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The Importance of the Asset Allocation Decision

Several different decisions, including asset allocation, security selection and market timing, affect the return to a pension fund (or any investor). The impact of each type of decision can be measured by comparing a portfolio's actual return with the return on a hypothetical portfolio that does not reflect a particular decision that went into the real portfolio. The critical element in the comparison is defining the naive alternative to the decision.

When asset allocation is the decision being evaluated, the naive alternative is not obvious. If Treasury bills are the appropriate naive alternative, then asset allocation is, as commonly thought, the single decision with the greatest impact on a typical pension fund's return. But if a diversified mix (such as the average asset mix across large pension funds) is the alternative, then the impact of departing from this naive allocation may be no greater than the impact of other decisions, including security selection.

IT IS WIDELY believed that the **asset allocation** policy decision of an investor is far more important than decisions such as market timing or security selection.[1] Of course, this belief reflects the practices of the *average* investor—more specifically, the average pension plan sponsor. But it is conceivable that some investors take such large bets on, say, **security selection** (or large departures from the composition of market indexes) that security selection has a greater impact on the achieved return of these investors than asset allocation policy. Sponsors might thus like to know how to estimate the relative impacts of different types of investment decisions on their funds' returns.

This article describes a method investors can use to analyze their returns and determine the impacts that several different risk-taking decisions have on these returns. In the course of constructing a suitable model and applying it to a very small sample of actual results, we discovered that the massive influence currently attributed to asset allocation policy depends crucially on one factor—that is, the naive alternative from which the sponsor's policy represents a departure. If the naive alternative is a reasonably diversified portfolio, then asset allocation policy may, for many sponsors, be only as important as (or not much more important than) other types of investment decisions.

Performance Attribution

The impact of any investment decision can be measured by comparing its outcome with the outcome of some alternative decision. This notion is frequently used to **attribute** pension fund investment performance to each of a number of decisions. For example, some funds compare the return on an actively managed portfolio with the return that would have been earned had funds been invested in the market portfolio instead. The difference represents the value added (or perhaps lost) by the investment judgments, which represent departures from the market portfolio.

While the principle is easy to understand, its application is often difficult. It is difficult to define the alternative portfolio that would be held by an investor who is devoid of investment judgment. Conventional wisdom defines the naive alternative as one that represents all available opportunities proportionately; this is usually the same as the average of what everybody else is holding.[2]

1. Footnotes appear at end of article.

Glossary

Asset Allocation: The decision of how a fund should be invested across each of several asset classes, assuming neutral capital market conditions exist. This condition implies that asset class return expectations are roughly proportional to the asset classes' assessed riskiness; no class is considered to be underpriced or overpriced.

Security Selection: The decision of how an asset class portfolio should be invested in each of the available securities making up the asset class.

Attribution: The mathematical process of explaining an investment return by relating it to the different risk-taking decisions implicit in the portfolio, and the extent to which each of those risks was rewarded or penalized in the capital markets.

Minimum-Risk Portfolio: That combination of securities or asset classes that reduces the uncertainty of future portfolio returns to a minimum. A liability-driven minimum-risk portfolio is one that reduces the uncertainty of future surplus size (assets minus liabilities) to a minimum.

Coefficients of Determination: Measures of the extent to which any variable is statistically explained by another variable. Such a coefficient has a maximum value of one and a minimum value of zero.

Mean Absolute Deviation: A statistical measure used to show the average extent to which a series of numbers differs in size from a given number. In this calculation, it is immaterial whether the differences are positive or negative; differences of +2 and −2 are both considered as differences of 2 in calculating the average.

Furthermore, investment portfolios often reflect judgments of many kinds, each a departure from some naive alternative. A multilevel decision model for a pension plan sponsor (or indeed any investor) might involve three sets of asset allocations:

- the market mix, X,
- the sponsor's customized policy mix, Y, and
- the actual mix held from day to day, Z.

The corresponding trio of security weights would be:

- market weights, 1,
- the sponsor's customized "normal" weights, 2, and
- the actual weights of securities held from day to day, 3.

Allocation X could be the average weights of different asset classes held by all U.S. pension funds. Allocation Y could be the customized 60 per cent U.S. equities/40 per cent U.S. bonds selected as the policy for a particular sponsor's pension fund. Allocation Z on a particular day might be 55 per cent U.S. equities, 15 per cent U.S. bonds and 30 per cent cash, assuming that mix were deemed by the fund's manager to be temporarily superior to the policy mix.

Weights 1 might be the weights assigned to securities in a well known index such as the S&P 500, attempting to reflect the market's opportunity set. Weights 2 might reflect specific tilts that the sponsor elects from a long-term policy perspective, such as a tilt toward long bonds rather than the intermediate length that reflects all bonds available in the U.S. Weights 3 would consist of the weights of the actual securities held in the portfolio on a particular day.

The basic naive portfolio consists of asset class weights X and security weights 1 (see Figure A). It is conveniently labeled Portfolio X1. It earns no-judgment returns. All other portfolios reflect a choice of some kind, whether made consciously or unconsciously by representatives of the sponsor or by the investment manager (who may also be the sponsor). Portfolio Y2 is the quintessential representation of the sponsor's decisions, while Z3 represents the investment manager's decisions.

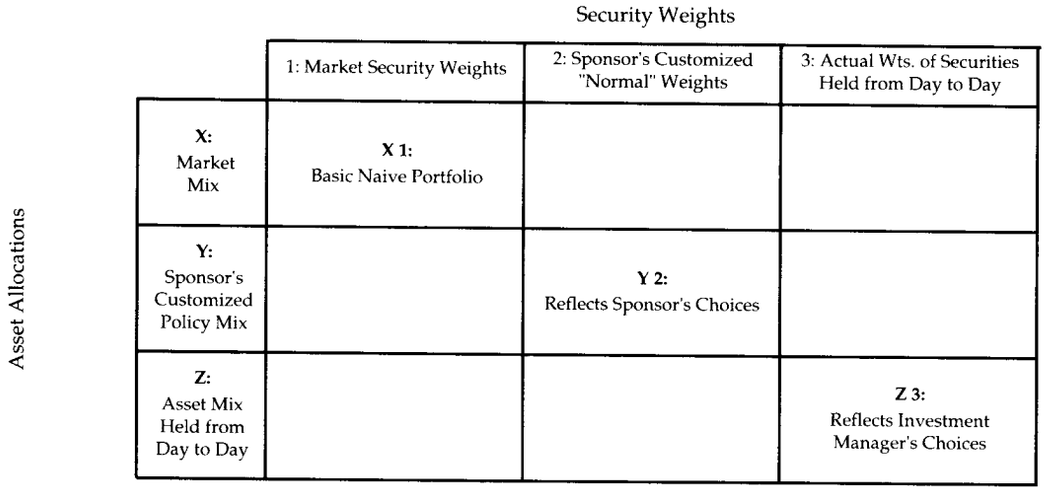
Differences between the different portfolios' returns measure the impact of various kinds of investment judgments. Thus (Y1 − X1) measures the impact of the sponsor's customized asset allocation policy as the two hypothetical portfolios differ only insofar as the sponsor's policy allocation differs from the neutral market allocation.[3]

In summary, Portfolio X1 represents the results from neutral participation in the markets. Differences between portfolio returns represent the impacts of investment decisions.

Naive Asset Allocations

We mentioned earlier the difficulty of defining the naive asset allocation. While we used the market mix to illustrate Allocation X in the model above, it is by no means obvious that this is what a naive pension plan sponsor would do.

Figure A Composition of Various Portfolios



Some candidates for Allocation X frequently found in practice include the following.

A: 100 per cent in T-bills. This could be the minimum-risk portfolio for (1) a sponsor concerned with asset growth rather than surplus growth or (2) a sponsor concerned with surplus growth, which believes that pension liabilities are real in nature and that real interest rates tend to remain constant over time.[4]

B: 100 per cent in bonds. This could be the minimum-risk portfolio for a sponsor concerned with surplus growth and focused on pension liabilities that are either fixed in nominal terms or inflation-sensitive up to each member's retirement but not beyond retirement.

C: The average asset allocation held by large pension funds. We assumed this to be 50 per cent U.S. stocks, 5 per cent international stocks, 30 per cent U.S. fixed income, 5 per cent real estate and 10 per cent cash.[5] This allocation might be the naive selection of a sponsor who asks, "What is everyone else doing?"[6]

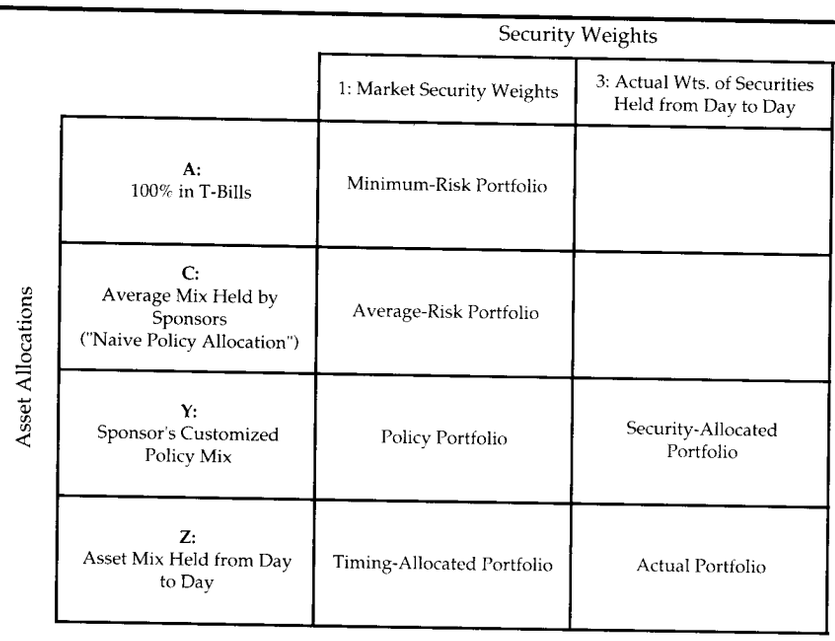
D: The asset allocation representing the "market mix." This would include all available investment opportunities. But what is "all"? Everything available to U.S. investors? Everything available anywhere in the world? Because of the difficulty in defining "all," we did not take this candidate any further.

Conceptually, we believe the appropriate hierarchy of investment policy portfolios is the one shown in Figure B. We define the **minimum-risk portfolio** as liability-driven, in the sense that it minimizes the extent of future surplus uncertainty. For the balance of this article, we will use T-bills as the minimum-risk portfolio, without attempting to defend or convert others to this viewpoint. (Results are virtually identical if bonds are used as the minimum-risk portfolio.)

The average-risk portfolio is Naive Allocation C (i.e., "what other large pension funds are doing"), combined with market security weights. For the remainder of this article, we will refer to this allocation as the "Naive Policy Allocation." Comparing the return on this portfolio C1 with the return on T-bills reveals the reward received by the average fund for accepting risk.

The sponsor's policy portfolio depends on the specific sponsor. Sponsors usually conduct periodic analyses of the characteristics of their pension assets and liabilities, as well as their own comfort levels (frequently called "risk tolerance" in the finance literature, although in practice psychological aspects of risk tend to be at least as important as financial aspects). As a result of these analyses, they adopt their own

Figure B Portfolios Used in Study



asset allocation policies, which may differ from the average-risk portfolio. Comparing the return on this portfolio Y1 to the return on the average-risk portfolio C1 reveals the impact of the sponsor's decision to depart from the implicit average risk tolerance of other sponsors.

Once this hierarchy of investment policy portfolios is established, one can proceed as follows.

- Ignore the existence of security weights 2. In effect, assume that sponsors invoke no deliberate policy tilts away from standard indexes for the relevant asset classes.
- For the impact of *market timing*, compare the returns on the timing-allocated portfolio (Z1) to the returns on the sponsor's policy portfolio (Y1), that is, market timing equals the impact (Z1 − Y1).
- For the impact of *security selection*, compare the returns on the security-allocated portfolio (Y3) with the returns on the policy portfolio (Y1). That is, security selection equals the impact (Y3 − Y1).
- The residual part of the actual return earned by each sponsor's fund is attributed to the *interaction* of market timing and security selection, as well as portfolio *activity*; all our hypothetical portfolios were rebalanced quarterly and remained unchanged throughout the quarter. Thus interaction plus activity equals the impact (Z3 − Y1 − timing − selection), which equals the impact (Z3 + Y1 −Z1 − Y3).

Return Volatility

We examined the volatility of returns for seven Russell U.S. sponsors, using quarterly data over the 1985–88 period.[7] We regressed historical portfolio returns on five different portfolios—the naive alternatives A and C, each sponsor's policy portfolio, the timing-allocated portfolio and the security-allocated portfolio.[8] The results indicate the amount of the variability of each sponsor's returns explained by each decision level. The individual sponsors' squares (**coefficients of determination**) were then averaged over the seven sponsors.

For these seven sponsors over the four-year period, 97.5 per cent of the variation in total plan returns was explained by their policy portfolios.[9] The diversified naive allocation (Alternative C: average large pension fund exposures to the asset classes) explained 97 per cent of the variation in total plan returns. Table I gives the amount of the variation in plan returns explained by different decision levels.

Our results highlight the importance of the

Table I Return Variation Explained

Decision Level	*Additional Variation Explained by this Level*	*Cumulative Variation Explained through this Level*
Minimum Risk	2.66%	2.66%
Naive Policy Allocation	94.35	97.01
Specific Policy Allocation	0.50	97.51
Market Timing*	0.14	—
Security Selection*	0.40	—
Interaction and Activity*	1.95	—
Total	100.00%	100.00%

* The additional return variation explained by market timing, security selection and interaction and activity need not be sequentially cumulative. Therefore, rather than imply a specific order, they are left blank.

naive allocation. If T-bills, rather than a diversified mix, had been selected as the naive alternative, then the sponsor's choice of policy allocation would explain most of the variation in plan returns. The use of a diversified mix as the naive alternative makes the choice among different diversified mixes relatively unimportant; that choice explains only an additional 0.50 per cent of return variation.

Return Impact of Different Decisions

We believe the most significant analysis concerns the potential impact of different types of decisions on returns themselves, rather than their variability. Table II shows the results of our return analysis.

The average quarterly return on T-bills over the period was 1.62 per cent.[10] By contrast, the Naive Policy Allocation would have resulted in an average quarterly return of 3.75 per cent—2.13 per cent higher than the T-bill return. We interpret the 2.13 per cent as the average quarterly reward over the period for the average pension fund's decision to take investment risk as a matter of policy. The reward, of course, is highly dependent on the time period under consideration. There must be periods when the reward is negative; that is the essence of risk.

The absolute size of each quarterly reward (or cost) is important. Sponsors will accept negative results if they expect that, in the long term, positive results will predominate.

The size of a decision's impact (regardless of sign) is an indication of its potential effect. It is certainly an *ex post* measure of its effect. We therefore measured the dispersions of the impacts around zero and calculated the average of the absolute values of the dispersions. This measure is the "**mean absolute deviation**" (MAD).[11]

For the Naive Policy Allocation, the potential impact on the fund's return, as measured by the MAD, amounted to 4.43 per cent per quarter. The specific asset allocation policies adopted by the sponsors in the sample added, on average, 0.49 per cent per quarter to the Naive Policy Allocation return; the policy portfolios earned an average quarterly return of 4.24 per cent. The impact of a specific policy allocation relative to the Naive Policy Allocation was occasionally negative. The potential impact of the specific policy allocations, as measured by their average absolute size, was 0.79 per cent per quarter.

Table II Quarterly Return Impacts of Different Types of Decisions

Source of Return	*1985–1988 Average Quarterly Return**	*1985–1988 Average Quarterly Contribution†*	*Potential Quarterly Impact as Measured by Average MAD*
Minimum Risk (T-bills)	1.62%	1.62%	—
Naive Policy Allocation	3.75	2.13	4.43%
Specific Policy Allocation (average of 7 sponsors)	4.24	0.49	0.79
Market Timing (average of 7 sponsors)	—	(0.10)	0.57
Security Selection (average of 7 sponsors)	—	(0.23)	0.85
Interaction and Activity (average of 7 sponsors)	—	(0.05)	0.15
Quarterly Total Fund Return (average of 7 sponsors)	3.86%	3.86%	5.63%

* All returns are before all fees and expenses.
† Returns and mean absolute deviations were computed for each sponsor and then averaged across sponsors.

Table III Extreme MAD Results in Study

Source of Potential Quarterly Impact	*Lowest Quarterly MAD for any 1 Sponsor*	*Average Quarterly MAD Over 7 Sponsors*	*Highest Quarterly MAD for any 1 Sponsor*
Specific Policy Allocation	0.51%	0.79%	1.53%
Market Timing	0.23	0.57	0.73
Security Selection	0.53	0.85	1.50
Interaction and Activity	0.07	0.15	0.20

The average quarterly return of the timing-allocated portfolios was 4.14 per cent. That is, the average quarterly impact of market-timing decisions by sponsors was −0.10 per cent. When the quarterly impacts were averaged in absolute terms (without regard to sign), the average was 0.57 per cent. This is the potential quarterly impact of managers' market-timing decisions.

Security selection had an average impact of −0.23 per cent per quarter, and a potential impact of 0.85 per cent per quarter. Interaction and activity had an average impact of −0.05 per cent per quarter and a potential impact of 0.15 per cent per quarter.

Further Comments

Table II indicates that T-bills and the risk premium associated with the Naive Policy Allocation accounted for most of the return over the period studied. Market timing, security selection and the effect of interactions and activity all, on average, reduced returns. Specific asset allocation policy decisions added slightly to returns.

The relative magnitudes of the *potential impacts* are particularly interesting.

- The potential impact of the Naive Policy Allocation easily surpasses all other decisions.
- The potential impact of interaction and activity is the smallest, when measured over one quarter.
- The potential impacts of specific policy allocation and of security selection are roughly equal in magnitude and somewhat greater than the potential impact of market timing.

The order of average magnitudes in Table II may not hold for every sponsor. Table III shows, for example, the highest and lowest potential impacts for different sponsors in the sample. One sponsor departed significantly from the Naive Policy Allocation—so much so that the mean potential impact of the specific policy allocation was 1.53 per cent per quarter. Another sponsor departed relatively little from the Naive Policy Allocation; the mean potential impact of the difference was only 0.51 per cent per quarter. Averaged over all seven sponsors, the mean potential quarterly impact of specific policy allocation was 0.79 per cent per quarter, the same number shown in Table II.

The potential impact of the specific policy allocation will be high for any sponsor whose attitude toward risk differs significantly from the attitude of the average sponsor. This is a decision only the sponsor can make. Similarly, the potential impacts of market timing and security selection will depend on the specific sponsor.

In our sample, the potential impacts of specific policy allocation and security selection are of roughly equal magnitude in all columns and larger than the potential impact of market timing. But there could conceivably be a sponsor with a specific policy allocation identical to the Naive Policy Allocation, which believes in holding indexed portfolios and adding value through market timing. For such a sponsor, the potential impacts of specific policy allocation and of security selection will be zero; market timing will produce the entire impact. This demonstrates the importance of each sponsor's deciding individually how much significance each type of decision should be given.

Finally, it is legitimate for the expected reward from a specific policy allocation to be negative for a sponsor that consciously decides to take less investment risk than the average sponsor. However, the expected reward from active management decisions should not be negative; if it is, the exposure to active management should be severely curtailed.

Existing Literature

The Brinson, Hood and Beebower (BHB) study is the seminal work on performance attribution, and deservedly so.[12] Our study follows its methods to a large extent. But we made two conceptual changes.

First, in performance attribution, there is usually a base return (representing the naive port-

folio) and a series of effects (representing the impacts of judgments). If the base return is itself added to one of the effects, it exaggerates the impact of the corresponding judgment. Essentially, this is equivalent to assuming that the naive portfolio always has a zero return. The naive portfolio thus implies no investment whatsoever; this is clearly unrealistic.

We were careful not to measure the impact of the sponsor's policy decision, in our numerical results, as the difference from a zero return. This reduces the explanatory power of the sponsor's policy decision as a source of return variability, relative to the results of BHB. The difference is small if the naive alternative is T-bills. The reduction is quite large if the naive alternative is a diversified portfolio.

Second, we asked ourselves what the naive alternative to a judgment on asset allocation policy would be. Experience with sponsors indicated that when they study the subject, they almost always consider the average mix held by other sponsors. Hence our decision to consider Naive Allocation C as the point of departure. The same experience underlies our concept of the policy allocation as itself representing a departure from a naive allocation, rather than from no investment whatsoever.

For most sponsors, the decision to depart from a risk-minimizing investment policy is likely to have a greater impact on total plan returns and return variability than any other single decision. Relative to a naive diversified mix, any specific asset allocation policy may have a sizable impact on total return, but nothing like the dominance frequently (and erroneously) attributed to it. Decisions regarding active management (market timing and security selection) can be as worthy of a sponsor's attention as the asset allocation decision. ■

Footnotes

1. See W. F. Sharpe, "Asset Allocation," in Maginn and Tuttle, eds., *Managing Investment Portfolios*, 2nd ed. (Boston: Warren, Gorham & Lamont, 1990), who accurately quotes the prevailing sentiment: "It is generally agreed by theoreticians and practitioners alike that the asset allocation decision is by far the most important one made by an investor." The definitive quantitative study on the subject is G. Brinson, L. R. Hood and G. L. Beebower, "Determinants of Portfolio Performance," *Financial Analysts Journal*, July/August 1986.
2. Conventional models of economic equilibrium require that all markets clear so that there is no excess supply in any market. Thus the portfolio positions held in aggregate are the market with no ownable assets excluded. The market so defined represents a benchmark against which average performance can be measured. See, for example, K. J. Arrow, "The Role of Securities in the Optimal Allocation of Risk Bearing," *Review of Economic Studies* 31 (1963–64), pp. 91–96, or R. Radner, "Existence of Equilibrium of Plans, Prices, and Price Expectations in a Sequence of Markets," *Econometrica*, March 1972.
3. Actually, (Y2 − X2) is an equally valid measure of the impact of the sponsor's policy allocation. This illustrates the principle that there may not always be a unique "right" way to measure impacts, merely ways with different degrees of usefulness. In fact, however, Weights 2 are rarely found in practice, so (Y1 − X1) would usually be used.
4. While a discussion of the characteristics of pension liabilities and surplus is beyond the scope of this paper, an explanation is provided in D. D. Ezra, "Asset Allocation by Surplus Optimization," *Financial Analysts Journal*, January/February 1991.
5. See the 1989 *Money Market Directory for Pension Funds*, p. xvii (corporate pension funds with total assets exceeding $500 million). In different countries, of course, this allocation will be different, reflecting local preferences and opportunities.
6. A simple benchmark frequently quoted consists of 60 per cent stocks and 40 per cent bonds. Results using this allocation are virtually indistinguishable from the results using mix C.
7. This study is based on a small sample and a short period of time. Our purpose was to outline an approach rather than to produce definitive numerical results.
8. The asset class benchmarks were the Russell 3000 for U.S. equity; the MSCI EAFE Index for non-U.S. equity; the Shearson Lehman Hutton Aggregate Bond Index for U.S. fixed income; the Russell NCREIF Property Index (formerly FRC Property Index) for real estate; and the Salomon Brothers 3-Month Treasury Bill Index for cash. Sponsors' actual policy weights were used when available. For sponsors lacking policy portfolios or for periods prior to the adoption of a policy portfolio, policy weights were inferred from the client's average actual allocations to managers for those periods. For these seven sponsors, two had policy portfolios for all quarters and two lacked any policy portfolios. The average length of time these sponsors had policy portfolios was 10 quarters. Thus, on average, the policy portfolios for the initial six quarters were inferred.
9. This result is reasonably close to the 93.6 per cent

calculated for a larger sample, and over a longer time, by Brinson, Hood and Beebower, "Determinants of Portfolio Performance," *op. cit.*

10. All quarterly return numbers can be annualized by taking the fourth power of the return relatives and subtracting one.
11. Had we used standard deviation instead, we would have measured the variation around the mean and accorded greater weight to extreme observations. We believe measuring the deviations from zero (MAD) provides a better sense of potential future outcomes and is therefore a good measure of the potential impact of different types of decisions.
12. Brinson, Hood and Beebower, "Determinants of Portfolio Performance," *op. cit.*

Gastineau and Jarrow *footnotes concluded from page 51.*

fiting. The growth in regulators' databases makes this concealment increasingly difficult.

14. One of the few corners of recent years occurred when two registered representatives allegedly purchased 108 per cent of a small company's floating shares in a variety of customer accounts. Somehow, the size of the position escaped the attention of the firm's compliance officers, and a corner occurred. See E. J. Savitz, "Eternal Limbo? The Amex Has Yet to Reopen Trading in Chase Medical," *Barron's*, May 8, 1989.
15. In early 1991, the Securities and Exchange Commission approved an NYSE rule change that greatly increases stock specialists' flexibility in using options.
16. See E. H. Fleischman, "Panel Discussion on Regulatory Issues Facing the Futures Industry," *The Review of Futures Markets*, May 1988.
17. J. A. Grundfest, "Perestroika on Wall Street: the Future of Securities Trading," *Financial Executive*, May-June 1989.
18. Jarrow, "Market Manipulation," *op. cit.*