THE IMPORTANCE OF ASSET ALLOCATION

by John Nuttall

Written in 2000

There is a widespread belief in the truth of statements such as "studies show that asset mix determines 93.6% of the return of a portfolio". This belief apparently arises from an article by Gary Brinson and colleagues published in 1986. If you search for "asset allocation" you will find a lot of variants of the statement. Many of them specifically give the source as Brinson and colleagues. Almost all these statements misquote the Brinson results. Not only that, there are serious problems with the results themselves.

Read the whole story, which seems to suggest that thousands of people in the investment industry in the US and Canada have been misleading the public for years.

From the Table of Contents you can jump to any section in the article. Those who want to quickly grasp just the essentials of the story might want to read the Summary, Section 1.1, and then go to Section 5.

Note that some of the external links referred to in this document may no longer be in operation.

I welcome comments of any nature. Contact information.

EXECUTIVE SUMMARY

> "Data from 91 large US pension plans indicate that investment policy dominates investment strategy (market timing and security selection), explaining on average 93.6% of the variation in total plan return ." Brinson et al. 1986.

Many people have misinterpreted this statement. For instance

- Almost all the 'quotes' omit the important qualifier "on average".
- Many omit the word "variation", and claim that 93.6% of investment RETURNS come from asset allocation.
- Others incorrectly interpret "variation" to mean variation of return from plan to plan.
- Most seriously, there has been a frequent misunderstanding of what the authors meant by "investment policy" or "asset allocation". Brinson et al. defined investment policy to be a

combination of the choice of asset classes and the choice of asset mix. Many think it is just asset mix that determines over 90% of your return. Later work showed that it is the first part of investment policy, the decision to invest in the various asset classes, that is responsible for the major part of return, represented by the return due to the market portfolio. An advisor or manager does not deserve any credit for this return.

The return due to investment strategy is defined as the return of the portfolio relative to a portfolio of index funds with fixed weights. Averaged over plans, this return will be close to zero. Brinson et al. unjustifiably declared that this return was therefore due to chance and did not contribute to overall return. That is the real meaning of their statement that the return due to investment policy is overwhelmingly dominant, in spite of the fact that, for some plans, strategy returns were large.

Important conclusions are

- Asset mix choice is usually responsible for a minor part of portfolio return.
- An investor who believes that asset allocation dominates portfolio return should invest in index funds and not try to time markets.

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SUMMARY

Formalism

Brinson et al. describe the investment process used to manage a portfolio as a heirarchy of three decisions taken one after the other.

- Decision 1: Choice of asset classes
- Decision 2: Choice of fixed normal asset class weights
- Decision 3: Security selection and market timing (changing the weights)

Together the first two are called investment policy (passive management) and the third is investment strategy (active management). The policy portfolio corresponding to a given actual portfolio is a hypothetical portfolio with the fixed normal asset class weights and class returns equal to those of an index corresponding to each class.

In order to analyze the contribution to portfolio return of these parts of the investment process they and later researchers wrote the return of a portfolio for any period as the sum of terms corresponding to each of the decisions.

- 1 Base Return - Return of the market portfolio, an appropriate average of all the portfolios in a group under study.
- 2 Asset Mix Return - Return of the policy portfolio relative to the market portfolio.
- 3 Strategy Return - Return of the actual portfolio relative to the policy portfolio.

Policy return is defined as the sum of Base return and Asset mix return.

Errors in the Statements of Brinson et al.

Brinson et al.(BB) make a number of statements about the size and importance of the various contributions to portfolio return defined above. Errors in these statements include

- BB do not clearly distinguish between the size and importance of a contribution. The importance of a return contribution to the decision-making process of an investor is determined by how much that contribution might vary over the group of portfolios, not its absolute magnitude.
- In their original articles BB did not realize that the biggest contribution to the size of policy return was the market portfolio return, which does not vary across portfolios and has no effect on the decisions of an investor. Brinson later acknowledged this point.
- BB argued that, although strategy return could vary widely from one portfolio to another, it was far smaller and less important than policy return. Both these statements are untrue using the above definition of importance.
- BB argued that, since the average over portfolios of strategy return was close to zero, its contribution to return was due to chance.The definition of strategy return ensures that its average over portfolios will be close to zero, but BB provided no evidence to support the claim that the return was due to chance, although that could be the case.
- Also, because of the definition, the average of asset mix return over portfolios will be close to zero, but BB did not assert that this was due to chance. They were inconsistent in their application of the efficient market hypothesis.
- BB calculated the coefficient of determination (CD) of the regression of the actual portfolio period returns against those of the policy portfolio. The CD measures the contribution of the policy portfolio to the variance over time periods of the actual portfolio. For most portfolios this was close to 100%. BB did not realise that this was due to the dominance of the market portfolio return in most portfolios.
- BB argued that the CD data showed that portfolio return is dominated by policy decisions. This may be correct, but it does not follow from the CD data, which contain no information about the alpha coefficient in the regression.

Errors in the Claims of Others Who Refer to the Brinson Articles

Since the publication of the BB articles, there have been many references in a variety of media to their results, and in particular to the BB quantitative claims about the average value over portfolios of the CD. Very few of these references quote the BB CD statements correctly. Some common errors in the quotations are

- Almost all the claims omit the words 'on average'. This changes a statement about the average of a distribution of CD values over plans to a statement that all plans had the same CD, which produces unintended precision.
- Many claims omit the words 'variance' or 'variation'. This changes a statement about the contribution of investment policy to variance of return into a statement about the contribution to return.

- A number of claims interpret 'variance' to mean 'variance over plans' rather than the correct 'variance over time'.
- Many claims use words such as 'show' or 'prove' that convey the impression that the results of the studies are true in general rather than just for the particular plans using particular asset classes during a particular period of time.
- By using terms such as 'the right mix', 'asset mix', etc. many claims imply that it is the second component of investment policy return rather than the first component, the base return, that is dominant in size. They may be unknowingly correct with regard to importance.

Of course, as noted above, the original BB statements are incorrect to insofar as they claim that the CD data says anything about the level of return.

Analytical Approach to Performance Attribution

It is possible to derive most of the results of the Brinson studies by analysis of the formulas for the components of portfolio return. This approach adds additional insights. Four conclusions are

- Asset mix choice is usually responsible for a minor part of portfolio return.
- Do not state or imply that security selection is of negligible while at the same time investing in a portfolio of actively managed funds.
- Do not state or imply that that investment policy is overwhelmingly dominant while at the same time engaging in market timing (active asset allocation).
- When marketing an optimization program, use evidence that demonstrates the ability to predict the data needed to perform the optimization. The Brinson studies do not do this.

Other Critics of the Brinson Articles

A number of authors, notably William Jahnke, have criticized various aspects of Brinson's results and their interpretation by others. I point out errors in the arguments of several people who have attempted to rebut Jahnke's criticisms.

Implications of the Analysis of Brinson's Articles

The story suggests that there exists widespread incompetence in the investment industry and brings into question other pronouncements that are generally accepted.

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SECTION 1 - QUANTITATIVE CLAIMS BASED ON THE BRINSON ARTICLES

BRINSON ET AL. SAY

Quote 1.1 "Data from 91 large US pension plans over the 1974-83 period indicate that investment policy dominates investment strategy (market timing and security selection), explaining on average 93.6% of the variation in total plan return ." Brinson et al. 1986 , summary

Quote 1.2 "On average, policy returns accounted for 91.5% of the variance of actual returns." Brinson et al. 1991 , page 45

EXAMPLES OF HOW OTHERS CLAIM TO QUOTE QUANTITATIVE STATEMENTS IN THE BRINSON ARTICLES

Quote 1.3 "A widely cited study of pension plan managers shows that 91.5 percent of the difference between one portfolio's performance and another's is explained by asset allocation." Fidelity Investments 2000

Quote 1.4 "Asset allocation is a proven technique that leading institutional investors employ frequently." "Studies have shown that it can be responsible for as much as 90% of a portfolio's performance." Citibank 2000

Quote 1.5 "A study in the Financial Analysts Journal suggests that creating the appropriate mix of investments is actually the most important decision a money manager can make and accounts for more than 90% of long-term investment performance." Salomon Smith Barney 2000

Quote 1.6 "In a research study of pension plan performance conducted by Brinson, Hood and Beebower in 1986 and updated in 1991, it was concluded that asset allocation accounted for 92% of the investment results, 5% from security selection, and 3% from tactical or market timing." Goldsmith Mellon DeLosReyes 2000

1.1 ALMOST ALL CLAIMS ARE MISQUOTATIONS

Many mutual fund companies and financial planning firms offer funds, services or programs which set up a portfolio for an investor consisting of a variety of classes of assets, such as stocks, bonds and cash equivalents. An asset allocation service or a financial planner chooses the proportions of the assets in

each asset class on the basis of the circumstances of the particular investor. This process is known as asset allocation.

It is therefore not surprising that there have been probably thousands of claims made by the investment industry about the great importance of asset allocation to the return of a portfolio. Many of them state that studies or research have shown or proved the claims to be correct. Many of them give a percentage measure, such as 93.6%, 91.5% or over 90%, for the contribution of asset allocation to return. It is quantitative claims of this nature, supposedly derived from two articles published by Brinson and colleagues in 1986 and 1991, that are discussed in this section. I call the first article B1 and the second article B2. Together they are denoted by BB.

These claims appear in printed promotional material, magazine and newspaper articles, books, and increasingly on the Internet. In a report (called NN) written with my daughter in 1998 are listed over 50 examples of such claims. The astonishing fact is that all but one of these claims misquoted the results stated in the Brinson articles. That one correct quotation has now disappeared from its site, and has been replaced by an incorrect version.

The claims often differ in only a few words from the Brinson articles, but these differences completely change the meaning of the statements. In this matter, precision of language is important. (Please let me know if you find any of my language imprecise or unclear, so that it can be improved.)

I am sure that many investment industry practitioners will find it very difficult to accept the truth of my ideas on asset allocation, since incorrect versions have been so widely circulated. They should look at what the Brinson articles actually say about the quantitative importance of asset allocation to return, and they will see that I am correct. The truth is not determined by a popular vote, or even by a panel of experts, but a recent article (called IK) by Roger Ibbotson, a Professor at the Yale School of Management and Chairman of Ibbotson Associates, a well respected figure in the investment industry, clearly supports my position.

1.2 THE MEANING OF THE QUANTITATIVE STATEMENTS IN THE BRINSON ARTICLES

1.2.1 Return due to Investment Policy and Strategy

In order to explain the meaning of the statements from the Brinson articles appearing at the beginning of the section, I have to introduce some terminology. BB studied pension plans that invested in three classes of assets, namely stocks, bonds and cash equivalents, all from the US. In their view, the investment process, which determines how the portfolio is managed, consists of two major sets of decisions which form a heirarchy.

- **Investment Policy**
  - **Decision 1** Choice of asset classes in which to invest.
  - **Decision 2** Choice of normal asset class weights that remain unchanged over time. The

weights are often determined by an optimization procedure designed to generate an expected risk (variance) and return appropriate to the circumstances of the particular investor. (Choice of asset mix.)

- **Investment Strategy**
  - **Decision 3** Security selection and market timing. Choice of individual securities within each asset class, and adjusting the asset class weights from their normal values on a short term basis.

To assist in measuring the contributions of policy and strategy to portfolio return, BB chose for each asset class an index which measured the return of the securities in that class. For example the index used for stocks was the S&P 500.

BB defined the return due to the combination of the two components of investment policy as the return of a hypothetical portfolio of index funds with the same fixed normal asset class weights as the actual portfolio. In terms of a formula, BB wrote

(1.1) RP(j) = w(1)RI(j, 1) + w(2)RI(j, 2) + w(3)RI(j, 3)

where

RP(j) = the return due to investment policy for period j
RI(j, k) = the return of the index for asset class k for period j
w(k) = the normal weight for asset class k.

BB define the return due to investment strategy as the difference between the actual return and the policy return, so that

(1.2) RT(j) = RP(j) + RS(j)

where

RT(j) = the actual return of the portfolio for period j
RS(j) = the return due to investment strategy for period j.

See Section 3 for more details on the form of the components of return.

1.2.2 Mean Annualized Return

B1 studied 91 large US pension plans (B2 studied 82) for 40 quarterly periods totalling ten years. BB presented two types of data from the studies. The first was mean annualized return (more precisely, annualized return averaged over time), which, for a given plan, is the return of the plan for each year of

the study averaged over the ten years involved. In Table VI of B1 the authors listed average return due to policy (passive) and strategy (active), as well as average actual return. In this table, 'average' means average over plans, not to be confused with mean or average over time. The results on mean annualized return (MAR) from the two studies are summarized in the following table.

Article	Return	Average	Minimum	Maximum	Range	Std. Dev.
B1	Policy	10.11%	9.47%	10.57%	1.10%	0.22%
	Actual	9.01%	5.85%	13.40%	7.55%	1.43%
	Strategy	-1.10%	-4.17%	3.69%	7.86%	1.45%
B2	Policy	13.49%	12.43%	14.56%	2.13%	0.49%
	Actual	13.41%	10.34%	19.95%	9.61%	1.75%
	Strategy	-0.08%	-3.43%	6.73%	10.16%	1.67%

Table 1.1 . On mean annualized returns (MARs) for the plans in the Brinson studies.

1.2.3 Contribution to Variance

The other type of data reported by BB related to the variance of the series of 40 quarterly returns for the portfolio of a given plan. For each plan BB performed a regression analysis of the 40 actual period returns against the 40 policy returns. This analysis gives rise to a coefficient of determination (CD), often known as R-squared, which measures how well the policy returns 'explain' the variance of the actual returns. The CD can have values between zero and one, with CD = 1 meaning a perfect fit of the regression line to the data. BB listed CD values as percentages and obtained the data in the table below, where 'average' means 'average over plans'.

Article	Average	Minimum	Maximum	Std. Dev.
B1	93.6%	75.7%	98.6%	4.4%
B2	91.5%	67.7%	98.2%	6.6%

Table 1.2 . On coefficients of determination (CDs) of the regression of actual return against policy return for the plans in the Brinson studies.

This is where the well known numbers 93.6% and 91.5% come from. BB are referring to this data in the statements at the head of the section.

1.3 ANALYSIS OF CLAIMS THAT QUOTE QUANTITATIVE STATEMENTS IN THE BRINSON ARTICLES

BB make a variety of statements about the importance of investment policy (passive management, often called asset allocation or, incorrectly, asset mix in the claims) and investment strategy (active management), but the only statements that contain a percentage measure of the contributions are those two listed at the beginning of the section. It therefore seems safe to assume that any claim using a percentage measure (i.e. a quantitative statement) about the importance of a contribution to portfolio return or variance that cites the Brinson articles as source must be based on the BB variance statements Quotes 1.1, 1.2 .

It is very difficult to find a published claim of this type that quotes the BB variance statements accurately. As the examples of claims listed in Quotes 1.3 - 1.6 at the head of the section demonstrate, there are several ways in which the claims are materially inaccurate, and many claims are in error in more than one respect. The principal types of error found in the sample of claims in NN are

1. Almost all the claims omit the words 'on average'. This changes a statement about the average of a distribution of CD values over plans to a statement that all plans had the same CD, which produces unintended precision.
2. Many claims omit the words 'variance' or 'variation'. This changes a statement about the contribution of investment policy to variance of return into a statement about the contribution to return. The first statement most certainly does not imply the second, although it is not inconsistent with the second statement.
3. A number of claims interpret 'variance' to mean 'variance over plans' rather than the correct 'variance over time'.
4. Many claims use words such as 'show' or 'prove' that convey the impression that the results of the studies are true in general rather than just for the particular plans using particular asset classes during a particular period of time. See in particular Section 2.5 .
5. By using terms such as 'the right mix', 'asset mix', etc. many claims imply that it is the second component of investment policy return rather than the first component, the base return, that is dominant in size. They may be unknowingly correct with regard to importance.

The recent article by Ibbotson and Kaplan supports my position with regard to errors of type 2 and 3, and also indirectly on errors of type 1. This support is made more significant on account of the fact that previously Ibbotson Associates and a book by Ibbotson and Brinson (page 58) had both made a type 3

error.

In addition, as is discussed in Section 2 , I believe that both the quantitative and non-quantitative statements by BB about the importance of investment policy are themselves misleading, even when quoted accurately.

In Section 5 I consider some general questions raised by the widespread inability of the investment industry to quote the Brinson articles correctly and to recognize their faults.

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SECTION 2 - CLAIMS MADE IN THE BRINSON ARTICLES

BRINSON ET AL. SAY

Quote 2.1 "Although investment strategy can result in significant returns, these are dwarfed by the return contribution from investment policy - the selection of asset classes and their normal weights ." B1 , summary

Quote 2.2 "Active management, while important, describes far less of a plan's returns than investment policy." B1 , page 43

Quote 2.3 "asset allocation policy ... is the overwhelmingly dominant contributor to total return." B2 , summary

Quote 2.4 "Individual effects (of active management) varied widely ... . Clearly the contribution of active management is not statistically different from zero (that is, it is most likely attributable to chance). ... Active management ... had no measurable impact on returns ... ." B2 , page 44

Quote 2.5 " the normal asset class weights and the passive asset classes themselves ... provide the bulk of the return to a portfolio." B1 , page 42

Quote 2.6 "Tables VI (return data) and VII (CD data) clearly show that total return to a plan is dominated by investment policy decisions." B1 , page 43

2.1 THE RELATIVE IMPORTANCE OF THE CONTRIBUTIONS OF INVESTMENT POLICY AND STRATEGY

In addition to the quantitative Quotes 1.1, 1.2 at the head of Section 1, BB make a number of qualitative statements, such as Quotes 2.1 - 2.6 , about the size of the contributions of investment policy (passive management) and investment strategy (active management) to the level of portfolio return, not to its variance. It appears that the opinion of the authors might have changed somewhat from the first article B1 to the second article B2. Quotes 2.1 and 2.2 declare that strategy is important and can result in a significant contribution to return, whereas Quote 2.4 asserts that active management had no measurable impact on returns. At the same time, both articles state that the contribution of investment policy is the overwhelmingly dominant contributor to total return, and dwarfs the contribution of investment strategy.

It could be argued that the two portions of Quote 2.1 contradict each other, since it is difficult to see how strategy can be significant and still be dwarfed by policy. At least the authors put forward an internally consistent position in B2 , which is that strategy is of no importance at all, with policy being all important.

The essential information used by BB to draw conclusions about contributions to return is contained in Table 1.1. The information about CDs in Table 1.2 is of no relevance to return level, and the part of Quote 2.6 referring to CD is wrong. In the discussion of results in B1 , the authors remark that the values of the strategy component of mean annualized return (MAR) from the different plans are spread over a range of 7.86%, (although with an average value close to zero) and deduce that active management is therefore clearly important. However, the policy component of MAR for all plans is not far from 10%, which is more than twice the magnitude of the largest strategy contribution, although the range of policy returns is only 1.1%. In a nutshell, the BB argument is

> The size of policy return is always considerably bigger than the size of strategy return, so policy return is much more important than strategy return.

Unfortunately, this deduction is in error. A plan sponsor or an investor in an Asset Allocation Service presumably wishes to use the BB research in order to determine which investment decisions are most important. The importance of a decision should be measured by examining the difference in the results that might be obtained by choosing between the various alternatives open to the investor. Thus, in the B1 situation, a rational investor would say that the policy decision was not very important because there was a difference in return of just 1.1% between the best and worst choices. (See Section 2.2 for an explanation of why it was so small.) On the other hand, the strategy decision was much more important, because there was a difference of 7.86% between best and worst. In terms of importance, B1 has it backwards. Importance is not determined by size of return contribution, but by how much the contribution might change over various alternatives.

In B2 it looks as though the authors may have realized that the argument in B1 about the relative importance of policy and strategy was rather weak, so they changed their position. There was an even wider range of strategy returns in B2 (10.16%), and the average over plans of strategy returns was -0.08%, with standard deviation of 1.67%. B2 argued that

> the contribution of active management (strategy) was not statistically different from zero, that is, it is most likely attributable to chance. page 44

This deduction is another gross error in logic. The distribution of strategy returns may be due to chance, or perhaps it is due to differences in the skill of the managers involved. B2 present no evidence on this point.

There is, however a sound reason to expect that the average strategy return will be close to zero. Consider the component of strategy return due to security selection. The return due to security selection of each plan in each asset class is the return measured with respect to the return of the index for that class. If the plans together contain a representative sample of the securities making up each index, which is quite likely not far from the BB situation, then the definition of strategy return ensures that, as far as security selection is concerned, the average strategy return will be zero. Thus no information is contained in the result that average strategy return is close to zero. It is merely a consequence of the definition of strategy return.

In summary, rather than Quotes 2.1 - 2.6 , BB could have more accurately described their position in terms such as

> On account of the efficient market hypothesis, investment strategy has no predictable impact on returns; investment policy is the overwhelmingly dominant predictable contributor to total return.

2.2 THE COMPONENTS OF INVESTMENT POLICY

There has been much confusion about both the meaning and the importance (as distinct from the size) of the contribution of investment policy to return. In both articles BB stress that investment policy (sometimes they call it asset allocation policy) is made up of two components, choice of asset classes and asset mix (choice of normal asset class weights). However, BB made no attempt to estimate the size of the two individual components of policy return. This was done in subsequent articles by Carlton and Osborn and Hensel, Ezra and Ilkiw , whose analysis was later supported to a certain extent by Ibbotson and Brinson (page 59).

The idea is that the component of return due to the choice of asset classes should be measured by the

return of a market portfolio consisting of the assets in all the classes in which the portfolios in the study might invest.

The return corresponding to Decision 2 , the choice of asset mix, is then defined as the difference between the policy return (1.1) of Section 1.2.1 and the return of the market portfolio. As a consequence of this definition, there will be a range of contributions to policy return due to asset mix, and the average return over plans due to the choice of asset mix will probably be close to zero. (See Section 3 .)

In the BB studies all funds used the same asset classes, so that the return contribution due to Decision 1 , the choice of asset classes, that of the market portfolio, was the same for all plans. This contribution will be close to the average policy return listed in Table 1.1 ,

The range of returns due to policy given in Table 1.1 is therefore due solely to the component in return due to asset mix choice, which may be analyzed with the help of a simple formula for policy MAR that follows (more or less) from (1.1) ,

(2.1) RP = w(1)RI(1) + w(2)RI(2) + w(3)RI(3)

where

RP = the MAR due to investment policy
RI(k) = the MAR of the index for asset class k
w(k) = the normal weight for asset class k.

It is clear from this formula that the range of policy returns will depend on the spread of MARs for the various indices, and also, of course, on the spread of weights chosen by the plans. If the MARs for all the indices are the same, then the range of investment policy returns will be zero, no matter what the weights. In general, assuming no short selling, the maximum possible range will be equal to the difference between the highest and lowest index MAR.

BB did not present any information on the index MARs that applied to the periods of the studies, but this omission was later remedied by Beebower, Hogan and Ludwig , whose information is summarized in Table 2.1.

Article	Cash Equiv.	Bonds	Stocks
B1	8.6%	10.3%	10.6%
B2	9.2%	10.2%	15.3%

Table 2.1. On mean annualized returns (MARs) for the indices in the BB studies.

The near equality of the MARs for bonds and stocks in B1 (and the fact that the cash weight was never more than 35%) accounts for the narrow range of policy returns (1.1%) obtained for that study (see Table 1.1). In B2 there was a much bigger difference between the MARs for bonds and stocks, with the result that the policy return spread over funds in B2 was almost double that of B1.

Note that the explanation provided in B1, page 43, for the narrow range of policy returns is incorrect. The narrow spread is not due to the fact that all the plans chose similar weights (B1 Table IV shows otherwise), but due to the narrow range of index MARs.

2.3 THE RELATIVE IMPORTANCE OF THE COMPONENTS OF INVESTMENT POLICY

The relative importance of the two components of investment policy return described in Section 1.2.1 may be analyzed with the same approach as that in Section 2.1 . Again, the principle is that it is not the size of the return component that is important, but rather the the amount by which it might vary as a result of the investment decision responsible for that component.

On that basis, it is clear that, in BB, the component of policy return due to choice of asset classes, while large, is of no importance whatsoever. It is the same for every plan, and cannot be affected by decisions of the plan manager.

For returns due to asset mix choice, the situation is similar to that for strategy returns. Because of its definition, the contribution of asset mix choice is not statistically different from zero. Whether or not this is due to chance is an open question in terms of the evidence presented in BB. If BB were consistent, they would have argued that the return due to asset mix is unpredictable, just as is that of investment strategy, and concluded their studies with a statement such as

> On account of the efficient market hypothesis, neither investment strategy nor the asset mix component of investment policy has a predictable impact on returns; the only predictable contributor to total return is the choice of asset classes, which is of no importance at all.

2.4 MORE ON RETURN ATTRIBUTION

Following the above discussion, it is natural to assign responsibility and credit for the return due to investment strategy, Decision 3 , to the plan manager who chooses the securities and adjusts the weights. Similarly, whoever decides on the fixed normal weights (perhaps the manager of a pension plan, or a financial planner in the case of an individual) is responsible for the return due to Decision 2 , the choice

of asset mix.

The question arises as to who is responsible for the return due to Decision 1 , the choice of asset classes, which is measured by the market portfolio. I have argued that this decision is of no importance because the manager can do nothing to influence the market return. The manager is not responsible for the market return and should take no blame or credit for that return.

However, the return due to the choice of asset classes was the largest component of return for every plan in the BB studies, and we ought to attribute it to someone. The answer to this question given by Ibbotson and Brinson after the BB articles, is contained in the following quotation.

> The decision to adopt an asset allocation policy can be divided into two parts. First, the decision to hold any diversified asset mix (say, the market portfolio), rather than the riskless portfolio, accounts for a large share of the policy portfolio performance. Second, the deviation of the policy mix from the typical or market mix accounts for the rest of the policy portfolio performance. page 59

Ibbotson and Brinson are prepared to give credit for the return of the market portfolio relative to the riskless portfolio (T-bills, for example) to the person who decides to hire the manager to invest in a basket of financial instruments; that is the plan sponsor, or the individual investor as the case may be. It is not clear who it is that Ibbotson and Brinson believe to be responsible for the return of the riskless portfolio, still the largest component for almost all the plans in the study. They obviously do not think it should be the manager, and of course it makes no difference to how the portfolio is managed who gets credit for the riskless return. The only possible person to credit, if any credit is to be assigned, is again the plan sponsor or individual investor, for the riskless portfolio is not really completely free of risk.

On the other hand, it makes a great deal of difference when it comes to claims in sales communications and the like. We have argued in Section 2.1 that the BB claim in Quote 2.3 ,

> asset allocation policy ... is the overwhelmingly dominant contributor to total return

is a considerable overstatement because of the importance of strategy return, but it is correct to say that investment policy is very often the largest contributor to return. The point is that the Ibbotson and Brinson are conceding that the largest part of policy return, that due to choice of asset classes, should not be attributed to the plan manager. Similarly, the manager of an asset allocation service does not deserve credit for the largest part of the return due to asset allocation that the investment industry so often claims is responsible for 90% of portfolio return.

While a strong case can be made that asset allocation (not just choice of asset mix) is responsible for a large part of portfolio return, this is true only when using the BB definition of asset allocation as being equal to investment policy. It is highly misleading to imply that the manager of a portfolio deserves credit for all the policy return when in fact the manager's actions can influence only a small portion of

that return.

2.5 CONTROL OF INDEPENDENT VARIABLES

There is a fundamental flaw in the BB articles beyond anything that has been mentioned above. It seems that the entire thrust of BB is that investment strategy is of no importance to portfolio return, and they devise a way of measuring strategy return to demonstrate this conclusion. However, it is impossible to measure the importance of a contributor to a process without having a measure of the size of the contribution. For example, if a farmer wishes to determine the effect of fertilizer on the yield of corn plants, he will grow a number of plants, apply different, known amounts of fertilizer to each plant, and then compare the yield of each plant with the amount of fertilizer applied.

It is the same for BB. Until they know the amount of strategy management used by each plan (the independent variable), they cannot draw meaningful conclusions about how the portfolio return (the dependent variable) is affected by strategy. BB provided no information that measured the contribution of strategy management, so that their results on return have no meaning. For all we know, most of the plan managers were 'closet indexers' who tried to make sure that their class returns were close to the corresponding index.

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SECTION 3 - ANALYTICAL APPROACH TO PERFORMANCE ATTRIBUTION

A common approach to trying to understand an aspect of investing is to perform a study of data from the past that might shed some light on the problem. It is indeed important to keep in touch with reality, but it must not be forgotten that what happened in the past was only one of many possible scenarios, and that something quite different might occur in the future. We have to be careful when generalizing from results such as those of BB .

In the case of interest to BB, the discussion above has suggested how in some respects it might be possible to learn more by analyzing the formulas for the various return components than by looking at what values they had for a number of pension plans over a specific time period. Below I present some simple formulas and then proceed to make several deductions from them. The conclusions of this section are at the heart of the article, and for the sake of emphasis and continuity I repeat some of the material from Section 2 .

I know that some people are not comfortable with any type of mathematics. Indeed, the Financial Analysts Journal requests authors to do their best to relegate all mathematics to an appendix where it will not disturb readers. The formulas I use below are just compact ways of writing the equivalent of

what I shall also try to say in words. There is nothing to be frightened of. Look at the pdf file in my section on approximation theory if you really want to be scared, and that is easy reading compared to some mathematical articles.

3.1 FORMALISM

My aim is to convey some essential points, and I will simplify the situation to some extent without losing anything important. I consider a group of portfolios that all invest in the same three asset classes, numbered 1, 2, 3. We follow the portfolios for a time span consisting of a number of equal periods (say quarters) labelled by j.

I shall assume that the managers do not engage in market timing, so that the weight w(k) of each asset class in each portfolio does not change with time.

For a given portfolio define

RT(j) = the actual return of the portfolio for period j
RP(j) = the return due to investment policy for period j
RMP(j) = the return of the market portfolio for period j
RAM(j) = the return due to choice of asset mix for period j
RS(j) = the return due to investment strategy for period j
RI(j, k) = the return of the index for asset class k for period j
RM(j, k) = the actual return on the managed asset class k for period j
w(k) = the normal weight for asset class k.

The following equations hold for the portfolio for each period j.

(3.1) RT(j) = w(1)RM(j, 1) + w(2)RM(j, 2) + w(3)RM(j, 3)

This equation says that the actual return of the portfolio is the sum of the returns of the actual returns of the assets in each class, multiplied by the corresponding fixed normal weight for the class.

(3.2) RP(j) = w(1)RI(j, 1) + w(2)RI(j, 2) + w(3)RI(j, 3)

This equation defines that the return due to investment policy is the sum of the returns of the returns of the index for each class, multiplied by the corresponding fixed normal weight for the class.

(3.3) RAM(j) = RP(j) - RMP(j)

This equation defines that the return due to asset class mix is the difference between the return due to

investment policy and the return of the market portfolio.

(3.4) RS(j) = RT(j) - RP(j)

This equation defines that the return due to investment strategy is the difference between the actual return of the portfolio and the return due to investment policy.

We shall be taking averages over time (periods) and over portfolios. We denote the average over time (the mean) of return RT(j) by **RT** . We denote the average over portfolios (weighted according to size) of RT(j) by RT (j). The notation is similar for the other quantities.

Now we make the crucial assumption that the portfolios in the group are representative of the entire market. In this case the return on the index for class k for period j will be the average of the return of the assets in that class over all portfolios, so that

(3.5) RI(j, k) = w(k)RM(j, k) / w(k) ,

where w(k) is the weight of asset class k averaged over portfolios.

The return of the market portfolio for period j will be the average over portfolios of the actual return of each portfolio, from which it follows with a little algebra that

(3.6) RMP(j) = w(1) RI(j, 1) + w(2) RI(j, 2) + w(3) RI(j, 3) .

Substituting (3.2) and (3.6) in (3.3) gives an expression for return due to choice of asset mix,

(3.7) RAM(j) = (w(1) - w(1))RI(j, 1) +(w(2) - w(2)) RI(j, 2) + (w(3) - w(3)) RI(j, 3).

Substituting (3.1) and (3.2) into (3.4) gives the strategy return as

(3.8) RS(j) = w(1)(RM(j, 1) - RI(j, 1)) + w(2)(RM(j, 2) - RI(j, 2)) + w(3)(RM(j, 3) - RI(j, 3)).

Finally, averaging (3.6) , (3.7) and (3.8) over time leads to the formulas needed to analyze the components of mean (average over time) return for a given portfolio.

Decision 1: Mean Return of the Market Portfolio

(3.9) **RMP** = w(1) **RI** (1) + w(2) **RI** (2) + w(3) **RI** (3)

Decision 2: Mean Return due to Asset Mix Choice

(3.10) **RAM** = (w(1) - w(1)) **RI** (1) +(w(2) - w(2)) **RI** (2) + (w(3) - w(3)) **RI** (3).

Decision 3: Mean Return due to Investment Strategy (in this case security selection only)

(3.11) **RS** = w(1)(**RM** (1) - **RI** (1)) + w(2)(**RM** (2) - **RI** (2)) + w(3)(**RM** (3) - **RI** (3)).

Remember that

RM (k) = the actual mean return of asset class k in the portfolio.
RI (k) = the mean return of the index for asset class k. It is independent of portfolio.
w(k) = the weight of asset class k in the portfolio. It is assumed to be independent of time.
w(k) = the weight of asset class k averaged over portfolios.

3.2 DEDUCTIONS FROM THE FORMULAS

3.2.1 Mean Return of the Market Portfolio

Formula (3.9) shows that the mean return of the market portfolio, the first component of return that is common to all portfolios, is determined by the fixed market portfolio asset class weights w(k) and the mean index returns **RI** (k). It is likely that the market portfolio will mostly contain stocks and bonds, with a small cash component. In most recent years its mean return has been significantly positive.

3.2.2 Mean Return due to Asset Mix Choice

It follows from the definition of w(k) and (3.5) that

(3.12) **RAM** = **RS** = 0,

that is, the averages over portfolios of the mean returns due to asset mix choice and investment strategy are zero. I stress that this is a consequence of the definitions (in practice, the assumption that the portfolios represent the market), and (3.12) contains no significant content. The asset mix and strategy returns for the various portfolios will each have a distribution with mean zero.

From (3.10) the range of contributions to mean return due to asset mix will depend on two factors

- The range of normal weight values for the various asset classes over the portfolios
- The range of mean index returns for the various asset classes

The first factor may be more clearly expressed in terms of a plot of asset class weights such as Figure D of B2. That figure shows a point for each portfolio in a graph with the equity and bond weights as axes. (Note that the weight for the cash component is determined once the other two weights are known, since the three weights add to unity.) The first factor may be interpreted as the diameter of the set of points in the plot.

If either range is small, then the mean asset mix return contribution will have a narrow distribution, no contribution being far from zero. No matter what the choice of normal weights, the range of contributions to mean asset mix return will be no more than the difference between the largest and smallest mean index return.

3.2.3 Mean Return due to Investment Strategy

From (3.11) the range of contributions to mean return due to investment strategy will depend on

- The range of the actual asset class returns for the various asset classes over the portfolios.

In practice it will also depend on the extent that the weights depart from their normal values due to market timing.

Since there are always a few stocks that have returns far from that of the stock index, the potential range of values of the contribution to mean return due to investment strategy will be large. If we consider a big enough group of portfolios, it is to be expected that the standard deviation of the distribution of strategy returns will depend on the extent to which the managers make an effort to produce a return that is not far from the index. If there are a lot of aggressive managers, then the standard deviation will be larger than it would be for a group of closet indexers.

3.2.4 Importance and Predictability

For a large group of portfolios, the definitions show that most contributions from asset mix and strategy will be near zero, and thus usually considerably less than the market portfolio contribution due to choice of asset classes. Since the choice of asset classes is a part of investment policy, it is correct to say that, in terms of size, the contribution from investment policy usually dominates investment strategy for most portfolios, not far from what BB state.

However, BB were concerned with attributing responsibility (and therefore credit) to the plan managers making decisions relating to the various components of portfolio return. Later, the BB results, often in distorted form, have been used to promote asset allocation services and funds, with statements which probably convey to the great majority of readers the impression that asset mix choice is responsible for almost all the return of a portfolio.

The results of the present analysis, and also the data from the BB studies, show that this impression is wrong. In fact, both the magnitude of the contribution from asset mix choice and the range of values of the contribution that are affected by the manager's decisions are usually small compared to the contribution from the choice of asset classes. Not only that, the range of values of return due to asset mix choice is almost always less than the range of values of the contribution from investment strategy that are affected by the manager's decisions. In summary

Conclusion 1

Asset mix choice is usually responsible for a minor part of portfolio return.

Next I consider the question of predictability. There is no doubt that the decisions of the manager can affect asset mix return and, often to a greater extent, investment strategy return. If, however, these components of return are determined by chance, and are not due to the exercise of skill, then they are not the manager's responsibility and the manager does not deserve any credit for a successful result.

Much research has been carried out on the question of whether or not investment returns are due to chance. It is not an easy question to decide, and I am not going to express a view on this issue. However, I believe that anyone wishing to make claims about the importance of the components of return should clearly state their position on the role of chance in determining portfolio return, and support it with evidence as far as possible.

It does seem reasonable to expect that the manager of an asset allocation service or fund who believes that returns due to investment strategy are purely random will use index funds to represent the various asset classes in the portfolio. Thus I arrive at

Conclusion 2

Do not state or imply that security selection is of negligible value while at the same time investing in a portfolio of actively managed funds.

While the present simplified model does not deal with market timing, it is clear that a conclusion similar to the above holds, namely

Conclusion 3

Do not state or imply that investment policy is overwhelmingly dominant while at the same time engaging in market timing (active asset allocation).

3.2.5 Optimization

The core of an asset allocation service aimed at the individual investor is a system intended to maximize future return for a prescribed amount of risk, which is assumed to be measured by the variance over time of the portfolio returns. Suppose that this optimization is performed on the returns of the asset class indices. The input data needed to carry out the optimization are the expected mean index returns and the covariances of these returns. Since the analysis applies to the future, it is necessary to predict what this input data will be. Thus, anyone who claims to be able to choose the normal asset class weights (i.e. asset mix) to optimize return for a given risk is implicitly claiming to be able to predict index returns and covariances. In particular, the optimization requires the ability to predict the future relative returns of the various asset class indices, including, in the BB case, the relative return of bonds to stocks.

There appears to be very little connection between the analysis of the components of portfolio return following the method of BB and an understanding of how well the optimization procedure will work. Indeed, it is difficult to see how a manager could use the BB results in the optimization procedure. It appears that the BB work is used solely for the purpose of marketing optimization programs. These thoughts lead to

Conclusion 4

When marketing an optimization program, use evidence that demonstrates the ability to predict the data needed to perform the optimization. The Brinson studies do not do this.

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SECTION 4 - OTHER CRITICS OF THE BRINSON ARTICLES

Since the first article by Brinson et al. appeared in 1986, a number of writers have criticized the articles or those who subsequently quoted BB . In varying degrees these criticisms raise some of the same points that appear in this article. I briefly discuss the ideas of some of these critics.

4.1 CARLTON/OSBORN AND HENSEL/EZRA/ILKIW

As I mentioned in Section 2.2 , articles in 1991 by Carlton and Osborn and Hensel, Ezra and Ilkiw pointed out perhaps the most significant error made by B1 , who did not realize that by far the largest component of policy return was due to the market portfolio (naive portfolio in the terminology of Hensel et al.), for which the portfolio manager deserves no credit. In the words of Hensel et al.,

> "In performance attribution there is usually a base return (representing the naive portfolio) and a series of effects (representing the impacts of judgements). If the base return is itself added to one of the effects, it exaggerates the impact of the corresponding judgement. Essentially, this is equivalent to assuming that the naive portfolio always has zero return. The naive portfolio thus implies no investment whatsoever; this is clearly unrealistic." page 70.

Carlton and Osborn applied this framework to the contribution to variance. Hensel et al. did the same, but also investigated return in a manner somewhat analogous to the discussion in Section 2.1 .

Unfortunately the message of these two articles has been largely overlooked by the investment industry. In fact, although they reject an essential claim of BB, the articles have been used to support the typical inaccurate interpretation of the erroneous BB results. Thus the Canadian mutual fund management company AGF stated

> "Research has shown that asset allocation is responsible for more than 90% of your overall return (the average from six studies performed from 1986 to 1993 in Canada and the US covering various periods between 1974 to 1992. - source William M. Mercer Limited)."

Among the six studies were the articles by Carlton and Osborn and Hensel, Ezra and Ilkiw .

4.2 IBBOTSON/BRINSON

I also mentioned in Section 2.2 that the 1993 book by Ibbotson and Brinson , in the passage quoted in Section 2.4, seemed to support the general trend of the Hensel et al. ideas. I have not found any subsequent reference where Brinson discussed the apparent contradiction between the book and BB.

4.3 JAHNKE

William Jahnke, a financial planner, has been the most articulate critic of the Brinson articles and of those who misquote them. His original article on the subject attracted a number of negative responses, including two from some of the authors of BB. On his web site Jahnke has a number of documents that express his opinions, and in particular rebuttals of the responses to his article and a discussion of the recent article by Ibbotson and Kaplan .

My opinions coincide with those of Jahnke in many respects. For instance, he makes the following points.

- BB measure only the contribution of investment policy to the variance of return, not return, as many incorrectly believe.
- The mathematics of regression analysis makes it clear that the CD (coefficient of determination or R-squared) contains no information about return level.
- The range of returns over portfolios is the correct measure of the importance of a component of return.
- The observation that the range of investment strategy returns is close to zero is only to be expected, and is of little meaning.
- BB did not analyze the reasons for the spread of strategy returns, i.e whether they were due to skill or chance.
- It may not be possible to generalize the results of a specific study to other situations.

Strangely, Jahnke does not emphasize what is perhaps the most glaring flaw in the BB analysis, the fact that the bulk of investment policy return is not attributable to the portfolio manager, as was first pointed out by Carlton and Osborn and Hensel et al. in 1991. It is only in Jahnke's recent discussion of the Ibbotson/Kaplan article that I can find any mention of this point, which is conceded by those authors, as it had been earlier by Ibbotson and Brinson .

Jahnke introduces an alternative measure of the importance of investment policy, perhaps not a very good one.

Jahnke appears to be mainly concerned to promote his own approach to investment management, a process of varying asset class weights to reflect changing expectations. He wants to disprove the implication of BB that such an approach has little value. Curiously, the two defenders of the Brinson articles cited below that were authors of BB deny that they advocated an approach where asset class weights would remain constant. Singer states

> "The conclusions in BB do not endorse the assumption of fixed asset allocation weights over time"

I think most people would interpret Quote 2.4 to be such an endorsement.

The defenders of BB spend a good deal of effort trying to discredit Jahnke's approach and his measure of importance, and they avoid to some extent tackling the specific criticisms of BB.

Jahnke provides rebuttals to the responses of five defenders of BB, and includes excerpts from the

responses. The interested reader should study this material on the Jahnke web site . In my opinion the rebuttals do not reflect well on the defenders. Here are a few quotations from the rebuttals, followed by my comments.

4.3.1 Singer

Brian Singer was an author of B2.

> "Jahnke incorrectly argues that the narrow range of policy returns and the wide range of actual returns is more important than the over 90% of return variation described by policy plan mixes. His argument is absurd."

Singer has not understood the crucial point that policy plan mix describes only a small part of return variation. Brinson and recently Ibbotson and Kaplan have conceded that the choice of asset classes is far more important. Jahnke is absolutely right.

> "The narrow policy range is a mere artifact of the SEI Large Pension Plans Universe. ... if the universe held plans with policy mixes ranging from short-term fixed income benchmarks to equity-only benchmarks, the range of policy returns would have been extremely wide."

Singer plainly does not understand the significance of Equation (3.2) . The reason why the range of policy returns was small, particularly in B1, was because the difference between the highest and lowest class index returns was small. The data in Figure D of B2 show that there was a considerable spread of mix choices among the plans.

4.3.2 Evensky

Harold Evensky is a well known financial planner and author.

> "During the ... 10+ years since B1, the acceptance of the basic premise regarding the importance of the asset allocation decision has not been substantively challenged"

The book by Ibbotson and Brinson contradicted the main point of BB.

4.3.3 Wilson

I have not been able to gain access to Philip Wilson's original article in the Dow Jones Investment Advisor. The comments of Wilson as reported by Jahnke are too confused to make a sensible reply possible.

4.3.4 Beebower, Hogan and Ludwig

Gilbert Beebower was an author of both B1 and B2.

> "The coefficient of determination, or R-squared, is the universally accepted standard statistical measure of how well the returns from each plan's strategic asset allocation explain the plan's actual returns."

This astonishing remark suggests that the authors of BB really did believe that there is no difference between contribution to return level and contribution to variance of return over time. It appears that the many misquotations of the BB quantitative claims were indeed expressing the intent of BB. The remark flies in the face of Jahnke's explicit numerical examples and the trivial mathematical analysis that shows that the CD contains no information about return level. If this argument is not convincing enough, then the recent very clear statement by Ibbottson and Kaplan on the difference between variance of return and return level might sway the doubters.

> "The narrow range of policy returns are a direct result of the asset class returns over the period studied."

The authors have understood this point, in contrast to Singer.

> " What is significant, ... , is that the attribution to asset allocation (meaning investment policy) was so consistent from study to study which involved such different market results."

This shows that the authors have still not grasped the point about the predominance of the market portfolio in policy return.

4.3.5 Statman

Meir Statman is a practitioner and an academic. Statman does not attempt to answer the most serious specific criticisms of BB.

4.4 IBBOTSON/KAPLAN

As I stated in Section 1.3 , Ibbotson and Kaplan make very clear their opinion that many of the supposed quotations of the BB message are in fact wrong. They assert correctly, that, in my words,

- Many claims omit the words 'variance' or 'variation'. This changes a statement about the contribution of investment policy to variance of return into a statement about the contribution to return. The first statement most certainly does not imply the second, although it is not inconsistent with the second statement.
- A number of claims interpret 'variance' to mean 'variance over plans' rather than the correct 'variance over time'.

As remarked in Section 1.3 , this position is a little surprising in view of the fact that Ibbotson has previously made a claim making the second of the above errors, and such a claim is still present on the Ibbotson Associates web site in March 2000.

Ibbotson and Kaplan also show by regressing total fund returns against a common benchmark (our market portfolio) that

> "the CDs obtained by BB are high simply because funds participate in the capital markets in general and not because they follow a specific asset allocation policy."

This conclusion confirms the work of Carlton and Osborn and Hensel et al. , and completely undermines the significance of the Brinson results and the garbled versions of them that have been so widely distributed.

The May/June 2000 issue of the Financial Analysts Journal contains letters that Janhke and I wrote about the article of Ibbotson and Kaplan, together with a response from the authors.

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SECTION 5 - REMARKS ARISING FROM THE STUDY OF ASSET ALLOCATION

I first heard about the Brinson studies (referred to as BB) in late 1996 from a senior executive in one of Canada's largest investment managers. Being interested in learning more about the theory of investing, I decided to investigate the source with a view to understanding the details of this important concept. I had a completely open mind and was not trying to sell any products. Indeed, I was a potential buyer.

I soon came to the conclusion that something was wrong with the executive's version of the story (something like Quote 1.6), and further study convinced me that the Brinson articles themselves contained serious errors. Later I came across the articles of Carlton and Osborn , Hensel et al. , and Jahnke , which served to confirm my opinions.

I have no doubt that by far the most important lesson that I have learned from my efforts is **not** exactly how important to portfolio return are the various components of return. Rather, it is the fact that, spread through the different segments of the North American investment industry, are a great many incompetent people. I have to conclude that, instead of being the knowledgeable experts that the marketing machine portrays them to be, thousands of professionals of many varieties do not understand the products the industry is selling.

There is one point on which both defenders and critics of the Brinson doctrine are agreed. Word of the doctrine, often garbled, has spread far and wide through the investment industry. It has been called a dogma which is accepted by the faithful without question. Probably most people who refer to the doctrine have never read the Brinson articles. It is an interesting problem to find out the 'vectors' which have spread the dogma. Perhaps a sociologist or psychologist will set up a research project to solve this problem, and to study what happens when the faithful come to accept that they have been misled by the high priests, as hopefully will happen some day.

5.1 SEGMENTS OF THE INVESTMENT INDUSTRY

Here I comment on some of the segments of the investment industry that have been involved in misleading the public on such a large scale. Futher details are to be found in NN . I would be obliged if readers would comment on, correct, and expand on this information as appropriate.

5.1.1 The Authors of the Original Articles

At the time of writing Gary Brinson was President and Chief Investment Officer of First Chicago Investment Advisors. He has gone on to be responsible for the management of one of the largest pools of assets in the world. From the listed order of the authors, I presume that Brinson was the principal author of both studies. Singer and Hood, two of the other BB authors were also with Brinson's firm. The fourth author, Beebower, was with SEI Corporation when B1 was written.

I believe that I and others have demonstrated convincingly that there are several serious errors of logic in BB. At the very least, the conclusions as they were stated by BB are misleading. The existence of no less than three of these errors has later been confirmed by one or other of the authors, but I have seen no sign that the authors have acknowledged that the conclusions of BB should be revised or reinterpreted.

It is true that many people have misquoted the quantitative results of BB, but many of these misquotations were in the spirit of the qualitative claims made by BB. I have not seen any sign that any of the BB authors have attempted to correct these errors made by others, although the exchanges with Jahnke would have provided an excellent opportunity to do this.

There seems little doubt that the BB authors bear a significant share of the blame for what has happened, but so do plenty of other people from the groups discussed in the subsequent sections.

5.1.2 The Financial Analysts Journal and its Referees

I understand that articles submitted to the Financial Analysts Journal (FAJ) are approved by anonymous referees before being accepted for publication. These unknown referees are surely at fault for not noticing the obvious errors in BB.

Jahnke has told us that B1 received the prestigious Graham & Dodd award given to the outstanding article published each year in the FAJ. The members of the award committee did not do their job very well.

5.1.3 Consulting Firms

Among the firms that have spread the false version of the BB dogma are Ibbotson Associates, BARRA Rogers Casey, and William M. Mercer. Such firms are regarded as the supreme experts by the industry, and the have a special responsibility to pass on accurate information. However, Ibbotson is to be commended for recently reversing his position.

5.1.4 Authors of Textbooks and Other Books on Investing

The authors of textbooks on investing, such as those used in business schools, no doubt play an important role in spreading information about investing through the industry. They should be very careful to make sure that the information in their texts is accurate. Unfortunately, a number of well known textbooks contain errors in their information on asset allocation.

A variety of other books also contain errors in their discussion of the Brinson work. Perhaps the best

known author with such a book is John Bogle , the founder of Vanguard Funds. His book contains an error of Type 3 . It is to Bogle's credit that he later realized his error and acknowledged it, although I suspect that he still does not appreciate everything that is wrong with BB.

5.1.5 Journalists

From what I have found, the record of journalists in this matter is rather poor. Plenty of journalists have repeated the typical erroneous versions of the BB results. Even writers in the Wall Street Journal and Fortune on the topic of Jahnke's criticisms did not make a lot of sense. I have found one journalist, Walter Updegrave , senior editor of Money Magazine, who did remark on the typical misquotation of BB, but I have found no journalist who produced an analysis of the actual BB articles.

5.1.6 Association for Investment Management and Research

The AIMR is responsible for the Financial Analysts Journal and the Chartered Financial Analysts (CFA) program. The CFA now plays a large role in the education of workers in the investment industry. I heard from one vice-president of marketing at a mutual fund management company that he thought he had learned about the false allocation dogma when studying for the CFA. This is nothing more than an indication, but it might be a good idea for CFA officials to check that their students are not being misinformed by any of the material they study.

5.1.7 Large Financial Organizations

Some of the largest US (and Canadian) organizations involved in the investment industry have made gross errors in their promotional material, as Quotes 1.3 - 1.5 show. These statements appeared on web sites in March 2000. I am referring to obvious misquotations of the results of the Brinson articles. A quick scan of the source would have shown immediately that the promotional statements were incorrect. I am surprised that the legal departments of the organizations do not insist that promotional material is checked for veracity before being published.

There certainly must be employees of these large organizations who are quite capable of performing the sort of analysis that I have done. If the economists and MBAs cannot manage it, then the organizations could ask a transplanted mathematician or physicist on their staff. Of course, I realize that the problem is likely due to lack of communication between the marketing department and the real experts, but this is not an excuse for providing misleading information to the public.

5.1.8 Small Financial Planning Firms

I have some sympathy for the smaller firms and individual financial planners, who often do not have the training and expertise of some of the people in large institutions. They no doubt often learn about the false doctrine from so-called experts, and find it very difficult to believe that many well-known pundits could actually be wrong.

5.1.9 Government Regulators

Do regulators have a role to play in this matter?

5.2 FINAL THOUGHTS

The topic of asset allocation as defined by Brinson has turned out to be more or less empty of content, but I do not feel that I have wasted my effort. I have found out that perhaps the experts on investing and financial economics are not all as skilled as the public has been led to believe. I think that a strong case can be made that the main application of the last 50 years of research in portfolio theory has been in marketing all sorts of investment vehicles.

After learning the truth about one aspect of the theory, asset allocation, I wonder how many other parts of the established dogma will survive careful analysis. Perhaps the most important tenet of the established faith is what I might call the Fundamental Theorem of Investing. This theorem states that

> In the long run, stocks will always outperform bonds by a wide margin.

Why this should happen is called the equity premium problem, and in due course I hope to present some comments on the problem on a another portion of this site. This problem is certainly not as trivial as the one discussed here, but it seems well worth looking at.

Another notion that has played a large role in investment theory is the Efficient Markets Hypothesis. Part of the EMH asserts that, in the investment industry, there are so many smart, hard-working people, supported by vast banks of information, that all securities are fairly priced except for periods of time too short for all but a few to exploit. This might be true, but I have to wonder whether it may not be possible to profit from widespread misconceptions among many participants in the industry.

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GLOSSARY

Annualized return: The return over a period of one year. It is not quite the same as the sum of four quarterly returns due to the effect of compounding.

Asset: Stocks, bonds or cash equivalents, such as T-bills.

Asset allocation: Another term for Investment Policy , according to BB. Others might interpret the term as choice of Asset Mix , one of the two components of Investment Policy.

Asset allocation service: A term used in Canada for a service which places the investor's funds in a group of mutual funds of different types, weighted according to the circumstances of the investor. Many financial planners do the same thing.

Asset class: A group of assets of the same type, such as stocks, US stocks, small cap US stocks, etc.

Asset class weight: The percentage by value of a portfolio, expressed as a decimal, of the asset class. E. g. the weight of stocks is 0.6 means that 60% of the value of the portfolio is in stocks.

Asset mix: The weights of all the asset classes in a portfolio.

Coefficient of Determination (CD): A quantity with a value between 0 and 1 that measures the goodness of fit of the line in a regression analysis . CD = 1 means a perfect fit. In the Brinson context the CD is interpreted as giving the proportion of the variance of the return of a portfolio that is explained by the policy portfolio. Brinson states the CD as a percentage.

Market timing: The process of changing the asset class weights in a portfolio from time to time.

Mean annualized return (MAR): The arithmetic average over a number of years of an annual return.

Index: A quantity which measures the return of a representative group of assets from an asset class. E.g. the S&P 500 for large US stocks.

Investment policy: According to Brinson, part of the process of managing a portfolio, made up of two components - choice of asset classes, and choice of weights for those asset classes.

Investment strategy: According to Brinson, the other part of the investment process besides investment policy. Investment strategy consists of market timing and security selection within the individual asset classes.

Normal weights: The fixed asset class weights used to define the policy portfolio .

Policy portfolio: A hypothetical portfolio of index funds with weights equal to the normal weights .

Portfolio: A collection of assets.

Performance: Usually interpreted to mean return , but sometimes might also include other measures such as variance (risk).

Policy: See investment policy .

Regression: In the present context, the mathematical process of finding the linear formula which best describes the relation between to sets of quarterly return data. On a plot such as Exhibit 2 in IK , the relation is represented by a straight line.

Return: In the present context, means total return of an asset or group of assets for a given period. Total return means the percentage (expressed as a decimal) gain or loss during the period from change in asset price and payments such as dividends or interest.

Security selection: The choice of individual securities within asset classes, in particular in a way different from the securities making up the index for the class.

Strategy: See investment strategy .

Variance or variation: A mathematical expression which measures the extent to which a series of quarterly returns (in the present context) fluctuates about its average. It square root is called the standard deviation.

Weight: See asset class weight .

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"Asset mix (stocks, bonds, cash) has accounted for an astonishing 94% of the differences in total returns achieved by institutionally managed pension funds (B1). The results of this study have been reaffirmed by countless others." p. 235

Bogle has now changed his position. In 1997 he wrote

"B1 stated that 'investment policy dominates investment strategy . . . , explaining on average 93.6% of the variation in total [pension] plan returns.' This statement may well be the seminal (and surely the most quoted) single citation on the subject of asset allocation.

Properly understood, the conclusion is, I think, beyond challenge. Unfortunately, however, it has been subject to considerable misunderstanding. It is often cited as meaning that asset allocation accounts for the differences in the annual rates of return earned by pension funds, rather than the quarterly variations of returns. I must confess that in my book, 'Bogle on Mutual Funds,' I made that error, saying that the allocation of assets among stocks, bonds, and cash 'has accounted for an astonishing 94% of the differences in total returns achieved by institutionally managed pension funds.' Happily, I think I rectified that shorthand summary by coming up with the correct conclusion: 'Long-term fund investors might profit by concentrating more on the allocation of their investments between stock and bond funds and less on the question of which particular stock and bond funds to hold." I stand by that conclusion today."

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