buyer on the second Friday of the quarterly cash-out month. Thus IPs trade with rights to accrued dividends. Notice that this is somewhat less than the terminal value from dividends received by a comparable index fund, since the index fund will be able to receive returns during the quarter from reinvestment of the dividends as they are paid. While individual stocks are quoted with a 1/8th tick size, IPs are quoted with a $0.01 minimum increment. S&P 500 EIPs, trading in round lots of 100, will look like ordinary stocks with the value of one EIP equal to 1/10th the value of the index. Compared to S&P 500 index futures, which trade in round lots of 500, the minimum investment in IPs will be 1/50th the size, or about $3,000 at current index levels, well within the range of small investors. Like index futures and options, during the day IPs continue to trade until 4:15 Eastern Time, fifteen minutes after the underlying stocks close. While stocks settle in five business days, cash-settled IPs settle in one business day. IPs also have explicit position limits (150,000 round lots for either the S&P 500 Index or Major Market Index IPs) and are cleared through the Options Clearing Corporation.

13 Although IPs are essentially perpetual instruments from the buyer’s point of view, the PHLX and the Options Clearing Corporation reserve the authority, upon one year’s notice, to force closure of all open IP positions. This authority may be invoked if the open interest in CIPs becomes too low to justify continued exchange listing.
portfolios and SuperUnits™. Like futures IPs are in zero net supply, so that the open interest is again limited by the willingness of investors to maintain short positions. Since IPs are oriented more toward longer-term buyers, the offsetting long-term seller should even be harder to locate than the short-term seller needed in the futures market. Interest of the largest institutional investors is also dampened by position limits which currently restrict investment in an IP to less than $500 million. Like futures, IPs also fail to pass through voting rights. Most important, IPs have a serious drawback not shared by other market basket alternatives: the necessary short side seems very unattractive. Using futures, investors can take a short position with a small amount of margin. Not only do IPs require that the proceeds of the sale be left as collateral with the broker, but, as in a short sale, the seller must put up in addition 50% of the value of the IP. Sellers must also be prepared for forced liquidation at the end of each quarter. Since the long side can force settlement, an arbitrage opportunity develops whenever IP prices fall below their current cash settlement value. Arbitrages would then buy IPs and force settlement. However, since sellers do not have the symmetric right to force settlement, IP prices can easily wander above index levels creating an undesirable and uncertain premium without creating an arbitrage opportunity.¹⁴ The short seller, even one who attempts to hedge by holding the underlying securities, faces potentially unlimited upside losses.

The early returns are in. As of this writing, IPs have been trading for about 11 days. Initial trading volume has been lower than expected, typically less than 10,000 contracts ($30 million) per day on the AMEX and much lower on the PHLX. Almost all the trading has been by market makers and specialists who are using IPs to hedge their positions. Both the AMEX and PHLX have had almost no outside customer business. An early article in the New York Times¹⁵ attributes the low volume to lack of interest from brokerage firms who see IPs if anything as primarily a retail product. IPs are seen as a confusing hybrid of options, stocks, futures and mutual funds apparently requiring some back office investment in accounting procedures and considerable broker education. At the same time, from a legal point of view, the continued existence of IPs is in question. Suits have been filed by the Chicago Mercantile Exchange and the Chicago Board of Trade claiming that IPs are inherently futures contracts and therefore should fall under CFTC rather than SEC jurisdiction. The CFTC has informed the SEC that it also supports this position, but has not yet sought legal remedy. The Investment Company Institute has filed a letter of objection with the SEC claiming that IPs are inherently mutual funds and should therefore

¹⁴ Closed-end investment companies provide a more extreme example. In this case, neither the buyer nor short seller can force settlement. As a result, closed-end investment company market prices often sell at significant discounts or premiums to net asset value.

come under the provisions of the 1940 Investment Company Act. As if this were not enough, the PHLX has gone on public record accusing the AMEX of literally copying its SEC submission, but has yet to take any legal action.

III. Exchange Stock Portfolios

On January 11, 1989 the CBOE resubmitted to the SEC a modified proposal to trade a basket of stocks. The NYSE filed a similar proposal on June 1, 1989. Even now, the final features of these proposals remain subject to further revision as the exchanges await the SEC's response.

The CBOE calls their proposed new trading instrument a "market basket security" (MBS) and the NYSE calls theirs "exchange stock portfolios" (ESP). Somewhat simplified, a MBS or an ESP permits an exchange similar to that of a common stock, except where a standardized portfolio of stocks is exchanged in place of a single stock. Both the CBOE and NYSE have chosen the S&P 500 as their first standardized portfolio, although the CBOE also proposes to trade an MBS based on the S&P 100 Index. Since these proposals are quite similar, only one, exchange stock portfolios, will be discussed in detail.

The seller of an S&P 500 ESP (who has not entered a subsequent closing transaction the same day) must be prepared to deliver in five business days after the trade, not a single stock, but a basket of stocks consisting of \( x_1 \) shares of IBM, \( x_2 \) shares of AT&T, \( x_3 \) shares of Exxon, etc., where the \( x \)'s are set equal to a multiplier times the weight of each stock in the "S&P 500 Portfolio Index." This weight will be approximately equal to its weight in the S&P 500 Index: the current number of outstanding shares of each stock divided by the current S&P 500 Index divisor. With the S&P 500 Index near 312, one ESP would be worth about 312 \( \times 16,000 = 5,000,000 \). The S&P 500 Portfolio Index differs from the S&P 500 Index in two respects to accomodate standardized basket trading. First, to reduce rebalancing required to liquidate a basket position whenever the composition of the underlying index changes, the S&P 500 Portfolio Index will not be changed as frequently as the S&P 500 Index. Minor changes in the S&P 500 Index will be allowed to accumulate. Such changes will only be reflected in a revised S&P 500 Portfolio Index once a calendar quarter or at the time a significant change occurs in the S&P 500 Index. Second, fractional weights will be rounded to the nearest share. Because of rounding to the nearest share rather than to the nearest round lot, almost all securities in the

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16 Letter by Matthew Fink representing the Investment Company Institute to Richard Ketchum, Director or the Division of Market Regulation, SEC, December 19, 1988. The letter states that exemptive relief from the provisions of the 1940 Act would be required in an number of areas. For example, exemption would be required for EIPs to be redeemable less frequently than daily, or for CIPs to be redeemable on a daily basis only in cash, and not in kind.
basket will involve portions of non-round lots. The large minimum size of the basket is influenced by the requirement to include all 500 stocks in the S&P 500 in roughly their current proportions, where the largest stock exceeds the smallest stock by a factor of about 3000%. The CBOE proposal has a smaller minimum trade size of about $1,500,000.

The New York Stock Exchange has developed a very innovative ESP floor trading environment designed to pool large amounts of market-making capital from its existing stock specialists and proprietary member firms. A "Basket Book Broker" (BBB) will coordinate trading in ESPs. Currently, 462 of the S&P 500 stocks are listed on the NYSE. The remaining 38 AMEX and OTC stocks in the index (approximately 3% of index capitalization) will be given a combined "mini-basket" quote by the BBB. With that exception (and to correct an error position), the BBB will not be allowed to trade for his own account. Every 15 seconds during the trading day, the bids and asks at each of the specialist posts in these stocks, together with the mini-basket quote, will be aggregated in proportion to their weights in the S&P 500 Portfolio Index. This aggregated first-tier bid and ask, good for one ESP basket, will be entered into the BBBs limit order book. In addition, these specialists will also set a second-tier aggregated quote good for three ESP baskets, which will also be entered into the book.\footnote{Aggregated specialist quotes can only be provided after all 462 stocks have opened for trading. According to the NYSE, during the first 100 trading days of 1989, all 462 stocks were open for trading 99.5% of the time after 10:00 Eastern Time.}

In addition, "Competitive Basket Market-Makers" (CBMM), representing NYSE individual members or member firms and each meeting a $10 million minimum capital requirement, will be obligated to make a two-sided market with a maximum quote spread of 2 index points during normal market conditions. CBMMs will be allowed to trade on behalf of customers as well as for their own accounts. CBMMs will have no obligation to maintain a floor presence, but can trade from upstairs terminals. The entire limit order book will be open not only to floor traders but also on CBMM upstairs terminals. Thus, in an unprecedented rule change, information about the depth of the market for ESPs -- limit order size at various prices away from the current market, as well as the current bid-ask quote -- will be available to all direct market participants.

Orders can be entered with a minimum tick size of .01 index points. Orders will be filled with priority given to price and time, but without the usual priority given to size.\footnote{The one exception is that the first and second tier aggregated specialist bids and offers will have priority over other orders placed earlier if they are placed at the same price.} Market orders in size will "walk the book" in the sense that they will be filled against several opposing limit orders at the displayed price of each limit order.

The combined effect of these innovations will be to concentrate large amounts
of market-making capital in ESPs. For example, if the specialist first-tier quote is hit, even a public customer seller in IBM may find himself (without ever being informed) on the opposite side of an ESP purchase. It would not be surprising to find that the bid/ask spread and market impact execution costs of ESPs will rival those in the index futures market.

Since an MBS or ESP transaction is so similar to the simultaneous entry but separate execution of shares of several common stocks (a program trade), the CBOE and the NYSE have requested similar margin and settlement provisions to common stocks. Unlike other derivative securities, since market basket securities and exchange stock portfolios do not create open interest, the exchanges believe that position limits are not appropriate. Finally, the CBOE and the NYSE have also sought exemption from the short sale uptick rule.

One interesting complication arises from the necessity to record a purchase price for each stock in the basket for tax and accounting purposes. For example, if subsequently, one stock in a purchased basket were sold, the seller might need to set an initial purchase price to establish a basis for tax purposes. Perhaps the first way of handling this that comes to mind would be to record the last transaction prices of the securities in the S&P 500 Portfolio Index at the time during the day just preceding the time of the basket transaction. If the NYSE has decided not to use this approach because it would be unrealistic to expect the computer systems available to investors to be capable of recording the previous transaction prices at unanticipated times during the day of all stocks in the S&P 500 Portfolio Index. Instead, the NYSE plans to assume that all recorded transaction prices for the individual securities will be taken from the closing transactions for the day of the trade.

For example, suppose for sake of argument there were only two securities in the basket: A and B, the first weighted by 100 and the second weighted by 200. Say at 11:00 Eastern Time, A is selling for $20 per share and B is selling for $30 per share. The net asset value of the basket, based on these prices, is \( (20 \times 100) + (30 \times 200) = 8,000 \). For many reasons, the actual transaction price for the basket might be somewhat higher or lower. Suppose it is $8,007. At 4:00 Eastern Time, the close of trading for the day, suppose the last transaction prices were $19 for A and $31 for B. The net asset value of the basket, based on these prices is \( (19 \times 100) + (31 \times 200) = 8,100 \). The buyer will receive (and the seller will deliver) 100 shares of A and 200 shares of B. For this, the buyer will pay $8,007. For bookkeeping purposes, the buyer assumes that he has purchased 100 shares of A at $19 per share and the 200 shares of B at $31 per share. The difference between the closing net asset value of the basket and the actual transaction price of the basket is 8,100 - 8,007 = $93. Currently, it is unclear exactly how this "clearance cash adjustment" will be handled for tax purposes. One possibility is that the tax basis for each stock will be reduced by the factor 8007/8100. More likely, the $93 will be considered an intra-day short-term capital gain (loss) for the buyer (seller) on the basket itself. In other words, the buyer will regard the transaction as
a purchase of a basket security at 11:00 for $8,007 and a sale of the basket security at 3:00 in exchange for shares worth at that time $8,100.

For index fund investors who desire to buy or sell a portfolio closely approximating the composition of the S&P 100 or S&P 500 Index, CBOE market basket securities and NYSE exchange stock portfolios will have advantages compared to program trading. In contrast to program trades, ESPs provide simultaneous execution across all securities in the basket at an intra-day price known before the transaction occurs. Exchange stock portfolios also visibly separate investors by their motivation for trading: investors with special information about individual stocks will continue to trade those stocks, while investors with overall portfolio objectives will tend to trade basket securities. This means that the spread portion of transactions costs should be lower for investors using baskets than for those who continue to trade in individual stocks through programs trades. This difference in spreads should be enlarged even further by a circular second order effect: since most of the remaining orders in individual stocks will now contain a larger proportional component of information-based trades, the spreads on individual stocks will tend to increase, providing yet further incentive for overall portfolio transactions to be implemented through exchange stock portfolios rather than program trades.¹⁹

For similar reasons, trading in exchange stock portfolios should also reduce market instability. Specialists trading in individual stocks will be less likely to confuse orders motivated by overall portfolio adjustment with orders motivated by information about individual stocks. This should permit them to make more orderly markets, particularly during times of large sale or purchase imbalances. Much of the imbalance that would occur will be removed from their shoulders and absorbed by the market makers handling basket trades.

Because of the replacement of S&P 500 program trading by lower cost basket trades, the basis in the S&P 500 Index futures market should become less variable and more closely attuned to fair value. It will simply be too easy for an investor to buy or sell the physical S&P 500 through a basket trade should the futures become mispriced. Most arbitrage-based program trades do not complete transactions in all S&P 500 securities, leaving open some cross-hedge risk. On the other hand, the CBOE and NYSE baskets provide virtually perfect replication. The closer approximation of the futures basis to fair value will itself reduce the amount of arbitrage-based program trading between futures and stocks. In turn, this will simplify trading at individual stock specialist posts.

The index-arbitrage trading that does remain should become focused primarily between baskets and individual stocks. However, the difference between a basket

¹⁹ For a formal model consistent with the conclusions reached in this paragraph, see Avanidhar Subrahmanyam, "A New Rationale for Markets in Baskets of Securities," working paper 10-89, Anderson School of Management, UCLA (April 1989).
trade and a program trade in the individual stocks (where delivery of the physicals occurs at the same time and dividends are identically treated) is much less than the difference between a futures and a program trade (where delivery of the physicals occurs at quite different times and dividends are treated differently). As a result, index-arbitrage between baskets and individual stocks should be much easier to accomplish, less profitable, and therefore less frequent.

Program trading may continue, however, to be a significant factor in the market for those wishing to trade a non-standardized basket. Even small index funds may prefer a program trade to a S&P 500 basket trade which forces them to hold small numbers, perhaps non-round lots, of several stocks. ²⁰

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²⁰ Based on current prices, Exxon has the highest weighting in an NYSE exchange stock portfolio with about 3100 shares. At the other extreme, about 160 stocks in the basket have weights of less than 100 shares.