

MISSOURI STATE EMPLOYEES' RETIREMENT SYSTEM

INVESTMENT RISK POLICY

*Adopted by the Board of Trustees
March 8, 2001*

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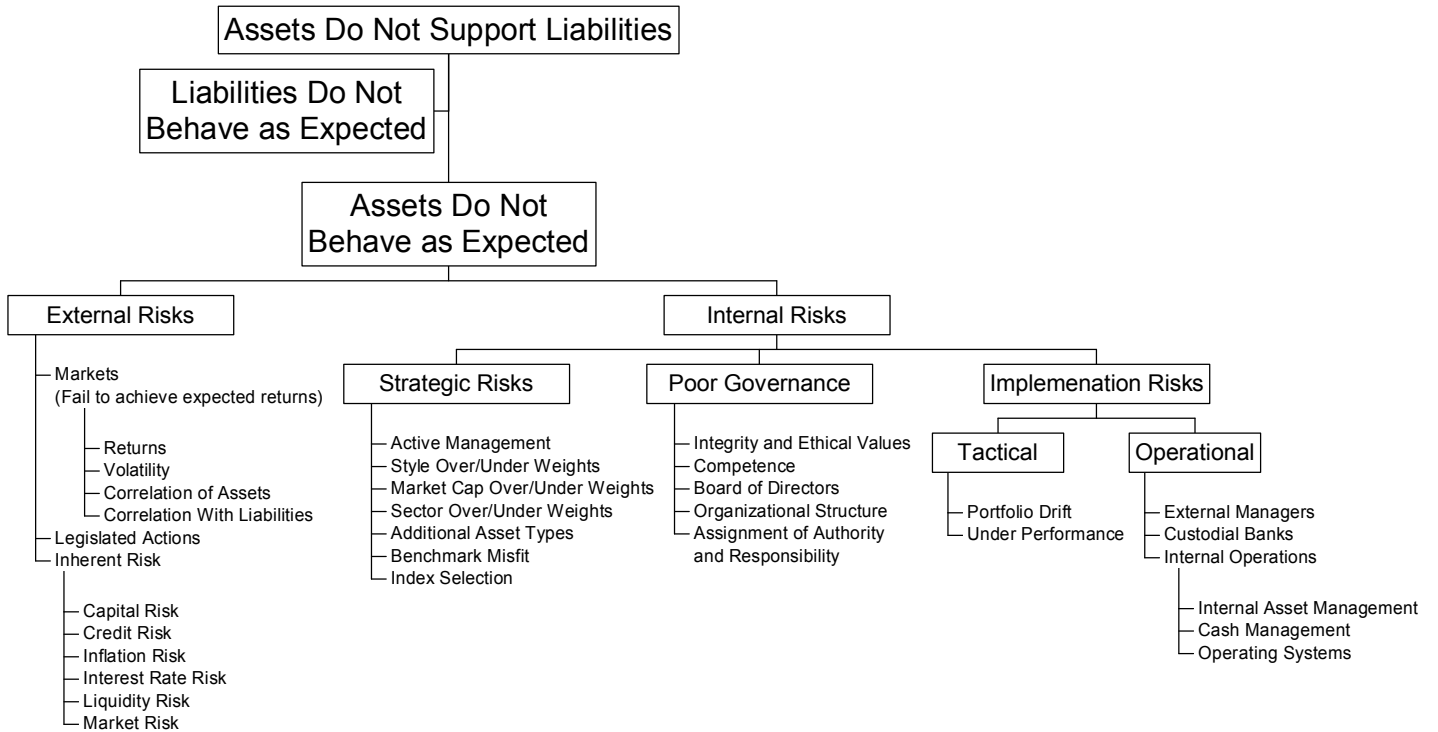
INTRODUCTION

MOSERS faces a number of risks in undertaking necessary investment activities. Some risks, such as normal market volatility, are generally unavoidable. Some risks, such as investing in emerging markets, are knowingly assumed in order to implement certain investment policies. Other risks, such as exposure to legal liability, are unnecessary and are avoidable.

Controlling or eliminating these risks is important to the MOSERS' fiduciaries. This document addresses the issues of investment risk that are specific to MOSERS and identifies common practices and procedures used by public pensions systems to address those risks. Finally, the document includes descriptions of the procedures, processes, or policies MOSERS specifically has in place to address each particular risk area. The risk areas and common practices and procedures were taken from a document titled "*Public Pension Systems – Statements of Key Risk and Common Practices to Address Those Risks*". This document was written by a committee consisting of public pension system Chief Investment Officers (CIO) and Internal Auditors (including the CIO and Internal Auditor from MOSERS) and has been endorsed by the Association of Public Pension Fund Auditors, the National Association of State Retirement Administrators, and the National Council on Teacher Retirement.

In preparing this document a "top down" or tiered approach was taken in identifying investment risks within public pension systems. The broadest and most significant risk (or primary risk) is stated first and then the subordinate risks are identified in order of decreasing importance until some level of immateriality is reached. The risks identified at the top "tier" are universal within the public pension system industry and, as we work our way down, become less common. The following chart outlines the key risks addressed in this document:

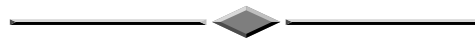
KEY RISK FRAMEWORK



ASSETS DO NOT SUPPORT LIABILITIES

The primary risk to MOSERS is that the assets will not support the liabilities. After all, *the underlying purpose of any defined benefit pension system is to pay current and future benefits to its members.* These benefit obligations cannot be met without the appropriate level of available assets. All other investment risks associated with MOSERS are ultimately just a sub-category of this primary risk.

Two major sub-categories of risk fall directly below the primary risk identified above. The first is that the liabilities of the pension fund will not behave as expected, and the second is that the assets will not behave as expected. Numerous factors, ranging from market volatility to demographic changes to policy changes that increase benefits, can cause the assets and liabilities of a pension system to behave unexpectedly. Without proper planning and management, these unexpected behaviors may ultimately affect whether or not MOSERS assets will support its liabilities.



POINTS OF FOCUS FOR ACTION

MOSERS uses three basic procedures at the highest level to address and manage the risk of assets not supporting liabilities.

- **Actuarial valuations:** Actuarial valuations are performed annually by an actuary retained by the board. The primary purposes of the annual valuations are (i) to evaluate the trends of the liability components of the system and their relationship to existing assets and (ii) to determine the contribution rate necessary to fund the liabilities on a level percent of payroll basis. Beyond that, the actuary prepares an annual gain /loss analysis to assess deviations from assumed experience in the funding risk areas and every four years prepares an experience study to determine whether or not assumptions need any fine tuning to bring them closer in line with actual experience.

While not done universally, it is becoming increasingly common for public pension system boards to hire an additional independent actuary to review or audit the work performed by the retained actuary. These reviews are typically called actuarial audits.

MOSERS' Action: A qualified independent actuary retained by the Board prepares an annual actuarial valuation and an annual gain/loss analysis. Beyond that, the retained actuary prepares an experience investigation every four years. Finally, a separate independent actuary periodically reviews (audits) the work of the retained actuary.

- **Asset/liability studies:** Studies generally performed periodically to identify changes in the relationships between the assets and liabilities of a pension fund.

MOSERS' Action: MOSERS does not perform specific asset/liability studies, but instead focuses on cash flow projections to identify amounts expected to be needed to meet

benefit payments. These projections are updated annually by the actuary and presented in the actuarial valuation report. The projections are monitored closely to ensure that the portfolio is composed of investments that, combined with employer contributions, will generate sufficient cash to fund disbursements in the most effective and efficient manner.

- **Asset allocation models:** Models are generally constructed by the System's investment staff and/or investment consultant and approved by the Board of Trustees. The objective is to identify an asset allocation structure which will allow the system to limit risk through diversification while at the same time producing returns which will be sufficient to meet the system's funding objectives. In many instances, the asset allocation exercise is part of a comprehensive asset/liability study.

MOSERS' Action: With the assistance of the external investment consultant and investment staff, the Board has established an asset allocation policy and strategic mix to ensure diversification of assets. The policy and strategy mixes are documented in the Investment Policy. The policy document requires the Board to formally review the policy and strategy mix at least every five years.

ASSETS DO NOT BEHAVE AS EXPECTED

Simply stated, this is the risk that the return needed to meet the liabilities is not produced due to unexpected behavior of the investment chosen. This unexpected behavior could result from a wide variety of factors, ranging from internal operational issues to external market forces.

In fact, all the investment risks that could have a material effect on MOSERS stem from assets not behaving as expected or planned. Therefore, all the risks identified in the remainder of this document focus on risks that can cause assets not to behave as expected.

The specific risks that may ultimately cause assets to not behave as expected fall in two general categories: external and internal influences.

EXTERNAL RISKS

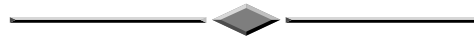
Markets Fail to Achieve Expected Returns

With the assumption that MOSERS is a long-term investor and employs standard asset allocation software to build a diversified portfolio of assets, this risk is not that the actual annual returns of any given asset class will not meet the expected annual returns. This particular risk is intrinsic to the assets themselves and mitigated by using such factors as expected volatility and correlation in diversifying the portfolio. In fact, it is assumed that all classes of assets will perform significantly differently than expectations over short periods of time.

Instead, this is the risk that the long-term behavior of one or more of the asset types turns out to be significantly different than expected due to unforeseen market, economic, or political factors. These deviations from expectations may result from any or all of the following:

- The long term returns of the asset type.
- The long term volatility of the asset type.
- The asset type's correlation or behavior in relation to other asset types.
- The behavior of the entire asset allocation in relation to the liabilities of the plan.

The use of improper assumptions in modeling could, over time, result in a significant under funding of the MOSERS.



POINTS OF FOCUS FOR ACTION

MOSERS uses three primary vehicles to address these risks.

Asset Allocation Reviews: Periodic asset allocation reviews take a prospective approach to managing market risk by examining the appropriateness of the set of assumptions being used in the allocation model.

MOSERS' Action: At a minimum of once every five years, with the assistance of the external investment consultant and investment staff, the Board conducts an asset allocation study. The last study was conducted in March 2000 and is documented in the January 2001 issue of Value Added titled Asset Allocation. The results of this study established an asset allocation policy and strategic mix which are expected to generate returns in excess of the four percent real return required to meet the current future liabilities. In order to produce real returns in excess of four percent, a heavy allocation to stocks was necessitated. Given the significant weighting to stocks, finding assets that truly exhibited return patterns unlike stocks (diversifying assets) was extremely important. The resulting policy and strategy allocations are documented in the Investment Policy.

Long-term Performance Measurement: This is conducted for each asset type and the portfolio as a whole. Performance measurement can be referred to as a retrospective approach to managing the risk because it evaluates the historical returns and volatility of each asset type, as well as the historical correlations among the asset types. By evaluating the historical performance, market trends may be identified which may help the plan sponsor avoid long-term unexpected market behavior.

MOSERS' Action: MOSERS' custodial bank calculates performance monthly, and that information is reviewed by the external investment consultant. Once satisfied that the information is accurate, the external investment consultant uses the performance calculations to prepare a quarterly performance report that is formally presented to the Board. In addition, internal staff calculates the quarterly Value at Risk (VAR), which

incorporates correlation among asset types to estimate the total loss that can be expected over a given time horizon with a certain degree of confidence.

Periodic Actuarial Valuations: These studies track the actual behavior of the assets as matched against the actual behavior of the liabilities and quantify the ongoing difference of the impact of any unexpected behavior. If unfavorable trends develop, then the asset allocation or other factors affecting the future behavior of the system (e.g., contribution rates) can be adjusted.

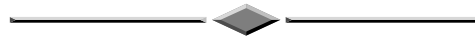
MOSERS' Action: An actuarial valuation is performed annually by a retained qualified independent actuarial firm. In addition, a separate independent actuary periodically reviews (audits) the work of the retained actuary

Legislated Actions

MOSERS' funding is predicated on assumptions regarding long-term rates of return and the application of present value concepts to promised future benefits. Any change to the realization or fulfillment of these assumptions by virtue of legislated action may substantially impact the financial health and economic viability of the system. Examples include laws that limit what asset types public pension systems may own and legislation that increases benefit formulas without considering available assets.

Another example that could seriously affect the assets of MOSERS is legislation that artificially increases the interest rate assumption, with the intended effect of a reduced contribution from the employer. A shortage in expected contributions can obviously upset the balance between assets and liabilities and ultimately cause MOSERS to be under funded. The added risk of this type of legislation is that it would probably require that a higher level of investment risk be taken in order to support the new assumptions.

The key risk in any of these examples is that a radical change is made without understanding the effects on the program being changed, with the attendant risks of trend chasing, confusion, and lack of long-term focus.



POINTS OF FOCUS FOR ACTION

Sudden adverse legislative changes are sometimes unavoidable; however, MOSERS can take certain steps to minimize the likelihood that such situations will occur.

Investment Policy: A well-organized and documented investment policy that has been approved by an appropriate governing body is key to avoiding sudden and frequent overhauls of the investment program by various political bodies. An unorganized and haphazardly executed investment program will likely find itself subject to periodic overhauls initiated by outside sources as it experiences intermittent periods of performance that may be considered by some to be poor.

MOSERS' Action: MOSERS has a comprehensive Investment Policy that was originally adopted by the Board in June, 1995. The Board also approves subsequent revisions to the policy – the current version was adopted September 21, 2000.

Education: Educating policy makers and constituents about the system is also an effective mechanism for managing this risk. The more knowledgeable these groups are about the key investment concepts employed in financing a public pension system the less likely they are to pursue changes that may negatively affect the investment plan. This education is often accomplished through regular communications from the System. In addition, other educational materials, such as the investment policy and strategy of the system, are often made available.

MOSERS' Action: MOSERS distributes a Trustee Handbook to each new Board member. This handbook outlines the organizational structure of MOSERS, identifies the responsibilities and functions of the Board, and contains the comprehensive Investment Policy. In addition, each new Board member is encouraged to meet one on one with the Executive Director and CIO to discuss MOSERS' investment philosophy. The Board is provided with continuing education by receiving presentations by the external investment consultant and internal investment staff on various investment topics at Board meetings. The investment staff also produces a newsletter called Value Added prior to each Board meeting. This newsletter serves to educate the board on new investment issues being explored or investment strategies and procedures currently employed by MOSERS.

Legislative Liaison: Most public pension systems have some sort of monitoring and communication process in place to keep in touch with proposed legislation or other actions that may affect the System's assets. Early awareness and effective communication enables the System to educate the public and lawmakers on the potential effects of the legislation before its passage.

MOSERS' Action: MOSERS employs a full time staff member whose primary responsibility during the legislative session is to track and report on proposed legislation affecting MOSERS. In addition, MOSERS contracts with a Governmental Pension Consultant who serves as a liaison between MOSERS and members of the legislature.

Finally, the Board has adopted the following governance policy pertaining to legislation:

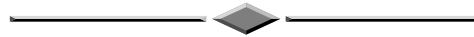
- 1. The Board may not take a position inconsistent with its fiduciary duties on any proposed legislative changes that could have a material legal or financial effect on the System.*

2. *The Board may authorize the Chairman, any other Board member, or the Executive Director to appear before the General Assembly to testify in accordance with this policy on behalf of the System.*
3. *Staff will review all proposed legislative provisions and provide technical comments and fiscal information to the sponsor and the appropriate legislative oversight agencies.*

Inherent Risks

All investments are subject to one or more types of inherent risk. It is expected and necessary to assume some level of risk in order to achieve needed returns. For example, some inherent risks present in common investment vehicles follow:

- Capital Risk - The risk of losing the original investment.
- Credit Risk - The risk that the issuer will not make scheduled payments.
- Inflation Risk - The risk that the investment return will not keep pace with inflation.
- Interest Rate Risk - The risk that changes in interest rates will decrease values.
- Liquidity Risk - The risk that the investment cannot be readily converted to cash at prevailing or assumed prices.
- Market Risk - The risk that adverse market shifts will cause losses.



POINTS OF FOCUS FOR ACTION

As indicated, these risks are inherently present and are usually knowingly assumed when investing. Usually, they cannot be avoided; however, one way to mitigate these risks is by utilizing the principle of diversification. This way, for example, if one company or industry falters, the threat to the overall fund will be minimized.

MOSERS' Action: At a minimum of once every five years, with the assistance of the external investment consultant and investment staff, the Board conducts an asset allocation study. The last study was conducted in March 2000 and is documented in the January 2001 issue of Value Added titled Asset Allocation. The results of this study established an asset allocation policy and strategic mix which are expected to generate returns in excess of the four percent real return required to meet the current and future liabilities. In order to produce real returns in excess of four percent, a heavy allocation to stocks was necessitated. Given the significant weighting to stocks, finding assets that truly exhibited return patterns unlike stocks (diversifying assets) was extremely important. The resulting policy and strategy allocations are documented in the Investment Policy.

INTERNAL RISKS

Strategic Risks

Strategic decisions, as they pertain to MOSERS' investment program, can be defined as decisions, usually made by the Board, to move away from underlying policy benchmarks. For example, assume a pension fund employs a simplified asset allocation model of 50% domestic equities, 35% fixed income, and 15% international equities and adopts the Russell 3000, Lehman Bond Aggregate, and EAFE, respectively, as the policy benchmarks for this base allocation. This fund could meet its asset allocation objective and policy benchmarks by simply indexing the appropriate percentage of all its funds into the Russell 3000, the Lehman Bond Aggregate, and EAFE.

Using this strategy, the risk of not achieving the policy benchmark returns less transaction costs, would be minimal, almost non-existent. However, any decision to move away from this strategy increases the risk that returns will not meet the returns of the policy benchmark, which may ultimately result in assets not meeting the expected long-term performance assumptions. Examples include decisions to overweight or underweight particular styles (e.g., a bias toward a value or growth style in U.S. equities), and overweight or underweight to market capitalization (e.g., overweighting small capitalization stocks) and sectors or regions (e.g., underweight a particular country in an international equity portfolio). Despite the risk involved in moving away from policy benchmarks, the MOSERS' board has elected to deviate from the policy based on the belief that the rewards of potentially achieving incremental return exceed the incremental risk of performing below the policy benchmark.

Another issue is the potential flaws in the underlying benchmarks themselves. No benchmark is a perfect reflection of the underlying general market. Even the S&P 500, often used as a reflection of large cap U.S. stocks, has substantial international exposure. The choice of a particular small cap U.S. index can result in widely different returns over periods of time, such as differences in the performance of the S&P 600 and the Russell 2000 (common small capitalization U.S. benchmarks). Potential problems in this area are magnified as the indices being used to replicate markets, which are less liquid and more inefficient (such as international emerging markets), are utilized. While over longer periods of time these differences in performance may become less significant; they are an area of potential concern over shorter time periods.



POINTS OF FOCUS FOR ACTION

Manage the Risk: Ultimately, most Systems do not choose to avoid the risk associated with strategic decisions. Instead, they elect to manage the risk. Managing the risk begins with clearly defining the policy benchmarks established for the fund and the acceptable level of deviation from these established benchmarks. Some Systems establish benchmarks at the strategic level as well as the policy level. Again, using the Russell 3000 as a policy

benchmark, a fund may strategically decide to own a disproportionate number of value stocks in their portfolio and, therefore, decide to incorporate a tailor-made benchmark to reflect their decision to be overweight in value stocks. Benchmarks may be further defined at the specific manager level. Regardless of the number of benchmarks established on different levels, they normally are clearly defined and should ultimately roll up into the overall policy benchmarks.

MOSERS' Actions: MOSERS establishes benchmarks at the policy, strategy, and individual manager level. In some cases, decisions have been made to employ strategic decisions which necessitate strategy benchmarks that deviate from the policy benchmarks. For example, the domestic equity policy benchmark is equal to 100% of the Russell 3000 Index, but the domestic equity strategic benchmark is equal to 60% of the S&P 500 Index, 20% of the Russell 2500 Value Index, and 20% of the Russell 3000 Index. The deviation of this strategy benchmark from the policy benchmark reflects MOSERS strategic decision to overweight small value stocks within the domestic equity portion of its portfolio and to actively manage a portion of the portfolio in all-cap concentrated portfolios. The Investment Policy requires that each benchmark be clearly specified, measurable and investable. In addition, the investment policy requires the benchmark to be determined for each individual manager, in advance of funding, by mutual agreement between the manager, staff, and external consultant.

Long-term Performance: Monitoring the long-term impact of the strategic decisions is another way Systems manage the risk that the strategies will not provide the anticipated returns for the System. The results of strategic decisions usually only become apparent over a period of years. Individual annual returns for strategies may be volatile when compared with the returns of the underlying asset class or policy benchmarks. For example, a decision to overweight small cap equities may under perform the general equity market for several consecutive years. A long-term performance measurement system can monitor these return variances or risks by simply tracking the impact of these particular strategies over time and comparing them to the alternative of investing in the broad asset class or policy benchmark. Performance measurement is usually conducted by a pension fund's outside consultants and/or staff in formal periodic reports to the board.

MOSERS' Action: MOSERS' custodial bank calculates performance monthly, and that information is reviewed by the external investment consultant. Once satisfied that the information is accurate, the external investment consultant uses the performance calculations to prepare a quarterly performance report that is formally presented to the Board. In addition, internal staff calculates the quarterly Value at Risk (VAR), which incorporates correlation among asset types to estimate the total loss that can be expected over a given time horizon with a certain degree of confidence.

Poor Governance

Governance risk, in this context, refers to the risk that the board, staff, or agents of a public pension system will, either intentionally or unintentionally through their management actions or lack thereof, cause the assets of MOSERS to under perform expectations. Agents of a

public pension system include external consultants, money managers, auditors, actuaries, and legal counsel.

Characteristics of poor governance may include incompetence, poorly or improperly defined roles, poor communications, failure to meet fiduciary responsibilities, lack of ethical standards, and inconsistency.



POINTS OF FOCUS FOR ACTION

The focus here is the control environment, which is the foundation for the entire internal control system within the organization. The control environment defines the character of the organization and affects the attitudes of all individuals towards governance and control. It consists of several elements including: integrity and ethical values, competence, a qualified board of trustees and executive staff, a rational organizational structure, and proper assignment of authority and responsibility. Without this foundation, other components of the control system often fail.

Integrity and Ethical Values

Code of Ethics: Public pension systems often develop and adopt their own code of ethics to address the need for ethical standards within the organization. Others may recognize a more general set of ethics from their state government or other organization. Some Systems may not officially “adopt” a code of ethics but may address many of the ethical issues in personnel manuals, trustee handbooks, and other internal policies and documents.

MOSERS’ Actions: MOSERS primarily addresses ethics for staff in the Personnel Policy Handbook. The policy generally requires staff to avoid unethical behavior in the course of performing MOSERS related duties. The policy specifically requires staff to avoid: 1) using an official position for private gain; 2) giving preferential treatment to any person or entity; and 3) losing their independence or impartiality in making decisions.

The following is included in the MOSERS Trustee Handbook to address Board member’s ethics:

“The Board of Trustees has not adopted a formal ethics policy; however, the Board is required to adhere to the standards of conduct required by law. Two of these standards are set forth in Section 104.500.6 and .7, RSMo, which state that “no Trustee of the system is to gain or profit from any funds or transaction of the system except benefits arising from interest in investments common to all members; and any Trustee accepting any gratuity or compensation for the purpose of influencing his/her action with respect to the investments of the funds of the system is required to forfeit his/her office and is subject to the penalties prescribed for bribery.”

In addition, the policy titled “Board Members’ Code of Conduct”, included in MOSERS’ Governance Policies, also addresses the ethical conduct of Board members.

Fiduciary Responsibility: Good governance of public pension systems also includes the understanding of fiduciary responsibilities by boards, staff, and agents of the system. For most boards, fiduciary responsibilities are defined and imposed through state laws and regulations pertaining to the system (including direct or indirect references to trust law). Mission statements, plan documents, and other internal documents may further define the fiduciary responsibility of the board. Many times the fiduciary responsibility of staff members and agents is also defined in and/or imposed by state laws and regulations and through other methods similar to the way in which it is established for the board. Staff's fiduciary responsibilities may also be defined through written policies and guidelines approved by the board. In the case of agents to the system, their fiduciary responsibilities are normally defined and acknowledged in writing. This is usually accomplished through contracts and written agreements between the system and its agents.

MOSERS' Actions: The fiduciary responsibility of Missouri public pension fund trustees is specifically addressed in Section 105.688, RSMo. This statute basically requires Board members to act as investment fiduciaries in administering the system's assets and goes on to further identify the specific considerations the Board members should take before making investment decisions. The MOSERS Trustee Handbook contains information relating to the Board's fiduciary responsibility, as does the Investment Policy.

Section 104.1069.2, RSMo, gives the Board authority to delegate fiduciary responsibility to MOSERS' staff. Specifically, the relevant portion of the statute reads, "Trustees of a board may delegate to employees of the system, or to an agent, functions that a prudent trustee acting in a like capacity and familiar with those matters could properly delegate."

The fiduciary responsibility of MOSERS' agents is defined in contracts and written agreements. All investment managers must sign an Investment Management Agreement that contains language acknowledging the manager's fiduciary responsibility to MOSERS. The external investment consultant and custodial bank contracts also contain similar clauses.

Competence

Hiring Practices: Methods used to help ensure a competent staff include establishing good hiring practices, conducting effective periodic evaluations, and providing an attractive working environment. Most public pension systems operate under public rules and personnel policies or have their own defined standards and procedures.

MOSERS' Actions: MOSERS hiring practices are outlined in the Personnel Policy Handbook. These practices include establishing specific job descriptions for each position and clearly identifying education, skill, and experience requirements for each position. New employees are required to undergo a probationary period of either six months or a year. A performance appraisal is issued by the Chief Investment Officer (CIO) at the end of the probationary period. At the beginning of each calendar year the CIO meets with all members of the investment department to establish department goals for the year. On a monthly basis during the year the CIO meets with investment department personnel to discuss progress being made toward achieving established goals and to provide feedback to

employees' regarding work performance. MOSERS conducts a salary survey every two years to ensure that the salary of each position is in line with the market.

Training: Another method to help ensure the competency of staff and trustees is to provide an appropriate orientation for new board members and staff and continuing education for all board members and staff. New board members are often initially educated through an orientation process and receive on-going education by attending conferences and seminars. In addition, the investment staff and agents of the system may schedule portions of board meetings to further educate the board on investment related issues.

MOSERS' Action: MOSERS distributes a Trustee Handbook to each new Board member. This handbook outlines the organizational structure of MOSERS, identifies the responsibilities and functions of the Board, and contains the Investment Policy. In addition, prior to their first board meeting, new Board members are encouraged to meet one on one with the Executive Director and CIO to discuss MOSERS' investment philosophy. The Board is provided continuing education through presentations by the external investment consultant and internal investment staff on various investment topics at Board meetings. The board is also provided at will opportunities to attend conferences and seminars related to investments. Finally, staff produces a newsletter prior to each Board meeting which serves to educate the board on new investment issues being explored or on investment strategies and procedures currently employed by MOSERS.

MOSERS encourages investment staff to continue their education by offering reimbursement of up to 100% of tuition for courses taken that relate to the employee's career development. The specifics of the educational assistance plan are spelled out in the Personnel Policy Handbook. In addition, the policy offers financial assistance to staff members who wish to obtain career related certifications and licenses and will also pay for job-related professional dues and memberships.

Staff members are also encouraged to attend seminars and conferences which will further enhance their career development.

Outside Experts: Another method of managing the risk of poor governance is by hiring outside experts. Most Systems rely on outside experts such as actuaries, attorneys, auditors, authorities on governance issues, and consultants, when necessary.

A structured and methodical evaluation process, often involving the advice of consultants, is often used to ensure the competency of agents hired by public pension systems. In addition, other agents of the same profession may be hired to periodically review the work of the agent retained by the public pension system.

MOSERS' Actions: MOSERS utilizes the following outside experts to help manage investment-related risks:

- *Actuaries*
- *Attorneys*
- *Auditors*

- *Investment Consultants*
- *Money Managers*
- *Custodial Bank*

The activity of each of these agents is periodically reviewed by staff to ensure satisfactory performance. In addition, where appropriate, MOSERS has agents formally reviewed periodically by independent third parties.

Board of Trustees

Good governance of a public pension system usually begins with a competent governing board. The criteria for the selection of most public pension boards are usually detailed in the governing statute or other legal document establishing the public pension system.

MOSERS' Actions: The criteria for the selection of MOSERS' Board members is specified in Section 104.450, RSMo.

Organizational Structures

Organizational structures will vary among public pension systems, depending upon their approach (e.g., whether investments are managed externally, internally or a combination of both). Regardless of the approach, the structure should be clearly defined and key positions identified.

MOSERS' Actions: MOSERS Investment Policy clearly defines the organizational structure and the roles and responsibilities of all parties involved in the investments program.

Assignment of Authority and Responsibility

Written Policy: Another practice used to reduce the risk of poor governance is the development and adoption of written policy statements. For example, policy statements often address some or all of the following issues:

Legal and Statutory Framework

Sole Interest of Beneficiaries, Prudence Standards, Fiduciary Duty

Investment Goals

General Return Goals, Specific Risk and Return Objectives, Risk Tolerance, Identification of Liabilities, Asset Allocation Procedures and Principles, Allocations, Limits, and Rebalancing

Investment Structure

Overall Standards, Direct Board Responsibilities, Delegated Board Functions, Employees, Consultants, Advisors, Asset Managers, Custodians and other Support Groups, Standards for Selection, Fees, Procedure for Selection, Monitoring and Review Procedures, Risk Controls, Policies, and Procedures

Asset Class Policies

Objectives, Allowable Investments, Prohibited Activities, Styles, Benchmarks, Derivatives

Other Policies

Proxy Voting, Corporate Governance Policies, Ethics, Disclosures, Soft Dollar, Securities Lending, Personnel, etc.

Written and approved policy statements serve as an educational tool for new investment staff and board members and help ensure seamless transitions during staff and board turnover. In addition, having written and approved policy statements in place helps prevent sudden inappropriate changes to the investment plan in reaction to temporary or transient events.

MOSERS' Actions: MOSERS Investment Policy addresses the issues listed above. The policy has been formally approved and adopted by the Board and subsequent revisions are also approved by the Board.

Implementation Risk

This is the risk that policies and procedures may not be implemented properly. MOSERS may develop and adopt the ideal asset/liability mix, asset allocation model, and investment policies and strategies, but if staff or agents of MOSERS do not effectively implement the mix and strategies, then assets may ultimately not support the liabilities generated. Causes of ineffective implementation fall into two general categories: *tactical failure* and *operational failure*. Implementation risk and common practices to address the risk are discussed below in terms of these two general categories.

Tactical Failure

Two general sources of tactical failure may prevent MOSERS from achieving the benefits that would accrue from following its long-term investment strategy. First is the risk that the actual allocation of assets does not conform to the asset allocation strategy. Second is the risk that the actual return experienced through investment in specific assets does not equal the returns of the asset classes of which they are a part.

Portfolio Drift

For various reasons, a plan may not be adhering to the underlying asset allocation defined in its investment policy. For example, MOSERS current policy asset allocation is 50% U.S. equities, 25% international equities, and 25% diversification pool. Due to market movements (for example, a significant stock market decline), the allocation could, if left unattended, shift to 40% U.S. equities, 15% international equities, and 45% diversification pool. Particularly after a significant change in the market, a fund may remain in under weighted and over weighted positions for a prolonged period of time and, as a result, realize returns that dramatically differ from the return expected from the policy asset allocation. As

discussed below, the primary discipline employed to address this concern is the process of *rebalancing*.



POINTS OF FOCUS FOR ACTION

The primary discipline used here is an expressed rebalancing procedure. For example, many Systems incorporate ranges around an expressed policy asset allocation that, when violated, will trigger either a direct reallocation of assets to more closely align with the policy asset allocation or trigger a review of conditions to determine whether a rebalancing of assets should occur. As part of this process, most Systems will include a direct comparison of the actual allocation with the policy allocation in formal reports to the board of trustees.

MOSERS' Action: MOSERS has established a formal rebalancing program. The program is traditional in the sense that it based upon set ranges around an expressed asset allocation, that, when violated, triggers the reallocation process. The process is non-traditional in the sense that it uses futures contracts, currency forward contracts, and cash transactions to rebalance instead of only cash transactions. Relative to traditional rebalancing programs, MOSERS' process is expected to reduce both transaction cost and tracking error and is formally managed by an external money management advisor. The rebalancing policy is included as Appendix I in the Investment Policy.

Under Performance

Three types of tactical decisions may cause the actual returns of specific assets to under perform the asset class of which they are a part. First, as discussed above, strategic decisions may be undertaken; second, the actual allocation of assets to managers or accounts may not reflect the strategic allocations, which creates a misfit between the individual account benchmarks and the overall strategic objective, and third, the managers may under perform the asset class.

Strategic Decisions: The risks associated with strategic decisions discussed above may be the result of decisions to:

- Add asset types not included in the underlying asset classes (e.g., private equity, private debt, or emerging markets).
- Tilt the characteristics of an asset class (e.g., more or less small capitalization stocks).
- Take actions to try to reduce risk (e.g., hedging international currency risk).

Manager Misfit: A fund may hire the wrong manager or type of manager to fulfill a particular assignment within the asset allocation strategy. For example, a manager is hired to implement a strategic decision to overweight small value stocks and the manager turns out to be a small growth manager. Another example would be where a manager is given a particular benchmark and that benchmark does not reflect the segment of the asset allocation strategy for which it was intended (Benchmark Misfit).

Manager Under Performance: The external or internal managers employed by a fund to actively attempt to gain returns higher than those available by passively investing in the markets themselves may under perform the asset class. The actual returns could be significantly different, and lower, than those in the general market due to the manager's investment decisions.

In general terms, there are three types of managers employed to manage pension funds: managers of publicly traded securities, managers of private equity and debt, and managers of derivative securities.

▪ ***Managers of Publicly Traded Securities***

Public pension systems often hire active managers (both on-staff and outside institutions) to manage public and private investments. These managers are hired to outperform the alternative passive investment. This adds another level of potential disparity, and risk, in achieving the desired long-term returns: the difference in performance and results of the active managers from that achieved by the passive alternative investment in that asset type. In particular, it could lead to substantial under performance over a period of time from that contemplated by the underlying investment strategy.

This risk could arise in four ways: First, the active managers could be true to their style or discipline, but the results of that style or discipline could have unintended consequences (such as performance significantly different than the benchmark used for that manager). Second, the actual benchmark used, when combined with other similar managers or accounts, does not fit the profile of the overall strategic objective or benchmark for that portion of the fund. Third, managers could drift from their particular style when making individual investment decisions and thereby, achieve returns that are different, and lower, than that of the benchmark they were assigned. A fourth way is through operational failure and is discussed later.

Unlike the long-term nature of the asset allocation and strategic policy risks, the impact on the value of the portfolio as a result of adverse events due to an individual manager's investment activities can occur relatively quickly, sometimes in a matter of days or weeks. Unusual market conditions could invalidate a manager's underlying assumptions by which they choose stocks, bonds, or other individual investments. This "quicker" pace of adverse valuation consequences usually affects only those managers who deal in the public markets, with its liquidity and daily pricing. Private investment portfolios usually have a more leisurely time frame for recognizing changes in valuation, as discussed in the next section.

▪ ***Managers of Private Equity and Debt***

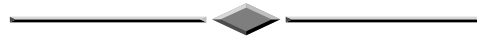
Investments in private equities, private real estate, and private commercial mortgages will most likely appear to go awry at a slower pace than their publicly traded counterparts. This usually happens over periods of months, not days, since the underlying investments in companies or properties are not valued as frequently.

▪ ***Managers of Derivative Securities***

Typically, public pension systems do not have significant exposure to derivative instruments that could swiftly change the risk profile of the fund. Many derivative exposures are simple

and direct substitutes for the underlying instrument. For example, the use of certain futures and forwards markets, such as the S&P 500 Futures Market, is practically interchangeable for holdings in the underlying security or securities. As a result, the risk management procedures for managers with publicly traded portfolios would suffice for tracking those positions if they could materially impact the portfolio.

The concern is with exotic instruments that have express or hidden leverage features or significant elements of optionality. These features could make the standard characteristic measurements (such as duration, beta, etc.) inapplicable for large market moves or, through express or implied leverage, result in a cascading effect from relatively small or marginal market moves. The task for a public pension system is to determine if those types of instruments are in the portfolio and, if they are, whether the aggregate exposure to the overall portfolio is such that additional and more detailed tracking mechanisms and other risk control measures are required.



POINTS OF FOCUS FOR ACTION

Concentrate on hiring quality managers and then monitoring three factors: people, process, and performance. Monitoring should occur on an ongoing basis or through separate periodic evaluations.

Due Diligence in Hiring: As it relates to portfolio managers, risk management begins with good hiring practices. Most public pension systems have a formalized due diligence process in place to identify external manager candidates that will incorporate the desired investment styles and disciplines to meet the objectives of the System's strategies. This process often includes the use of an independent investment consultant to assist in the search for managers that meet the criteria established by the system. The same prudence is usually exercised by public pension systems when hiring staff to internally manage funds.

The hiring process also usually includes the development of a contract that includes guidelines for the management of the specific portfolio. The guidelines usually include language that addresses:

- The objective of the portfolio;
- The benchmark the portfolio will be measured against;
- The desired characteristics of the portfolio; and
- The allowable, and possibly prohibited investments for the portfolio.

Guidelines help to further ensure that the managers adhere to the strategy and discipline for which they were hired. For internally managed portfolios, while there may not be a written contract involved, guidelines are usually documented and approved by members of the management team or the board.

MOSERS' Actions: MOSERS has established a formal Manager Hiring & Termination Policy. This policy is Appendix II of the Investment Policy. The overall objectives of the policy are to ensure that decisions are being made in a full disclosure environment

characterized by competitive bidding, objective evaluation, and proper documentation and that ultimately all decisions will be made solely in the interest of plan participants and beneficiaries. The Board has delegated this decision making process to staff and the external investment consultant. The roles of staff and the consultant and the specific procedures involved in the process to assure achievement of the objectives are detailed in the policy.

Upon selection, the manager is required to sign a general investment management agreement that outlines the manager's general fiduciary duties in relation to MOSERS. In addition, specific operational guidelines are developed that identify (i) the objective of the portfolio, (ii) the benchmark that the manager will be measured against (iii) the desired characteristics of the portfolio and (iv) the allowable and prohibited investments. These guidelines are signed by both parties and become part of the contract. Similar guidelines are also executed for each internally managed portfolio.

People: Many Systems also meet face-to-face on a periodic basis with the external management team. These meetings provide the System with a better understanding of the day-to-day operations of the external manager and the manager's business continuity, including resources and staff turnover. In addition, portfolio theory is often discussed to reassure the system that the manager is still a proper fit for the management niche for which they were originally hired.

MOSERS' Actions: MOSERS' investment staff conducts due diligence meetings twice per year with each external management team (one at MOSERS' office and one at the manager's place of business). The external investment consultant is required to attend at least one of these meetings annually and at least every other year they must attend the meeting at the manager's office. Either the external investment consultant or the MOSERS' investment officer prepares formal evaluations of the manager detailing the results of the meetings.

Monitoring the Process: Once the hiring process is complete, a key risk management practice is to ensure that a manager is performing in accordance with a desired style or discipline (the reason they were hired in the first place). Also, Systems will normally put measurement systems in place to assure that the style or discipline is having the expected result (performance in relationship to a benchmark or passive investment alternative).

A public pension system's investment consultant or staff, independent of the portfolio management function, usually tracks a manager's adherence to the guidelines on a periodic basis. Further, they may provide the board with a formal report identifying discrepancies in the portfolios and reasons for, or actions relating to, those discrepancies. Compliance monitoring can be accomplished with special computer software designed to generate exception reports when a portfolio is in violation of an established guideline or manually by periodically examining portfolio characteristics and trading activity for compliance with guidelines.

MOSERS' Actions: The CIO assigns the appropriate internal team to monitor the process of each external manager (for example, the Domestic Equities Team is assigned to monitor each external domestic equity manager). The team will generally periodically review the

holdings of the manager to ensure that the characteristics of the portfolio and style of the manager are in compliance with the operational guidelines.

In the near future, MOSERS plans to implement a more comprehensive monitoring process by utilizing special software designed to generate exception reports when a portfolio is in violation of established guideline. This new process will be implemented as part of the conversion to the new custodial bank.

Monitoring Performance: Even if a manager's portfolio adheres to the guidelines and style expected, the individual securities chosen could under perform the market or sector for which the manager was hired. This risk is typically tracked separately, and reasons for under performance are monitored, identified, and discussed with corrective action taken if necessary. This is usually done prospectively (the manager anticipates future events that could impact the style or discipline) and retroactively (analyzes reasons for present and past under performance to determine if the manager is still capable of implementing that discipline).

The retroactive check is accomplished through performance monitoring. In addition to the performance reports generated by the manager, on a regular basis staff and/or the investment consultant may produce their own set of reports for monitoring performance to aid in determining the reasons for over performance or under performance. Formal reports to the board may include such items as performance compared to market benchmarks, the analysis of the performance (attribution analysis), and a comparison to similar managers (peer analysis).

These types of reports should help guard against terminating managers simply because their style was "out of favor."

MOSERS' Actions: Performance reports that compare each manager's performance to their established benchmark are prepared at least monthly by MOSERS' custodial bank. Formal performance reports are prepared and issued to the Board quarterly.

Tactical Failure Summary

Sound hiring practices, periodic compliance monitoring, and continuous performance analysis are usually sufficient to prevent actions by individual managers that may cause material impacts to the overall risk profile of the portfolio. In combination, these practices collectively ensure that the characteristics and performance of the overall portfolio, both as a whole and in its individual parts, will perform in a manner that comports with that expected by the strategic policies adopted by the board.

Thus, by MOSERS performing these types of checks, it is unlikely that its portfolio performance will drift too far from what would be generated by the strategic allocation without the deviation being identified by one of the independent checks in place. Such a variation must be reflected in one or all of the following: the characteristics of the holdings, the reaction of those holdings to market movements, or deviations from peers with similar mandates.

Operational Failure

The risk of operational failure is not primarily concerned with investment strategy or tactics, but with management and operational issues used in the implementation process of the strategy or tactic. Operational failures often result from a breakdown in systems, procedures, personnel, or processes. One common approach to avoiding potential operational failure is for the management of public pension systems to implement procedures that ensure achievement of the following control objectives (as identified by General Standard 300, *Standards for the Professional Practice of Internal Auditing*):

- 1) The reliability and integrity of information.
- 2) Compliance with established policies, procedures, laws, and regulations.
- 3) The safeguarding of assets.
- 4) The economical and efficient use of resources.
- 5) The accomplishment of established objectives and goals for operations and programs.

Operational failure can occur in three major areas within MOSERS: external managers, custodial banks, and internal operations. MOSERS takes a consistent approach to managing and monitoring each of these relationships. The assumption is not made, for example, that internal managers generate less risk simply because they are part of the organization. On the other hand, it should not be assumed that external managers and custodians pose less risk because they are reputable industry experts. Things can go wrong in any environment, and, as a result, MOSERS plans to address risk through a systematic and consistent approach.

External Managers

The management of operational risk associated with external managers focuses on activities by the manager that change the assets held in their account, primarily buying or selling securities. Assuming the controls of the custodial bank are functioning properly (an assumption addressed later), then the operational failure of the external manager can basically only be the result of three actions:

- A security is inappropriately sold;
- A security is inappropriately purchased; or
- An intended sale or purchase of a security is not accomplished.

These actions are all the result of the manager not complying with the guidelines and strategies set forth by MOSERS.

The possibility always exists that an external manager, either intentionally or unintentionally, will not adhere to the guidelines or strategy for which they were hired. As discussed above, an adequate monitoring process should mitigate the risk of noncompliance by the manager; however, for the monitoring process to be effective, the data monitored

must be timely, available, and accurate. Therefore, an operational risk associated with external managers is that timely and reliable information is not available or that the information is inaccurate. Obviously, if MOSERS is monitoring inaccurate or dated holdings and trade data, then the risk of not detecting noncompliance features within the actual portfolio increases. Generally, the longer a portfolio is allowed to be out of compliance with the established guidelines and strategies, the more likely the returns of the portfolio will not be in line with expectations.



POINTS OF FOCUS FOR ACTION

Separation of Authority from Custody: The legal custody of a public pension system's assets is usually maintained through a custodial bank. Securities are held at the custodial bank in the custodian's name on the public pension system's behalf. Managers do not have direct control over those assets and must perform their activities through the custodial accounts. When a security is purchased or sold, the custodian must receive instructions from the manager to receive or deliver the security (usually on a "delivery vs. payment" basis). Therefore, it is very difficult for the manager to obtain more funds than authorized by the System. Consequently, each external manager creates only a limited amount of operational risk with regard to the overall public pension system because they only have access to the funds assigned them by the System.

If, for example, an external manager's building is destroyed and all records and capabilities are lost, the public pension system still has all of its securities under separate control. In addition, public pension systems can, at any time, "freeze" an external manager's account and prevent future access by the manager, which is often done upon termination of a manager. All that is lost is the opportunity cost of the added value that may have come from future decisions by the manager. Opportunity cost concerns can be limited by immediately transferring the securities to another manager's account, which is also frequently done upon the termination of a manager.

Finally, an external manager does not have the ability to move cash and securities out of the pension system's account to another destination, either within that custodian's system or outside the system. A manager only has control over the movement of securities and cash within the account. An attempt or request for this unauthorized type of movement should automatically trigger a request by the custodian for independent authorization from both the external manager's and public pension system's staff.

MOSERS' Actions: A master custodian maintains the legal custody of MOSERS' assets. The bank holds the securities in their name on the behalf of MOSERS. Managers do not have direct control over MOSERS' assets and must perform their activities through the custodial accounts. The custodian must receive instructions from each manager when a security is purchased or sold and the manager will only receive funds into their account at the direction of MOSERS. Therefore, the custodial bank is aware of every transaction by the manager

and makes the transactions readily available to MOSERS through an on-line accounting system. With this readily available information, MOSERS' staff is able to determine compliance in a timely and accurate manner. In addition, the manager cannot receive more funds than authorized by MOSERS.

Reconciliation: The accuracy of the holdings and transactions is usually assured through a monthly reconciliation of the data by the external manager and custodian or by the pension system staff from data provided from the external manager and the custodian. The reconciliation process helps to ensure the integrity and timeliness of the data used by the System in the monitoring process.

MOSERS' Actions: Monthly reconciliations of transactions and holdings are performed between external managers and the custodian. In addition, MOSERS utilizes an internal investment accounting system to record the holdings and transactions of most of the portfolios within MOSERS fund. MOSERS investment operations staff reconciles the information from the investment accounting system to the custodial bank records each month as well.

Due Diligence: Public pension systems also manage the risk of external manager operational failure by incorporating good hiring practices and conducting periodic due diligence reviews as discussed above. During the hiring process the System should take steps to ensure the external manager has adequate resources and qualified personnel to enable them to disseminate timely and accurate information. The on-going due diligence reviews help the System identify significant changes in the manager's organizational structure, ownership, personnel, or available resources that may affect future operational performance.

MOSERS' Actions: MOSERS has established hiring procedures and on-going due diligence reviews that address the concerns listed above. (See additional discussion on MOSERS' hiring procedures and due diligence reviews earlier in this document)

Custodial Banks

A system must be in place to ensure that the assets of a public pension system are maintained safely, securely, and with the appropriate legal protection. This task falls primarily to custodial banks. Therefore, a key component of managing operational risk by public pension systems is the quality of the custodial system. The custodial system needs to be accurate and provide staff the ability to access holdings, pricing, and transaction information on a regular and timely basis.



POINTS OF FOCUS FOR ACTION

Again, a key to obtaining quality reliable service from a custodial bank begins with the hiring process. While there are noted exceptions, the majority of public pension systems control the selection of their custodian. In those cases, most employ some sort of structured due diligence process when selecting their custodial bank, which could include the use of an independent external consultant. The process, in many cases will be similar to that used to select external managers.

MOSERS' Actions: MOSERS is very close to completing a search for a new custodian. The search involved issuing a formal request for proposal and reviewing subsequent proposals submitted by the banks. In addition, several meetings between MOSERS' staff and the bank's representatives also took place to help assure MOSERS of the quality of the bank candidates. MOSERS also utilized a specialty consultant on custodial banks during the process.

In essence, public pension systems rely on three basic mechanisms to assure the continued viability of the custodial operation once the hiring process is complete. The first is a comprehensive annual financial examination of the custodial records conducted by an independent accounting and/or auditing firm. The second is thorough a process of monthly reconciliation that generally takes place between the individual portfolio managers and the custodian. The third is through the periodic use of the System and its key components by internal staff.

Independent Audit: The financial statements of virtually all public pension systems are audited annually by an independent auditor. These audits are usually either conducted by a state government's audit agency or an independent certified public accounting firm hired by the system. Because the custodial bank plays such a material role in the operations of the System, the auditors must obtain a certain level of assurance that custodial operations are sufficient. The auditor can obtain this level of assurance by physically reviewing and testing the controls and procedures of the custodian's operations or by obtaining an independent report. The independent report should be prepared in accordance with the Auditing Standards Board Statement on Auditing Standards No. 70, "Reports on the Processing of Transactions by Service Organizations" (SAS 70 report).

Because of the expense involved with physically reviewing and testing the controls and procedures of the custodian's operations, most auditors opt to obtain a SAS 70 report for the custodian. It is important to note that a SAS 70 report that only contains descriptions of the policies and procedures at the custodial bank and the auditor's assessment as to whether such policies and procedures are suitably designed is not sufficient to reduce the pension system auditor's assessment of control risk. However, a SAS 70 report that also states that the policies and procedures were tested, and that they were operating effectively to achieve the related control objectives during the period is expressly designed to reduce the

assessment of control risk by users of the custodial system. The external auditors of a public pension system are allowed to use this latter type of SAS 70 report as a substitute for performing their own evaluation of the reliability of a custodian's operating system.

MOSERS' Actions: MOSERS' external auditors receive a copy of the custodial banks SAS 70 report each year and use it as a substitute for performing their own evaluation of the custodian's operating system. MOSERS Internal Auditor also receives a copy of the SAS 70 audit. The audit report is reviewed to determine if any adverse findings were made by the external auditors. Appropriate follow up action will be taken by MOSERS Internal Auditor

Reconciliation: The second ongoing check of the reliability of the custodial systems is the requirement that each portfolio manager and custodian reconcile the account positions on a monthly basis. This procedure involves the comparison of the custodian's security positions, prices, and valuations with the same information as recorded by each manager. Any discrepancies are duly noted and resolved on a timely basis. Differences in pricing sources may sometimes be allowed once identified, but there is usually no tolerance for any difference in the size of the position (or units held). Many public pension systems often withhold payment for asset managers or custodial services if either party fails to perform its reconciliation function on a timely basis. This monthly reconciliation function is usually monitored independently by the public pension system's internal staff.

The reconciliation process helps to assure that any material breakdown in the custodial system between annual audits will be identified on a timely basis. Corporate governance actions (stock splits, dividends, interest, warrants, etc.) will also be monitored through the valuation and unit holding comparisons.

MOSERS' Actions: Monthly reconciliations of transactions and holdings are performed between external manager and custodian. In addition, MOSERS utilizes an internal investment accounting system to record the holdings and transactions of most of the portfolios within MOSERS fund. MOSERS investment operations staff reconciles the information from the investment accounting system to the custodial bank records each month as well.

Periodic Reviews: In many cases, where sufficient internal staff members are available, many public pension systems also perform periodic reviews of the portfolios and transactions on a periodic basis. The potential benefit of this is to serve as a third check on the reliability and accuracy of the custodial system. These reviews often validate the accuracy of account valuations, currency positions, and periodic transactions. A significant breakdown in the custodial system should be revealed in this type of review and most significant errors in record keeping, corporate governance, and pricing should also be captured. To accomplish the periodic reviews, the data provided by the custodian should possess certain qualities to enable pension staff to perform their operating, reporting, and compliance functions. The necessary qualities include:

- The data must be relevant to the needs of the pension system staff.
- The data must be current, timely, and accessible to pension system staff.
- The data must be complete and accurate.

MOSERS' Actions: MOSERS utilizes its' investment accounting software (QED – IMS 200) as a third party check on the reliability and accuracy of the custodial system. Daily reconciliations are performed between the bank and internal accounting system to identify cash balance differences. In addition, monthly reconciliations are performed to identify transaction and holdings differences.

Internal Operations

Thus far, we have addressed the operational risks associated with external agents, but the internal operations of MOSERS are also exposed to operational risk. Such operational risk is present in areas of internal asset management, cash management, and operating systems used to protect data integrity.

Internal Asset Management: MOSERS' investment staff manages some assets internally. Most of the operational risks of internal management are the same as if the assets were being managed externally. These risks include cash movements in and out of the portfolios and compliance with the portfolio's intended strategy. However, some additional concerns are brought about by the practice of internal management. First, the monthly reconciliation process between external managers and the custodian is no longer naturally present and, thus, a process to help ensure data integrity is lost. Second, a layer of oversight may be eliminated with internal management since the investment officers who were responsible for monitoring the compliance of the external managers may now be managing internal portfolios and obviously should not be the sole monitor of the compliance of their own portfolio. MOSERS believes it is necessary to address these additional concerns when implementing procedures to internally manage assets.

Cash Management: Another internal operational risk involves cash management. Cash management involves the movement of cash between accounts, or into and out of the portfolio, either for distribution to beneficiaries or to fund external asset managers at the appropriate level. The risk is that unauthorized movements of cash will be made or that inappropriate amounts of cash will be distributed.

Operating Systems: Finally, there is the risk that the internal operating systems necessary to support the investment activity, for both internally and externally managed assets, will fail. For example, a communication link often exists between the pension system and custodian, which allows the pension system instant access to portfolio data. Internal computer systems may go down or the building in which the public pension system is located may suffer a catastrophe.



POINTS OF FOCUS FOR ACTION

As stated above, the operational risks of internal asset management are similar to the risks of external management; therefore, many of the risk management practices are similar. Hiring

practices are again important. MOSERS must diligently pursue competent individuals to ensure the fund is managed in accordance with the intended strategy. In addition, operational guidelines are put in place for each individual internally managed portfolio.

Accounting System: A public pension system with internal asset management usually implements its own investment accounting system to accomplish the task of reconciling monthly investment data with the custodial bank. The investment accounting software tracks all positions and transactions of an internally managed portfolio and the data can be reconciled with the monthly activity reported by the custodial bank. In addition, standard reports should be issued pursuant to a fixed distribution list to facilitate ongoing monitoring.

MOSERS' Actions: MOSERS uses its' internal investment accounting software as a check on the accuracy of the custodian's records for internally managed assets. The trades for all the internally managed assets are input into the investment accounting software and reported to the custodial bank. Monthly reconciliations are then prepared between the two systems. The reconciliations and trade input are both performed by the investment operations staff, who are independent of the trading and portfolio management staff.

Segregation of Duties: To successfully implement the investment accounting process, the pension system normally segregates duties between the management of the portfolio and the record keeping or accounting function associated with the portfolio. Basically, this means that the individual responsible for making trading decisions for the portfolio is not responsible for affirming the trades or entering the trade data into the accounting system. In addition, the portfolio manager, under this approach, is not involved in the monthly reconciliation process between the internal investment accounting system and the custodial system.

The separation of duties can also reduce the risk associated with cash management. The individual responsible for managing an internal portfolio typically does not also have the authority to transfer funds from the custodial accounts. Often two signatures (one from fiscal services and one from non-asset manager investment staff) are required to initiate cash movement from the custodian. In addition, the custodian will often be required to contact an additional staff member, perhaps the chief investment officer or chief financial officer, before completing the cash movement request.

MOSERS' Actions: As mentioned above, MOSERS utilizes the investment operations staff to input and affirm trades, as well as perform the monthly reconciliations. The investment operations staff is independent of the trading and portfolio management staff.

Only the CIO and Investment Operations Officer, who are both independent of the trading and portfolio management staff, are authorized to transfer funds from the custodial accounts. The signed authorization of either individual is required before the bank will initiate a transfer request.

Independent Oversight: To address the potential lack of independent oversight, public pension systems often assign individuals who are independent of the portfolio management

function to monitor the portfolio for compliance with established guidelines. An external investment consultant, an internal audit group, other staff (e.g., compliance officer), or a combination can perform the monitoring function.

MOSERS' Actions: MOSERS has established procedures to compensate for the layer of oversight eliminated with internal management. The external investment consultant is responsible for performing formal due diligence meetings twice per year with the management team of each internally managed portfolio and reporting the results of these meetings with the Board. One of these reports will be given orally by the consultant and the other will be written in a format similar to the external due diligence reports issued by the staff and consultant. In addition, MOSERS' internal auditor is responsible for auditing each of the internally managed portfolios annually for compliance with their prescribed operational guidelines and providing written reports to the Board summarizing those audits.

Business Continuity Plan: The risk associated with the internal operating systems of a public pension system may be limited because the “official” holdings and books of records are usually maintained off site at custodial banks. Nonetheless, public pension systems usually take steps to minimize the chances of failed internal operating systems. Regular back-ups of important internal data are usually performed and stored off site to preserve the data. In addition, a back-up connection line to the custodial bank and other essential communication links are often installed to ensure reliable data is available at all times. Finally, most pension plans develop some sort of disaster recovery plan to ensure the operating systems can be up and running as soon as possible in the unlikely event of a total breakdown in computer systems, building malfunctions, and other catastrophes.

MOSERS' Actions: MOSERS' official holdings and book of record are maintained off site at its' custodial bank. However, regular back-ups of the internal investment accounting system are prepared and stored off site. MOSERS possesses several dedicated lines to serve as back-up connection lines for its' custodial bank and other essential communication links. MOSERS is in the process of developing a system wide disaster recovery plan.