

THE PERSI INVESTMENT PORTFOLIO

June 29, 2018

Introduction

PERSI is a conventional reasonably diversified institutional investor that assures the delivery of market returns through the patient use of simple, transparent, and focused investment vehicles. PERSI believes more aggressive approaches carry greater long-term dangers than the problematic shorter term opportunities warrant. As a result, we are committed to a “conventional investment” approach for the foreseeable future (at least 5-7 years) and have completed the basic structure of the portfolio we prefer for the long term.

This direction is the continuation of a consistent approach over the past decades, and includes consideration of a number of factors – including some that are:

- return based (market returns are more than sufficient to meet PERSI’s conservative liabilities, there is no evidence that over time more complicated or complex investment strategies add to return for the great majority of institutional investors, and such additional efforts historically have, on average and for PERSI in particular, actually subtracted from market returns),
- resource based (small staff for the foreseeable future, potential Board turnover with different levels of investment knowledge, in-house budgets controlled by legislature),
- control based (complex portfolios are opaque and difficult for constituents to understand and Board members to fully comprehend and control when board time consists of ten meetings a year with an hour or two per meeting devoted to investment issues), as well as
- other factors (conventional investing uses adequately well understood concepts, is easier to explain to legislatures and other constituencies when markets decline, has a well-established literature and tradition, is relatively inexpensive, etc.).

This approach is in contrast to that taken by a number of other investment institutions, often termed “the endowment model”, a number of “risk-centric” approaches that have sprung up since the Great Recession and market collapse of 2007-2009 (risk budgeting, risk parity, risk factors or sleeves), as well as a proliferating number of “factor” and other approaches. Recognizing that there is no “one true way” to invest, PERSI has chosen the conventional investing framework as the one most appropriate for its particular situation.

This paper is a staff document that describes the implementation of the Board’s Investment Policy. The rest of this paper describes the underlying beliefs as understood by staff, a high level

overview of what is meant by “conventional investing”, and sets out in some detail the framework that is used by staff in looking at the PERSI portfolio.

General Investment Beliefs

While there are a number of investment approaches that are being followed today by the investment community, PERSI’s approach is founded upon a set of underlying investment beliefs concerning the management of its portfolio. These are:

1. "Conventional investing" (as generally discussed later) is the best framework for management of PERSI’s portfolio. This is particularly the case due to the size of the portfolio, the staff resources available, the potentially changing nature of the membership of the Board over the next few years (which will include non-investment professionals), and the relative infrequency and shorter length of Board meetings. In contrast, what has been termed the "endowment model" (exemplified by the Yale portfolio) and the various "risk centric" and factor portfolio construction approaches (risk budgeting, risk parity, and risk factors (or "sleeves")) require too many resources, are too opaque, have problematic return prospects for the vast majority of funds, and are not approaches that will be followed or explored for at least the next 5-7 years.

2. The goal of diversification of the portfolio has generally been met with the current asset types contained in the portfolio: namely, U.S. equities, international developed market equities, international emerging market equities, REITs, private equity, private real estate, government and sovereign debt, inflation protected securities (TIPS), credit debt instruments, private debt (the Idaho Commercial Mortgage program), and cash. Addition of other asset types or “sub asset class” investments (emerging market debt, bank loans, MLPs, infrastructure, commodities, gold, etc.) will not be occurring for the foreseeable future [although active managers are authorized to occasionally use instruments from some of these other types in attempts to outperform broader mandates, such as allowing a bond manager to occasionally use dollar emerging market debt in attempting to outperform their general fixed income benchmark].

3. Investment decisions and considerations will be taken with the time horizon of at least 5-7 years, and usually longer. Consequently, investment approaches that aim to enhance returns over the near or medium term (quarterly to 3-4 year time periods), often termed "tactical asset allocation", are not employed (although strict rebalancing may be impacted at various times). Particularly, "hedge funds”, quantitative "black box" strategies (e.g. "130/30") and other short term oriented strategies (tail risk insurance, covered call option writing, portable alpha, “crisis risk offset”, etc.) will not be employed.

Overview of “Conventional Investing” and the PERSI portfolio: Simple, Transparent, Focused and Patient

Conventional investing as implemented in the PERSI portfolio emphasizes the values of simplicity, transparency, focus, and patience. It relies primarily on general public markets as traditionally identified (global equities and investment grade fixed income) with additions of some private investments (real estate, local commercial mortgages, and private equity). It maintains a consistent presence in those markets, rebalancing as appropriate to keep percentage positions relatively constant over time. The approach depends on market movements, not active management, for success and in the core positions stays primarily in instruments that can be readily sold and confidently priced. It favors public and independently verifiable daily pricing for non-private instruments. It depends on surviving market volatility and long-term postures for long-term success, rather than short term efforts to fight market volatility.

Simple

The PERSI portfolio relies on long-term market returns to meet its investment goals. The portfolio as a base position has major exposures to the public markets of US large and small capitalization equities, international developed market equities, emerging markets equities, real estate securities (REITs), inflation-indexed securities (TIPS), investment grade bonds and straightforward, government guaranteed mortgage securities. The portfolio maintains a consistent presence in those markets, rebalancing as appropriate and particularly after volatile market movements.

The investment discipline is relatively simple and easy to follow, and does not tactically allocate the portfolio in any significant way over near term periods. The combinations of these exposures are designed to give a high probability of achieving the returns needed over long periods of time. As one of the simpler and less complicated approaches in the industry, this approach also allows a citizen Board and a small staff to exercise knowing control over the portfolio. This satisfies a key and long standing provision in PERSI’s investment policy which states that “In making individual investment policy decisions, the Board will have as an overall goal a flexible, simplified structure with clear roles and accountability. . . . The Board will favor a structure that accommodates a citizen Board and a small staff.”

PERSI has a real return (above inflation) need in the 3.75%-5.0% range. For base statutory benefits, the real return need is 3.75%, derived from the actuarial nominal net return goal of 7.0%, which in turn is based on an inflation assumption of 3.25%. Higher inflation than anticipated would mean that salaries will be higher than currently projected; therefore benefits (which are generally based on ending salary levels) would be higher than anticipated, and the portfolio would require higher returns than assumed. On the other hand, lower inflation would lead to lower salaries, with lower benefit payments, and would not require as high a nominal return. In addition, statutory benefits include a 1% Cost Of Living Allowance (COLA). COLA’s above 1% can be discretionarily awarded to the extent that long-term returns are consistently above the 3.75% real return rate. Full COLAs could be achieved with real returns around 5% over multi-decade periods.

These return goals result in a portfolio consisting of roughly 70% equity positions and 30% fixed income positions, consistent with the historical long term multi-decade returns of equities in the 5%-7% real return range, and fixed income returning 1%-2% above inflation.

Transparent

Conventional investing and PERSI rely on transparency as the primary risk control. Index funds provide the base position, primarily in the larger more liquid markets for broad basic exposures and as the primary vehicles for portfolio rebalancing and transitions (as well as cost control). PERSI maintains around 45% - 50% of its portfolio in capitalization weighted passive index funds. The portfolio active public security managers (about 30%-35% of the portfolio) usually have broad mandates, with a preference for managers with either clear styles or concentrated portfolios (as much if not more for risk control and transparency than clear additional return benefit). Because the style or portfolio is very clear and transparent with daily and independently priced securities or funds, activity can be monitored contemporaneously, unexpected behavior if it occurs is instantly clear, and explanations for unexpected behavior can be quickly determined. The portfolio concentrates the relationships to relatively few in number (around 20 public managers, around 20 private equity relationships, and a few real estate agents). “Black box” investing is avoided, and there is a strong preference for public securities or funds that can be independently daily priced. Private strategies (about 15%-20% of the portfolio) are in areas that would be understandable to reasonably intelligent people who may not have extensive investment training.

Focused

Conventional investing recognizes that the benefits of diversification basically disappear after 10-11 asset types are used in the portfolio, and that the benefits of moving from 4 asset types to 5 are much greater than from 44 to 45. Further, it believes a position needs to be at least 5% (and preferably at least 8%-10%) of the portfolio in order to have any noticeable impact on either the risk or the return of the entire portfolio. Conventional investing and PERSI therefore focus any extra efforts on a few initiatives that are to be held for the long-term.

In addition to diversification reasons, PERSI has added private assets (both equity and real estate) in an attempt to capture an illiquidity premium (and to realize the annual smoothing benefits recognized by the practices of actuaries and accountants). There is a dedicated manager and index fund for publically traded real estate investments (REITS). The real estate exposure (both public and private) is combined with a TIPS mandate to increase near to medium term (1-5 year) inflation protection. PERSI also has maintained for decades a larger than typical exposure to emerging markets for long-term growth prospects. PERSI also maintains a greater weight to small capitalization U.S. equities than larger capitalization US equities when its public U.S. securities portfolio is viewed by itself (a consequence of the use of active managers).

Special opportunities (such as the Idaho Commercial Mortgage Program) might occasionally be added, but PERSI would only add that type of investment if the return and risk profiles were so clear as to overcome the bias in favor of overall portfolio simplicity, transparency, and focus. Special opportunities are expected to be rare if generally available to institutional investors and, to date, the only special opportunity in the PERSI portfolio is the long-standing Idaho Commercial Mortgage Program.

PERSI therefore has focused its investments to 11 basic asset types: Large Cap U.S. equities (S&P 500), Small Cap U.S. equities (Russell 2500), Private Equity, Private Real Estate , Public Real Estate (REITs), Developed International Markets (EAFE), Emerging Markets, Investment Grade Bonds (Aggregate and Government/Credit), Inflation Index Bonds (TIPS), Idaho Commercial Mortgages, and Cash.

Patient

Conventional investing and PERSI accepts capital market volatility and accepts that the volatility will often be greater than the standard tools assume (which posit “normal”, or bell-shaped curve random market movements (“Gaussian”)). But, we do not try and actively maneuver the portfolio to avoid suspected or feared major moves in the various capital markets. The approach is rather to make the portfolios sturdier, and work to ensure that the liabilities that are being funded can be easily met over the much longer term while being maintained at acceptable levels through short term turbulence. PERSI views attempts to avoid that volatility and reach for shorter term gain as more likely leading to greater danger and disruption than the potential (and elusive) rewards justify. Avoiding tactical moves in volatile markets is analogous to staying put in a known sound structure rather than running around wildly during a severe earthquake. PERSI looks to returns over 5-7 years or more, and does not tactically maneuver the portfolio based on shorter term views.

Patience is a requirement of all successful investment approaches – not just traditional investing. As even one of the acknowledged gifted active investors – Warren Buffet – said

“In the investing business, if you have an IQ of 150, sell 30 points to someone else. You do not need to be a genius. You need to have emotional stability, inner peace and be able to think for yourself, [since] you’re subjected to all sorts of

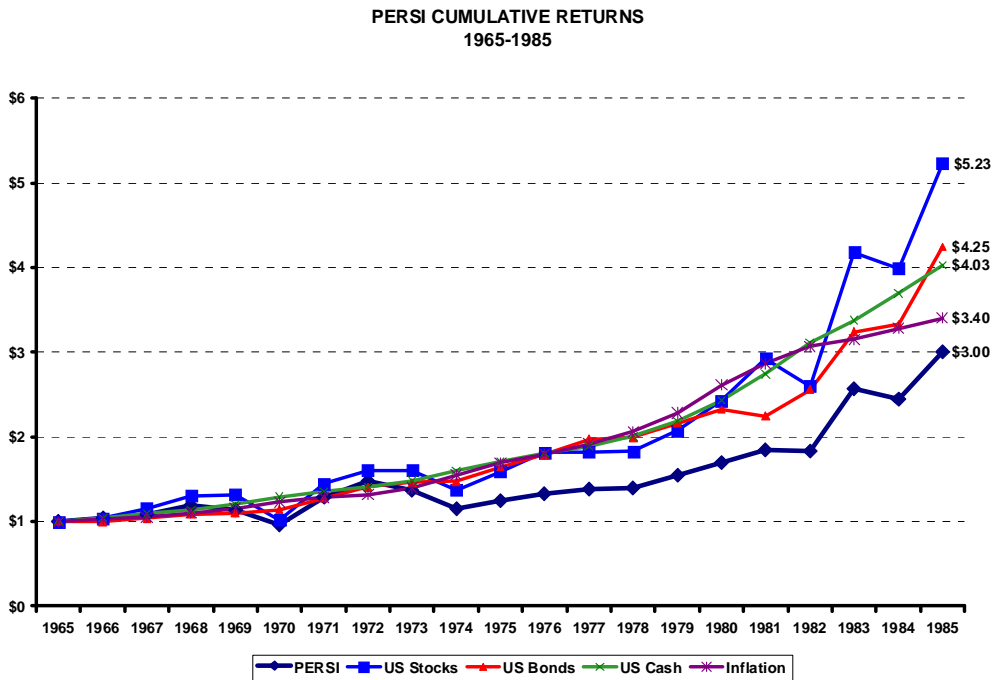
stimuli. It's not a complicated game; you don't need to understand math. It's simple, but not easy. . . Emotional makeup is more important than technical skill.”

Buffett FAQ. <http://www.buffettfaq.com>

Therefore, we believe a conventional approach is appropriate given likely PERSI resources and is sufficient for meeting PERSI's modest liabilities. It has a record of demonstrated success since its adoption in the early 1990s not only in absolute returns, but also in comparison with peer institutions. In addition, however, PERSI had previously tried a more aggressive, actively managed, and tactically allocated approach for much of its early history. That ended in a near disaster for the fund.

LESSONS LEARNED: PERSI 1965-1992

For the first two and a half decades of its history PERSI tried to maximize its investment opportunities and tried a number of different approaches to investment management. PERSI was founded in 1965, and from its inception through 1992 relied primarily on active management, tactical asset allocation, and opportunistic investing. The results were a near disaster - from its founding in 1965 through 1992, PERSI's cumulative returns lagged that of each and every asset class, including cash. Through 1985, PERSI's total fund did not even keep pace with inflation:



As a result, as of mid-1992, PERSI's peer performance was at the bottom of peer rankings.

RANKINGS IN THE TUCS PUBLIC FUND UNIVERSE

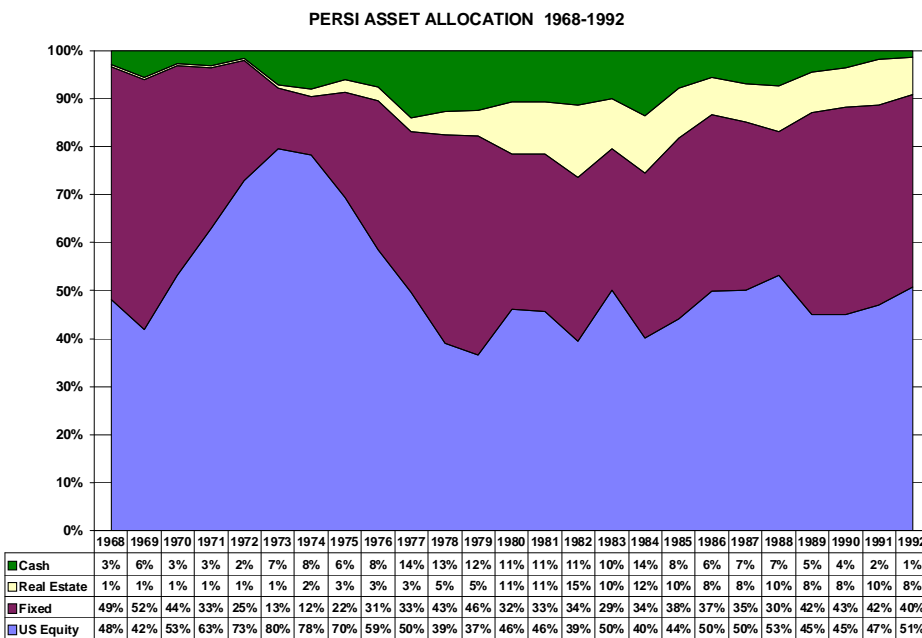
Percentile Rankings over Period

(1 is highest, 100 is lowest)

	1Yr	2Yrs	3Yrs	4Yrs	5Yrs	7Yrs	10Yrs
9/30/92	99	90	90	79	99	99	99

[TUCS is the Trust Universe Comparison Service, and was the database used by PERSI in the 1980s and early 1990s]

Until 1987, PERSI invested its assets through outside trust and insurance companies (called “funding agents”) reaching a total of eight by 1986. These agents exercised “full discretion in investment activities”, with investment policy “influenced to a degree by frequent consultation with the Retirement Board concerning total portfolio composition and current economic considerations.” (PERSI Tenth Annual Report at p. 17). The result was that during that period PERSI’s overall portfolio essentially chased trends. Over the first 27 years of PERSI’s existence, the equity allocation moved radically, ranging from 42% to 80% and back to 37% again:



For example, much like the recent reaction of many pension funds to the Great Collapse of 2007-2009, PERSI reacted to adverse market conditions of 1973-1974 by increasing reliance on active management, radically pulling back its equity exposure, increasing exposure to other asset types, and covering all of these active investment movements under the rubric of “diversification”. As the Tenth Annual Report (1975) stated after noting the “adverse investment results” of 1973-1974: “With a long-term objective of an optimum rate of return foremost in mind, the Board has not only further diversified in the number of funding agents [investment managers] but has also moved in the direction of further diversifying the portfolio and reducing the ratio of equity investments.” PERSI’s equity allocation subsequently declined from 78%-80% in 1973-1974 to 37% by 1979, just in time to miss the succeeding annualized ten year equity return of almost 13% from 1975 and an annualized five year equity return of 16.5% from 1979.

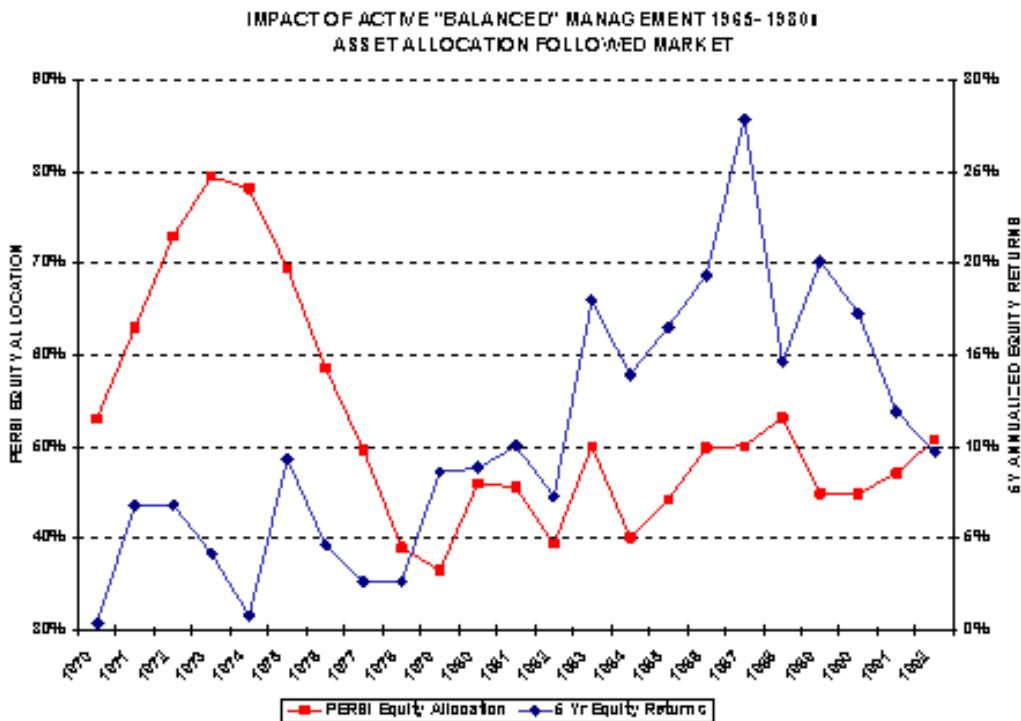
Results were so poor, in fact, that PERSI was instructed NOT to issue annual reports in the mid-1970s. As the Thirteenth Annual Report stated in its opening (December 1, 1978): “At the suggestion and request of a former administration, the Annual Report of the Public Employee Retirement System was discontinued following publication of the Eighth Annual Report for the period July 1, 1972 to July 1, 1973.” (At p. 1 – the Eleventh and Twelfth Annual Reports covering fiscal years 1976 and 1977 were never issued, and there is some indication as stated in the quoted sentence that the Ninth and Tenth Annual Reports covering fiscal years 1974 and 1975 were withdrawn after the fact).

The 1980s did not improve the investment stance of the fund. In addition to previous concerns, PERSI experienced major turnover and change in the management of its investment activities - with five major changes in overall investment management in the six years prior to late 1992. By FY 1986 PERSI had divided its investment funds among eight “funding agents” –essentially traditional broad institutional investment managers [such as four Idaho bank trust departments, insurance companies, and other institutional managers] - who “shall be granted full discretion in making investment decisions” (Twenty-First Annual Report at p. 56)]. In September of 1986, however, the Board fired all of the funding agents and gave the entire portfolio (except for real estate and the Idaho Mortgage Program) to the Frank Russell Trust Company who assumed full responsibility for “selecting managers and replacing them when appropriate” within the general asset allocation set by the Board (Twenty-Second Annual Report at 9).

Because of cost, lack of transparency, hidden costs and commissions, and other concerns, this change caused a large amount of public controversy and reaction. Then Chairman Rudd and the following long-serving chairman Jody Olson were both appointed during this period, and the result was a major change in the investment approach of the fund to reliance on an in-house investment staff and the beginning of a complete overhaul of the investment portfolio – including legislation that, among other impacts, “facilitated full disclosure of PERSI investment activities, . . .exempted investment advisory personnel from the personnel commission, [and] . . . changed the definition of “funding agent,” by broadening the definition to include investment management firms and individual investment managers.” [Twenty-Fourth Annual Report (FY1989) at p. 17]. As the introduction of that annual report noted: “There have been many changes in PERSI in this fiscal year. Some have been very visible, others not.” (Id. at p. 1).

The overhaul initially did not proceed smoothly, with the next three years seeing three different chief investment officers: Phil Halpern (1990), John Hart (1991), and Paula Treneer (1992). Each CIO concentrated on different investment portfolio goals, with the result that different investment goals were emphasized in different periods. By the end of 1992 PERSI was searching for its fourth chief investment officer in four years.

In essence, changing investment management approaches and PERSI's reliance on intense active management and tactical asset allocation by its agents and the Board resulted in trend chasing, with equity allocations increasing from 40% to 80% after the bull markets of the late 1960s, collapsing back to 37% after the 1973-1974 market crash, then increasing to 50% after missing most of the bull market in equities of the early 1980s. The market crash in October of 1987 caused another reaction against equities, with a drop back to the mid 40% levels, and only gradually building back to only 50% by 1992:



PERSI ended FY 1992 far below its targeted equity allocation of 65% and with a funding level in the low 60% range. During most of this first 27 years PERSI left actual allocations to the vagaries of active judgments by its agents with the Board making ad hoc reactions whenever severe market events occurred. It deliberately attempted to be a top performing fund, with its primary and express goal of being in the “top one-third of its evaluation service’s universe of other funds” (Twenty-First Annual Report (FY 1986) at 55). If PERSI had consistently maintained any reasonable asset allocation (50% or more equities) during this period and had

simply and transparently applied them during those years its assets would be over \$3 billion higher today.

Over twenty five years ago PERSI deliberately moved away from reliance on intense, constant active management and attempts to tactically allocate assets in an opportunistic manner. Instead of adopting whatever current investment approach is in favor (including the current trend to “outside CIOs” which is similar to the early reliance on bank trust departments), a consistent and stable management approach has been emphasized. We do not believe that a return to that reliance on active investing or any change in investment management direction is called for today. We do not believe that the new paradigms of modern trends in investment management have yet demonstrated that primary reliance on active management and opportunistic investing will lead to any happier ending for those believing the claimed investment skills of experts. Instead, PERSI simply aims to be a standard professional reasonably diversified institutional investor that assures the delivery of market returns through the patient use of simple, transparent, and focused investment vehicles. We do not pretend nor do we want to be anything more.

Conventional Investment Implementation – additional considerations

Conventional investing and PERSI therefore first starts with Modern Portfolio Theory with a 10 year or more time frame, and begins with the 8 major public asset types (US Large Cap Equities, US Mid and Small Cap Equities, Public Real Estate (REITS), International Developed Market Equities (EAFE), International Emerging Market Equities, Government Bonds, TIPS, Credit Bonds and Cash. Positions are then taken in low-cost capitalization weighted indices to get basic, cheap exposures.

Next, attention is focused on surviving expected potential shorter term extreme volatility (such as that which occurred in 2007-2009). This is accomplished by assuring that the cash needs of the organization can survive a market disruption of at least three years. This is primarily achieved through sufficient cash holdings or near-certain cash flows (reasonably secure contributions to the organization) that can assure meeting known near term obligations, and also adjusting the liquid investments to assure the presence of readily marketable assets that would be available in a crisis (e.g., shifting otherwise desired basic allocations in private assets to publically traded assets). PERSI has a very stable stream of diversified government contributions that cover over 90% of its ongoing cash payments for benefits, and therefore has a stable three year time horizon—one that easily navigated the 2007-2009 crisis.

The next objective is to “Avoid the Big Mistake”. Conventional investing and PERSI takes as its base position that market returns with the appropriate equity/fixed mix are sufficient to meet obligations over the long term, and that any attempt to generate extra return should not jeopardize basic market returns. Therefore, conventional investing understands that in order to get at least market returns, one has to consistently be in the markets.

As a result, major tactical asset allocation moves in anticipation of “poor” or “great” market opportunities are viewed with great suspicion and are disfavored. In order to make a major tactical asset allocation move pay off, three decisions, not just one, have to be correct: (1) when to get out of an asset type; (2) when to get back in; and (3) where to put the money in the

meantime. An incorrect decision on any of these three can lead to severe losses (including the unexpected problems with “illiquid cash” that popped up in 2008-2009). Another consequence of this principle is that conventional investing never makes a major move in the middle of a crisis: instead, it “blindly” rebalances during volatile market moves, and doesn’t try and time markets instead of following previously agreed upon disciplines. PERSI follows all of these disciplines, and does not implement tactical asset allocation procedures or employ managers with shorter term orientations (thus avoiding hedge funds).

Rebalancing

PERSI follows standard institutional practice and occasionally rebalances its portfolio. There is no universally accepted rebalancing procedure, with some arguing that standard rebalancing practices are not appropriate at all (See, for example, William F. Sharpe, Investors and Markets: Portfolio Choices, Asset Prices, and Investment Advice, Princeton University Press 2007 at Chapter 8.9.2).

Rebalancing essentially relies on the idea of mean reverting markets, which can take a few years to occur. Rebalancing hurts when markets trend and helps when markets revert with volatility. And, the practical impact is somewhat limited – at most about 40 basis points a year over a decade, but not in each and every year. (This is one of the reasons that Dr. Sharpe says rebalancing is not appropriate – first, that the market information carried by a severe move should be listened to but, second, that it is not “macro consistent” in that everyone cannot engage in a mean-reverting rebalancing strategy and still have the markets clear. He sees it as solely an active management belief, and not a portfolio discipline. PERSI actually agrees with this analysis in large part, but the “discipline” is common and also helps guide Boards in times of crisis).

Even if markets mean revert, one gets more “bang from the buck” by waiting for very major market moves rather than a number of incremental ones. The gain from rebalancing is not linear – for example the gain after a 10% drop is more than after a 1% drop, and much more from a 50% drop than a 10% drop. (100 down to 90, rebalance, and back to 100 gains 11%, but down to 50 and back to 100 makes 100% - more than 5 times the 10% drop).

Finally, there are transaction costs and, if a portfolio has more than a few “asset classes” - particularly if there are a couple of private asset types (like real estate and private equity) - then the portfolio becomes a “Rubik’s Cube” and practically very confusing to manipulate. Even then, with material private and illiquid allocations one can’t rebalance in time of extreme stress.

So, PERSI uses a more informal rebalancing approach. PERSI has net cash flows out monthly, and will rebalance back towards target with those cash flows (using passive index funds in the main liquid categories). Otherwise, for normal market moves PERSI will tend to rebalance once a year (around the close of the fiscal year). PERSI will actively rebalance when there is a really volatile market move, or huge uncertainty (such as in October of 2008 and then again in February of 2009, for example). We will also tend to let equity allocations by benchmark stay above target both because of an equity bias and because it is a means to put manager cash (which

usually runs to about 2% of the overall portfolio) to use. On the other hand, PERSI will rebalance more quickly when bonds are over target.

When rebalancing, PERSI will tend to move to the middle of the range when making major rebalancing moves rather than moving simply to the edge of the range.

Since this involves some ongoing judgment calls, it is important to have an ongoing measurement system in order to determine whether significant errors are being made. PERSI's measurement system is as follows. First we aggregate all the assets into three general categories (using the manager mandates): US equities (which includes global equity, REITS, private equity, and private real estate), international equities (including emerging markets), and fixed income (including TIPS, our commercial mortgage program, etc.).

Then we take the basic reference strategic asset allocation of 55% Russell 3000, 15% MSCI EAFE, and 30% Bloomberg-Barclay's Aggregate as the reference allocation. Then three numbers are tracked:

- (1) What would the return have been if the fund had strictly rebalanced to those proportions at the start of each month without any transaction cost and assuming index returns were achieved ("Strict rebalancing"),
- (2) What would the return have been over various time periods (yearly up to 20 years or more) if the fund had not rebalanced at all during the time periods and index returns had been achieved ("No rebalancing"); and
- (3) What were the actual proportions of those three in the fund at the start of the month by manager allocation, and what would the return have been if index returns had been achieved ("Actual Rebalancing").

Over time, the "actual" numbers should be between "no-rebalancing" and "strict rebalancing" or above both. If the "actual rebalancing" ever runs behind both for a prolonged period of time, PERSI would consider another approach.

For example, over the last 1 year period ending this month, no rebalancing of a 55-15-30 portfolio would have produced a return of

9.1%

Strictly rebalancing at the start of every month of those three assets without transaction costs would have returned

9.0%

Index returns using our actual proportions over the past year – the "actual rebalancing"- would have given returns of

9.2%

(Other actions changed the total portfolio return for the trailing one year period to

8.7%

but that is because of emerging markets, TIPS, global equity, and other policies moving the fund away from three simple asset classes).

For the last five years the numbers have been: no rebalancing

9.0%

Annually, strictly rebalancing,

9.1%

and annually, actual rebalancing

9.5%

Consequently, PERSI's more informal approach has produced acceptable results, and change is not indicated.

(PERSI also keeps track of underweighting or overweighting various other investment actions to be discussed next, such as emerging markets, global equities, private equity, real estate, TIPS, Idaho commercial mortgages, etc. Since a number of those allocations (particularly the private ones) are less controllable on a monthly basis, this is more informational, although they need to be tracked, considered and acted on if consistent poor returns are the result.)

Additional Investment Efforts: Beyond “the Basics”

After these basic steps and attitudes have been established, additional actions depending on resources and Board preferences have been taken by PERSI over the years. These extra actions have been taken either because of demonstrated return premiums or other similar reasons.

For example, there are a number of long-term “return premiums” that have been identified by academic research. An “illiquidity premium” from investing in private assets has been identified, for example, and provides a basis for investing in private equity and private real estate. A small cap and value premium have also been identified (although recently questioned), along with momentum, carry (e.g., buying higher yielding currencies and selling lower yielding currencies), selling volatility (e.g., selling puts), minimum variance, and others that apparently are found from time to time. See, generally, Antti Ilmanen, Expected Returns (Wiley Finance 2011). PERSI has implemented some of these biases, but by no means all. Nor has PERSI made these biases central to long-term success.

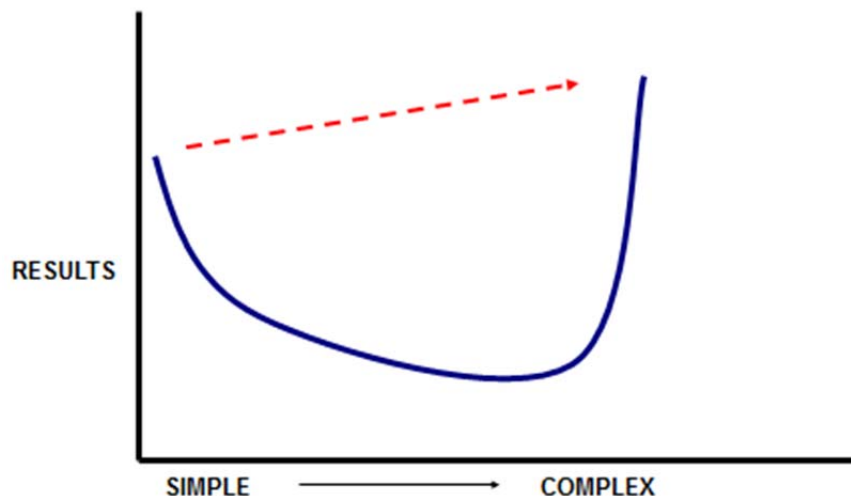
The problem is that even the identified excess return areas have proven to be extremely difficult to practically harvest consistently, or can lead to underperformance for prolonged periods of time. For example, a number of studies have shown that the illiquidity premium (and more) is usually harvested by the private equity general partners. Consequently, on average institutional investors actually pay out more in fees and carry than the premium (particularly since the losers don't pay back any losses on underperformance). All of the extra premium areas usually require payment of higher fees and greater transaction costs than simple cap-weighted passive investing. Further, none of the discovered premiums deliver excess returns consistently. For example, the “value” premium regularly disappears for years at a time – as the “death of value investing” cries heard in the late 1990s demonstrated and the experience of the last decade indicates.

All of these additional areas add complexity and require time for Boards and staffs, and are often not worth the extra effort unless there is a clear organizational commitment or belief in a certain additional approach that can survive changing Boards and staffs over the years that may occur before the extra efforts pay off. One of the most valuable resources of an investment

organization is not the assets in the portfolio, but the time required of the Board and staff. After the basics have been accomplished, additional investment efforts in more complex areas have to expressly trade off the requirement of additional resources and time compared to the often problematic longer-term return benefits.

Dr. David Swensen, the CIO of Yale and godfather (or direct father) of the “Endowment Model”, in fact, cautions the vast majority of institutional and private investors NOT to attempt to reach for most of these extra returns because of the problems of insufficient resources, extra fees, transaction costs, difficulty of long term commitment, and other barriers. David Swensen, “Unconventional Success” (Free Press 2005). In a 2011 Guest Lecture to Robert Shiller’s Financial Markets Course at Yale (Open Yale Courses, <http://oyc.yale.edu/economics/econ-252-11/lecture-6>) he describes (toward the end) what might be called the “Swensen J Curve”:

THE SWENSEN “J” CURVE



Dr. Swensen believes that simple conventional portfolios can perform quite well and successfully. He also believes that very complex “endowment portfolios”, if done extremely well, can outperform basic conventional investing. But, he cautions against the assumption that if one simply adds complexity a bit at a time, the performance will improve linearly. In fact, he asserts it is only the very, very excellent and well-resourced practitioners of endowment investing – the investing “1%” – that can actually do better:

“Few institutions and even fewer individuals exhibit the ability and commit the resources to produce risk-adjusted excess returns. ... No middle ground exists. Low-cost passive strategies suit the overwhelming number of individual and institutional investors without the time, resources, and ability to make high-quality active management decisions. The framework of the Yale model applies to

only a small number of investors with the resources and temperament to pursue the grail of risk-adjusted excess returns.”

Dr. David Swensen, The Yale Endowment 2013 Annual Report at p. 15

Everyone else, including almost all professional institutional investment organizations, will do much worse for their entry into more complex investing, and that for that vast majority, the more complex the portfolio, the worse the result.

As noted previously, PERSI has a few additional areas of investment beyond basic passive investment in large cap equity and standard investment grade fixed income. All were taken for reasons of basic diversification from three to ten asset types. In addition, each asset area was chosen for an added reason: either likely additional long-term return or additional inflation protection. All have been in place for at least 15 years, and up to 35 years. Consequently they also represent areas with a demonstrated comfort level by the various Boards and constituencies of PERSI. They are:

- Private real estate (late 1970s)(illiquidity premium, inflation protection)
- Small and Mid-cap US equity bias (1980s)(long term return premium, consequence of use of active management)
- Idaho Commercial Mortgages (late 1980s)(local investment and additional return)
- Emerging markets (late 1980s)(long term return premium)
- Private Equity (early 1990s)(long term return premium and smoothing of returns)
- Public real estate (REITS) (1997)(additional medium term inflation protection)
- TIPS (1998)(near term inflation protection)

Problems with Conventional Investing: Fighting Boredom and Emotional Exhaustion

The problem with conventional investing is that it requires extreme patience – an organization must be able to ride through extremely volatile markets without taking major action (except rebalancing) in anticipation of benefits over rolling 5-10 year time periods. This has proven to be practically impossible for many, if not most, organizations. Accepting shorter term roller coaster volatility is emotionally trying. In addition, conventional investing is very dependent on equity risk and return for meeting long term goals, while active management and those advocating alternative approaches often promise an ability to make equivalent returns in other asset types (including through leverage or security selection) over much shorter time frames. Third, one abandons the quest for higher than market returns, and has to read about the reported successes of the occasional winners in the “CNBC” view of the world. Finally, conventional investing values inaction – keeping to a basic market posture without much alteration during both good and trying times. For many organizations, it has proven to be harder doing nothing than doing something.

There is an old saying in investing that there are three ways to make money in the markets: one is physically exhausting, one is intellectually exhausting, and one is emotionally exhausting. The physically exhausting path is to work harder than everyone else - usually to try and find an

“edge”. But there are only so many hours in a day, and finding legal extra information is getting more difficult by the day with the rewards diminishing almost by the second. The intellectually exhausting path is to be noticeably smarter than anyone else in the market, but by definition this only happens to a very few. Being smart, well-resourced, articulate, and previously successful simply gets one in the institutional investment game – winning that game consistently in the future requires much more.

The emotionally exhausting path is that advocated by conventional investing, and requires facing periods of crisis with organizational equanimity. It is easier said than done.

The Conventional Investment Framework and the PERSI Portfolio

A conventional investment framework looks at an investment portfolio with five basic questions (and in order of importance):

- (1) What should be the basic equity/fixed income allocation?
- (2) What home country bias, if any, is desired?
- (3) What steps should be taken to diversify the portfolio (usually to 10-11 asset types) with what expected consequences?
- (4) How has that diversified posture been maintained or has there been drift because of rebalancing (or lack thereof) and/or tactical asset allocation?

Finally and least important,

- (5) How much active management will be used, and with what firms?

The focus – too often lost – should be on those decisions that drive over 95% of portfolio results – the ones taken by the Board and staff in portfolio construction and maintenance. These are the first four questions relating to the posture of the portfolio in the capital markets. Unfortunately, most analysis often concentrates on the final, and usually least important, question – how active management individually or collectively may or may not have beaten the relevant benchmarks for those managers over recent periods of time. But the benchmarks (and allocations to that particular area of the capital markets) is usually a given in the analysis – the portfolio as determined by the individual manager benchmarks is assumed as the starting point.

Instead, PERSI believes that a Board or staff should concentrate on determining and then following the impact of their decisions on the portfolio since: (1) these are the major decisions in their control; and (2) usually almost all of the portfolio results (both absolute returns and returns relative to peers) are driven by those first four allocation decisions.

Steps 1 and 2 – Setting the basic equity/fixed allocation and home country bias

The starting point is determining the basic equity/fixed income allocation, with the second choice being the desired “home country bias”.

Here an extreme example is what could be called the “Widow Buffett” allocation. Warren Buffett, in his 2013 Letter to Shareholders, described perhaps the simplest portfolio structure imaginable (at p. 28):

[T]he “know-nothing” investor who both diversifies and keeps his costs minimal is virtually certain to get satisfactory results. Indeed, the unsophisticated investor who is realistic about his shortcomings is likely to obtain better long-term results than the knowledgeable professional who is blind to even a single weakness. . . .

Nevertheless, both individuals and institutions will constantly be urged to be active by those who profit from giving advice or effecting transactions. The resulting frictional costs can be huge and, for investors in aggregate, devoid of benefit. So ignore the chatter, keep your costs minimal, and invest in stocks as you would in a farm.

My money, I should add, is where my mouth is: What I advise here is essentially identical to certain instructions I’ve laid out in my will. One bequest provides that cash will be delivered to a trustee for my wife’s benefit. (I have to use cash for individual bequests, because all of my Berkshire shares will be fully distributed to certain philanthropic organizations over the ten years following the closing of my estate.) ***My advice to the trustee could not be more simple: Put 10% of the cash in short-term government bonds and 90% in a very low-cost S&P 500 index fund. (I suggest Vanguard’s.) I believe the trust’s long-term results from this policy will be superior to those attained by most investors – whether pension funds, institutions or individuals – who employ high-fee managers.***

Warren Buffett, 2013 Letter to Shareholders, at 28 (emphasis added).

Thus for his wife after his passing, Mr. Buffett has made the basic choice of 90% equities, 10% bonds with a 100% home country bias (for reasons he lays out elsewhere in the Letter). A similar starting point should be used for any investment portfolio, including PERSI’s. (This also sets a basic starting point for risk control and monitoring considerations. The Widow Buffett Portfolio is also very easy to track and determine if it is behaving as expected. Any further actions also require additional risk control actions that become increasingly difficult and opaque as complexity grows.)

Here PERSI has set a basic 70/30 equity fixed income split, with a strong home country bias traditionally expressed as 55% U.S. Equities (S&P 500 and R2500), 15% International Developed Markets (MSCI EAFE), and 30% U.S. Investment Grade Fixed Income (Barclay’s Aggregate).

PERSI’s Basic 70% Equity/30% Fixed Split

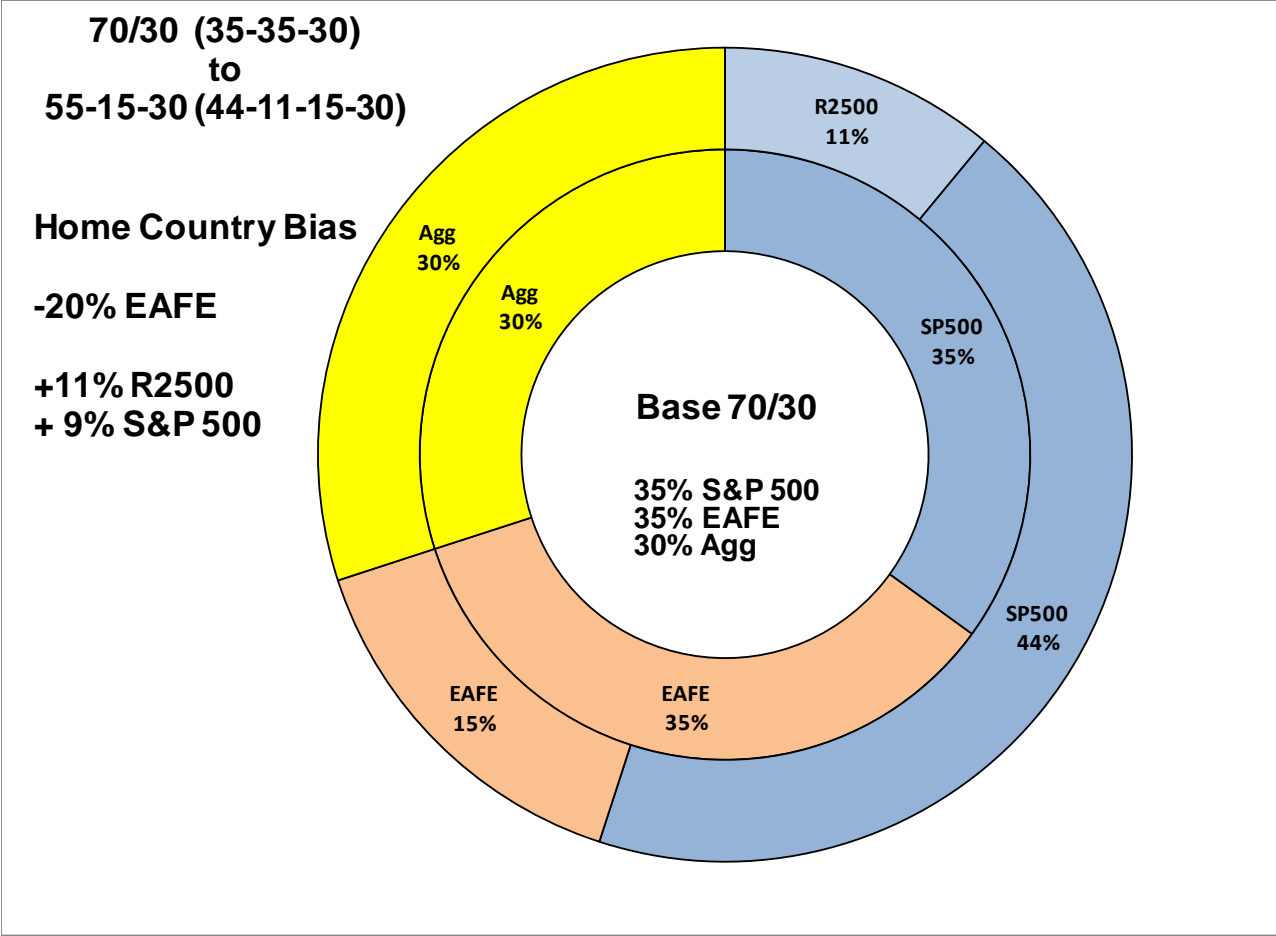
The reason PERSI has chosen a 70% equity/30% fixed allocation as its base posture is entirely due to the nature of PERSI’s liabilities, and a need for a real (after inflation) return of 3.75% over decades in order to meet basic statutory liabilities. PERSI’s actuary assumes a 7.0% net nominal return for assets, and 3.25% inflation for its wage assumptions. If inflation and wages

are higher than assumed, then active benefits will be higher than projected (and a greater return will be needed). But if inflation and wages are lower than assumed, then active benefits will be lower than projected (and a lower asset return can be tolerated). In addition, statutory benefits include the first 1% of inflation. Any higher inflation can be granted by the Board in its discretion, which can only occur if real returns are consistently higher than the basic 3.75%. Granting full COLA's would require a real return around 5%.

A 70% allocation to equities with a 30% allocation to bonds allows for achieving these goals. Over the past two centuries, and over rolling 20-30 years, equities have relatively consistently delivered real returns in the 5%-7% range, and fixed income has returned 1% to 3% fairly consistently. Therefore a 70/30 split would produce returns at the low end of 3.8% real (if both capital markets had 20 year returns at the low end of their historic range) to 5.7% real at the high end (if capital markets are jubilant). Thus a 70/30 split gives an excellent chance of meeting at least statutory benefits in poor capital markets (as occurred in the 2000s), while also giving a good chance of maintaining full purchasing power in good markets (as occurred in the 1990s),

PERSI's Home Country (US) bias – 55% US equities, 15% International Equities, 30% U.S. Bonds

PERSI has altered the roughly even split of US and international equities in the world capital markets to implement a relatively significant home bias towards U.S. equities. This has traditionally been expressed by PERSI as the “55-15-30” reference benchmark, meaning 55% U.S. Equities (S&P 500 and R2500), 15% International Equities, and 30% U.S. Bonds. With roughly 80% of the US equity market in large cap stocks (S&P 500) and 20% in mid or small capitalization stocks (R2500), this leads to the following home country bias:



[The exact percentage of US and international developed market equities in the World index fluctuates over time, and is usually in the 45%-55% range for US equities (and vice versa). For purposes of analysis and explication, a 50-50 split is used by PERSI for its reference benchmarks. Developed Market (EAFE) indices, the S&P 500 and the Russell 2500 are used as base positions to later isolate long-standing PERSI biases to emerging markets and smaller cap US stocks. There is often some minor benchmark disparity between the returns of the R3000 and the combined returns of the S&P 500 and the R2500, which need to be isolated in attributing performance].

This significant home country bias is due to three factors. First, PERSI liabilities are in U.S. dollars, and therefore most of its assets should be held in U.S. dollars. Second, PERSI's liabilities, as indicated above, are linked to U.S. inflation, and should be responsive to long-term movements in U.S. inflation. Since U.S. inflation is caused by higher U.S. prices, and higher U.S. prices are mainly charged by U.S. corporations, U.S. equities have been shown to respond to U.S. inflation quite well over longer periods of time (10-25 years). Finally, the U.S. equity capital market has historically been one of the best performing (and stable) equity capital markets in the world, and there is some reason to believe that that outperformance and additional safety over long periods of time is not just a historical accident.

PERSI'S STRATEGIC POLICY DIVERSIFICATION

The next step is the basic diversification from the simple home bias portfolio to the 10-11 asset types that provide additional risk/return benefits. Here PERSI has evolved and maintained the following strategic assets for diversification and other purposes for a number of years

- a. 11% R2500
- b. 18% S&P 500
- c. 8% Private Equity
- d. 8% Real Estate
 - i. 4% REITs
 - ii. 4% Private Real Estate
- e. 10% Emerging Markets
- f. 15% EAFE
- g. 15% Aggregate
- h. 5% Idaho Mortgages
- i. 10% TIPS

In essence, this policy portfolio makes two major shifts (which will be important when analyzing performance) from the simpler “home bias” portfolio for purposes of diversification, inflation protection and added return:

- a. It takes 26% from the S&P 500 and moves it into 10% Emerging Markets, 8% Private Equity, and 8% Real Estate (4% REITS and 4% Private) and
- b. Takes 15% from general investment grade bonds and moves it 5% to Idaho Mortgages and 10% to TIPS

As described earlier, and in addition to portfolio diversification, the movement to TIPS, REITs and Private Real Estate are primarily for additional inflation protection, and the addition of Emerging Markets, Private Equity, and Idaho Commercial Mortgages are aimed at long term added return.

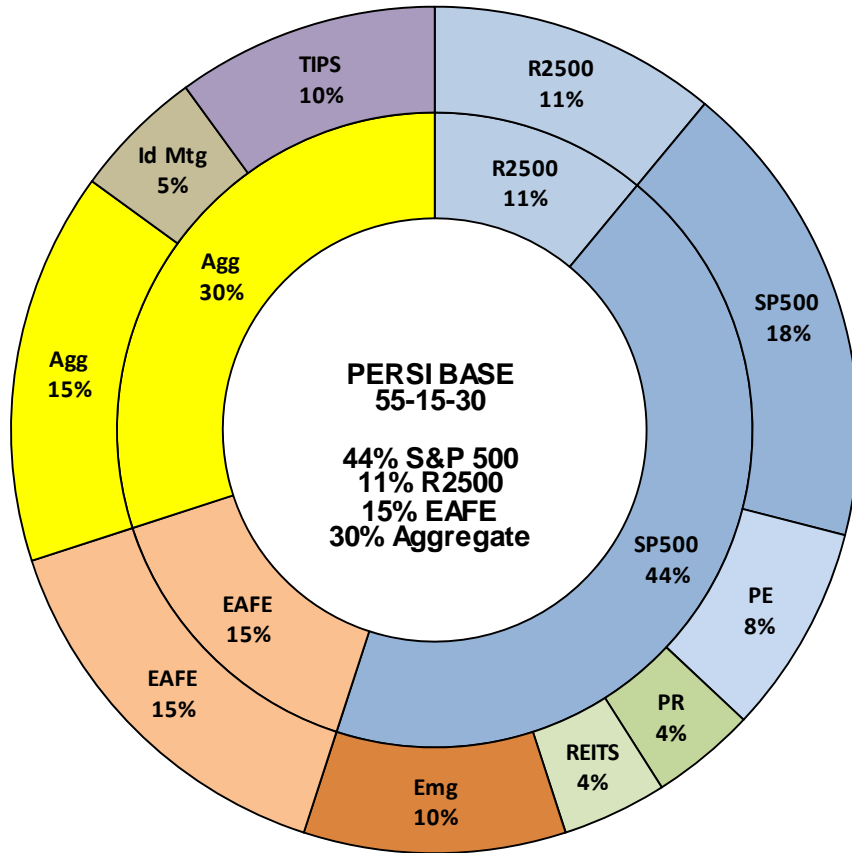
PERSI Policy Biases

-26% S&P 500
 +10% Emg Mkts
 + 8% Priv. Equity
 + 4% REITs
 + 4% Priv RE

-15% Aggregate
 +10% TIPS
 + 5% Emg Mkts

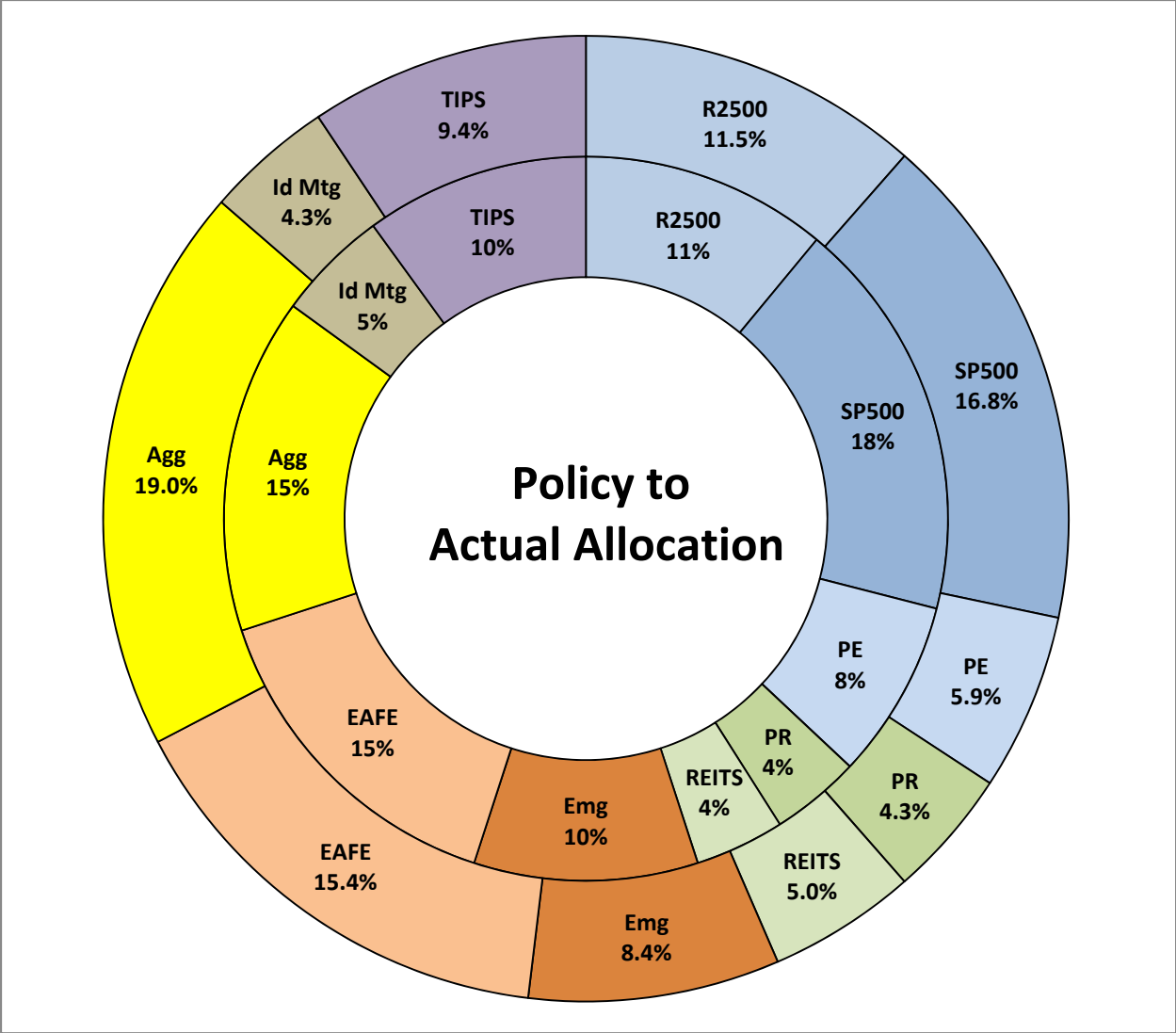
Inflation Protection
 +10% TIPS
 + 4% REITs
 + 4% Private RE

Added Return
 +10% Emg Mkts
 + 8% Private Equity
 + 5% Id Mort.



PERSI PORTFOLIO DRIFT

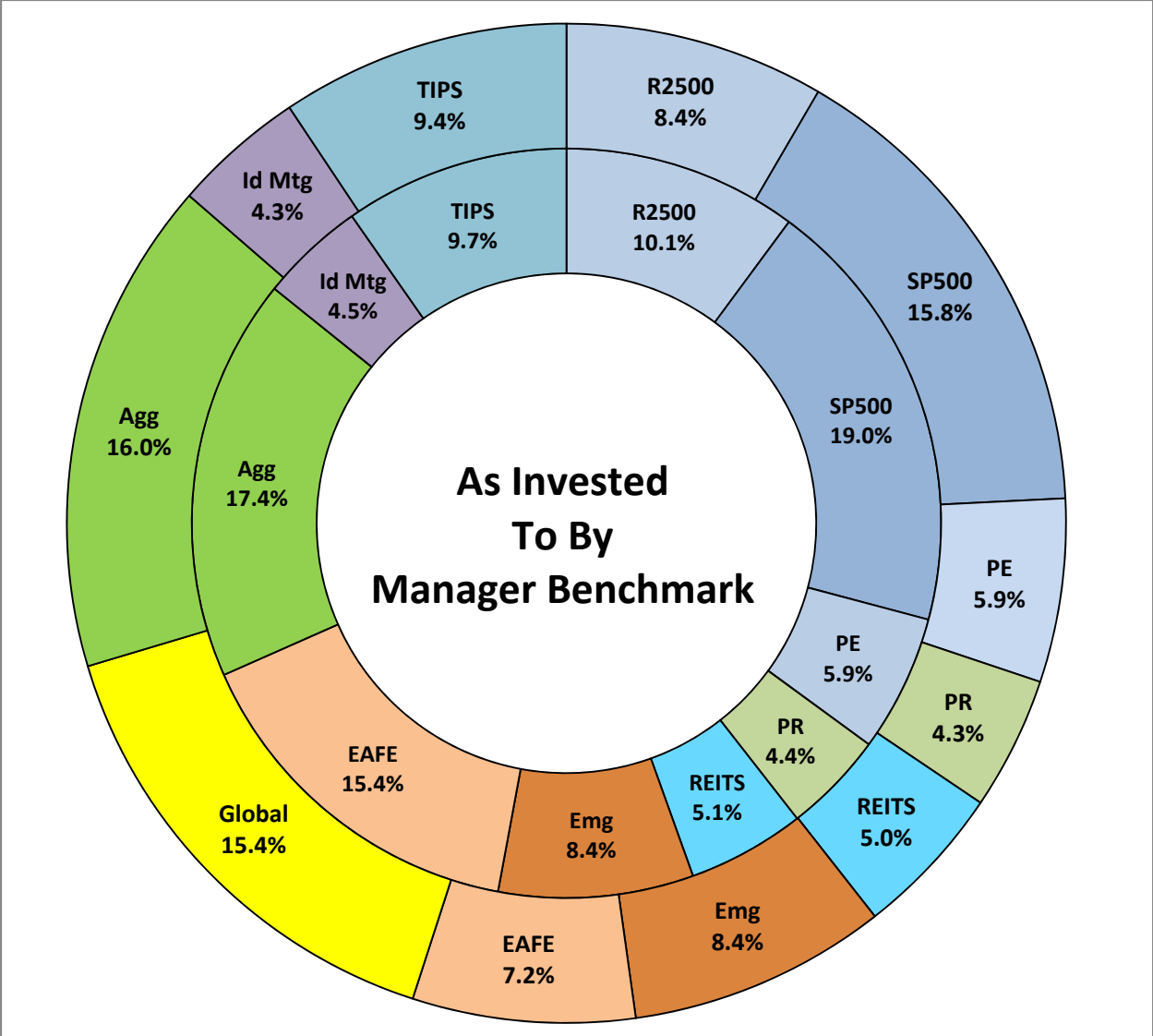
The next issue is how has the actual portfolio drifted from that basic diversified posture due to decisions not to strictly rebalance? The latest month's drift has been as follows



PERSI USE OF ACTIVE AND PASSIVE MANAGERS

The above numbers “look through” the portfolios of the actively and passively managed accounts to the underlying holdings as actually invested. Thus, cash held by managers is seen as bonds (“Agg”) and, more significantly, global (or “world”) equity mandates are broken down to their underlying holdings in EAFE, Emerging Markets, S&P 500, R2500, and cash.

In order to determine the impact of active and passive management on fund behavior, the “as invested” breakdown has to be recast to a breakdown by manager benchmark, with the biggest change made by including “World” (or global”) mandates. For the current month, this is as follows:

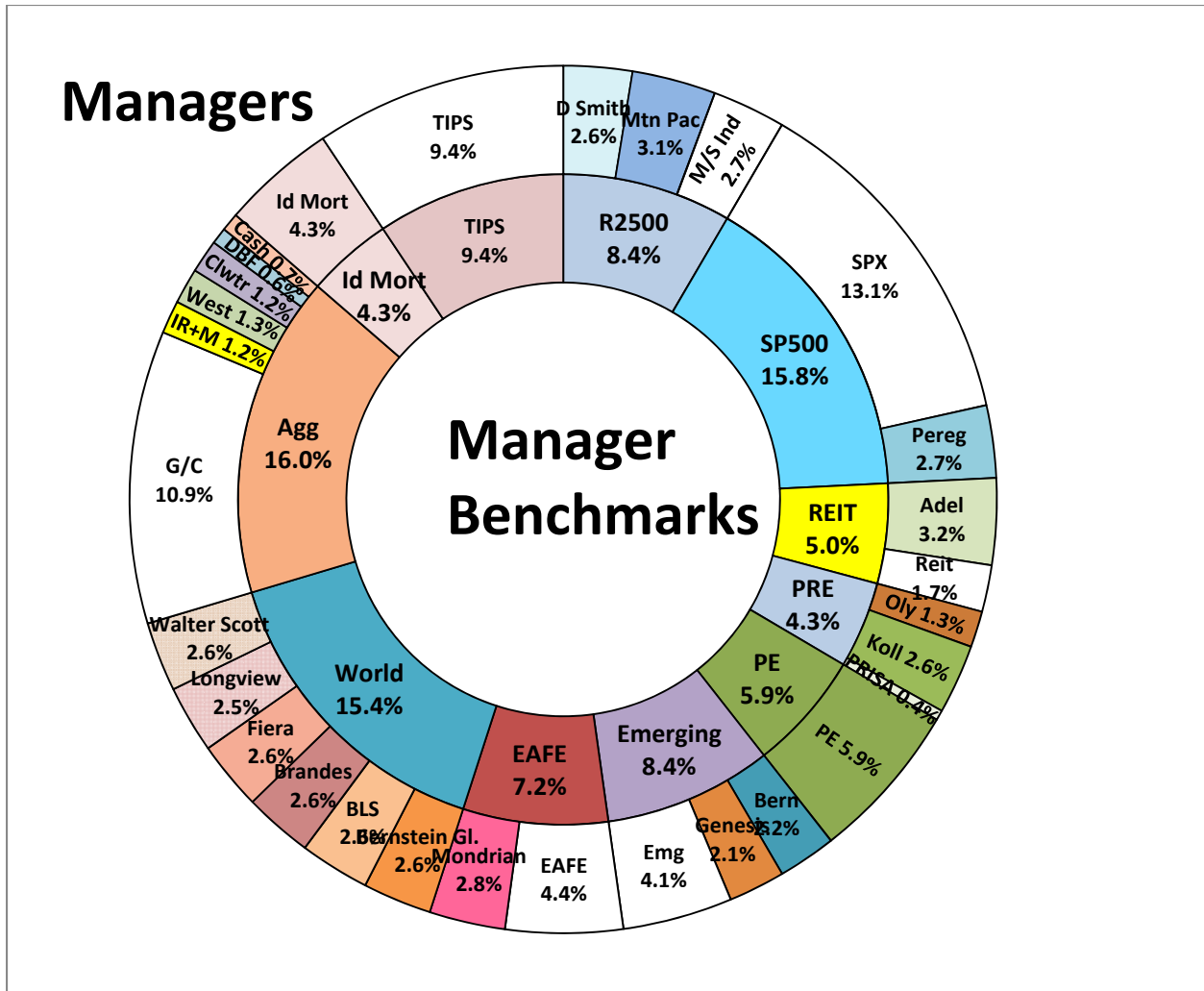


While a bit confusing, this breakdown shows generally how the global equity managers have deployed their money between international developed markets, emerging markets, and large and small cap US equities by subtracting the percentages in those areas in the outer “manager benchmark” ring from the inner “as invested” ring.

The final question is how have the actual assets been deployed among active and passive managers. The latest passive and the active manager lineup and allocations are set out below (White labels are passive index funds).

PERSI normally has approximately 50% of its assets in capitalization weighted index funds, and around 20 private equity relationships (not shown). PERSI also has historically maintained

about 20 public security relationships, and with equity managers has allocated about 3% to 4% of the portfolio to each manager. The managers generally either have concentrated portfolios or clear investment styles to allow clear explanations for periods of over or under performance (and to assure that nothing has changed in that manager's approach to the markets).



CONCLUSION

While any multi-billion dollar portfolio has a number of investments, the structure and performance of the portfolio can be either relatively simple to grasp or mind-numbingly complex. PERSI, over the years, has chosen to err on the side of a simpler, conventional structure. Our approach is not the only one available, and has been taken for reasons specific to PERSI.

At the core, a conventional framework is all that is needed given the conservative nature of PERSI's liabilities. PERSI only needs market returns in the general vicinity of capital market returns over the past 200 years in order to comfortably meet its liabilities. A conventional framework straightforwardly implemented has, in the past and likely for the foreseeable future, been the best and easiest way for any investor (institutional or otherwise) to generate good market returns. As a public agency, PERSI is unlikely to be able to garner the resources needed to be at the very top end of all institutional funds that have chosen to go down alternate and much more complex paths. Nor has it been shown that except for the very, very few, a more complex path has any reasonable chance of long-term success. In fact, available evidence tends to show that for the vast majority, each additional complex step reduces, rather than adds, to return.

As one of the best-funded retirement schemes in the world, PERSI has benefited from the simple, conventional path over the past 25 years, and until there is clear evidence to the contrary, intends to keep on the same path.