

Illinois Downstate Pension Fund Consolidation

Costs and Savings from Consolidating Police and Fire
Pension Funds

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I. Executive Summary

In Illinois, retirement benefits are provided to police officers and firefighters through local pension funds. The funds are regulated by state law, and managed by local boards of trustees. As of the end of fiscal year 2017, there were 643 pension funds for police officers and firefighters in Illinois. Policymakers over the last several years have occasionally called for the consolidation of the 641 downstate police and fire pension funds outside Chicago into one centralized fund.

PURPOSE OF REPORT

The Illinois Public Pension Fund Association (IPPFA) retained Anderson Economic Group to estimate the costs and savings associated with consolidating all police and fire pension funds in Illinois outside of the Chicago pension funds into one centralized fund.

OVERVIEW OF APPROACH

Fund consolidation would result in initial transition costs, followed by an ongoing reduction in costs to manage the pension funds. To estimate transition costs, we identified a set of costs associated with transitioning all assets from the downstate funds to one investment authority. These costs include explicit fixed costs, like commissions, as well as implicit variable costs, or the market risk of liquidating some assets in order to reinvest them in a central fund. To estimate these costs we relied on data from the Illinois Department of Insurance, asset management firms, and interviews with transition managers and other experts in the field.

To estimate the change in ongoing costs, we analyzed administrative, trustee-related, and investment-related expenses for downstate police and fire pension funds under their current structure and under a consolidated structure. We used data from comparable consolidated funds in the state of Illinois and across the U.S. to estimate the costs of managing the fund under a consolidated structure.

See “Appendix A. Methodology” on page A-1 for more details on our methods and sources.

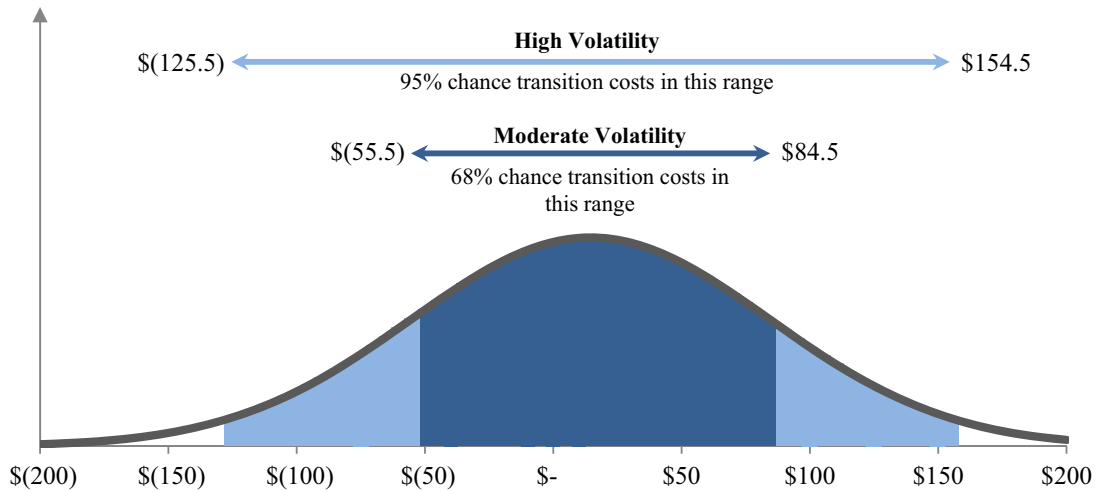
OVERVIEW OF FINDINGS

1. Liquidating a large portion of fund assets as part of the process of consolidating them into one fund will result in significant risk. We estimate that transitioning to a consolidated pension fund could entail a one-time cost of up to \$155 million.

We estimate the full net cost of the transition process for a range of scenarios to account for all aspects of the transition process. A major determinate of the transition cost is the amount of assets that are transferred in-kind under the consoli-

dated investment authority, as opposed to those liquidated and reinvested as part of the consolidation.

FIGURE 1. Range of Transition Costs from Consolidating Downstate Police and Fire Pension Funds



Source: Anderson Economic Group analysis of base data and information from Illinois Department of Insurance; Black Rock, Inc.; and the Vanguard Group.
 Note: We found that transition managers would be likely to transfer between 20% and 40% of assets in kind. This figure reflects estimates assuming that 20% of assets will be transferred in kind. See “Transition Costs” on page 10 for the results when assuming 40% of assets will be transferred in kind.

We estimate that, if the transition happens to be ill-timed and the funds miss out on market growth in the period when they are transferring assets, the higher end of total transition costs could reach \$155 million. On the other hand, if the transition happens to occur during a drop in the market, the net transition could actually result in savings of up to \$126 million. This range of possible transition costs is illustrated in Figure 1 above.

TABLE 1. Estimated Transition Costs (millions)

| Type of Cost | High Volatility Market | Moderate Volatility Market |
|----------------|------------------------|----------------------------|
| Explicit Costs | \$7 to \$12 | \$7 to \$12 |
| Implicit Costs | -\$138 to \$142 | -\$68 to \$72 |
| Total Costs | -\$125 to \$154 | -\$55 to \$85 |

Source: Anderson Economic Group analysis of base data and information from Illinois Department of Insurance; Black Rock, Inc.; The Vanguard Group
 Note: There is a 68% chance that the transition costs fall in the moderate volatility range, and a 95% chance transition costs fall in the high volatility range. Negative costs imply a net savings.

Table 1 on page 2 shows the breakdown of transition costs between explicit costs (brokerage fees and commissions for reinvesting assets) and implicit costs (changes in the market while funds are in transition).

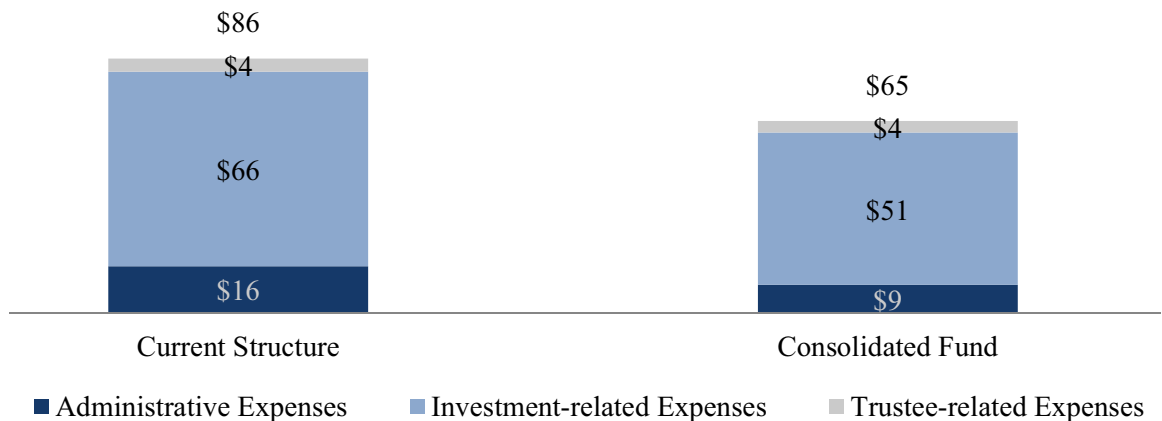
For a detailed discussion of our analysis on transition costs, see “Transition Costs” on page 9.

2. Under a consolidated structure, total expenses to administer the pension funds (excluding benefits) would decrease by 25%, or \$21 million annually.

Transition costs are a one-time expense associated with consolidation. Following consolidation, there will be ongoing net savings on an annual basis from lower administrative and investment costs.

Based on a review of the expense ratios for consolidated funds in Illinois and other states, consolidation of the downstate police and fire funds would reduce total expenses for administration, trustee boards, and investment by 25%. The majority of downstate funds hire administrative and investment professionals to help operate the pension funds. A potential consolidation would make a portion of these professionals redundant. Also, the consolidated fund would be able to negotiate lower costs, on average, due to its size. The potential savings of consolidating the downstate pension funds are approximately \$21 million annually, as shown in Figure 2 below.

FIGURE 2. Changes in Annual Pension Fund Expenses Under Consolidation (millions)



Source: Anderson Economic Group analysis of base data from Illinois Department of Insurance and annual reports from comparable consolidated pension funds

For a full discussion of changes in administrative expenses, see “Changes in Expenses Under Potential Consolidation” on page 5.

3. The transition costs associated with consolidating the downstate funds would be offset by annual savings in about ten years, at most.

Both the potential one-time costs associated with transition and the annual change in ongoing expenses will be reflected directly as changes in the net assets of the plan over time. As a result, they will directly translate into a change in the unfunded liability of the consolidated fund. If the transition results in a \$150 million cost, the unfunded liability of the fund will be \$150 million higher than the combined unfunded liability of the separate funds prior to consolidation. Similarly, over time, the annual savings to the fund will be reflected in marginally lower unfunded liabilities each year. Any change in the unfunded liability that occurs due to the transition will be amortized and reflected in costs to the municipalities that pay into the consolidated fund.

As outlined in Finding 1 on page 1, we estimate a range of transition costs associated with consolidation in order to account for uncertainty from market volatility during the transition process. Since the assets in the plan are expected to accrue investment returns over time, a loss in assets today is also a loss in the returns on investment from those assets over time. We expect that, after taking into account anticipated investment returns, our highest estimates for transition costs would be offset by estimated annual savings within ten years of consolidation.

**ABOUT ANDERSON
ECONOMIC GROUP**

Anderson Economic Group, LLC is a boutique research and consulting firm, with offices in East Lansing, Michigan and Chicago, Illinois. The experts at AEG specialize in strategy, business valuation, public policy, and market analyses. They have conducted nationally-recognized actuarial, economic, and fiscal impact studies for private, public, and non-profit clients across the United States.

The consultants at Anderson Economic Group have a deep understanding of public pension policy, and have completed pension reform analyses for clients across the country, including Oregon, Michigan, and Illinois.

For more information, please see “Appendix B. About Anderson Economic Group” on page B-1 or visit www.AndersonEconomicGroup.com.

II. Consolidation Costs and Savings

There are over 600 downstate police and fire pension funds across the state of Illinois. Each fund is governed by a locally appointed board, who perform all administrative and investment-related duties. Many of these boards hire administrative professionals and investment advisors, and all boards pay investment fees for brokers. Consolidating funds will result in the elimination of some of these expenses and an overall decrease in ongoing costs. However, there is also likely to be an immediate, one-time cost associated with the transition. We discuss each of these costs/savings below, in detail.

ONGOING ANNUAL EXPENSES

There are three sources of ongoing costs, other than benefit payments, for downstate police and fire pension funds: trustee-related, administrative, and investment-related.

Trustee-related. Under the Illinois Pension Code downstate pension funds are required to have a Board of Trustees that is tasked with fiduciary responsibility, as well as investment and administrative duties. Trustee-related expenses include professional association dues, office supplies, and costs related to the educational requirements of the trustees. Of the three expenses outlined in this section, trustee-related costs are the smallest.

Administrative. The local board of trustees often retain professionals to help the trustees operate the fund. These include administrators, auditors, actuaries, and attorneys. On average, administrative expenses are the second-largest of the costs outlined in this section.

Investment-related. Local boards often retain investment professionals, depending on the fund's size and asset allocation. In addition, investment transactions usually come with brokerage fees, and mutual funds require management fees and expenses. On average, investment-related expenses make up 80% of all downstate pension fund expenses outside of benefits.

CHANGES IN EXPENSES UNDER POTENTIAL CONSOLIDATION

If downstate pension funds are consolidated, this will result in a change for each of the categories of expenses discussed above.¹ To estimate the changes in administrative and investment-related expenses, we compared the expenses of

1. There will also be a change in the nature of the companies that provide these services. Currently, a set of small- to mid-size professional services companies based in Illinois specialize in providing administrative, financial, and investment services to downstate police and fire pension funds. Consolidation would result in these expenses going to larger companies that are more likely to be based out of state. We do not estimate or discuss the impact of that change on the state in this report.

the downstate funds in their current structure with the expenses of what would be comparable consolidated funds.

To estimate the changes in trustee-related costs, we assumed that local trustees would remain and act as local agents (as required in recent legislation proposed for consolidation), but general administrative tasks and investment authority would be consolidated and provided by the agency tasked with overseeing a statewide fund.

A potential consolidation would require moving administrative and investment authority of over 600 funds to one consolidated structure, eliminating some administrative and investment services patronized by the individual funds. Consolidation would also result in a decrease in investment management fees, since these fees tend to decline with the scale of a fund.

To estimate the changes in administrative and investment-related expenses in the current structure, we used data from the Illinois Department of Insurance (DOI). However, according to this data, investment expenses are only 0.25% of total asset values for downstate pension funds, which is an implausibly low amount. We determined that mutual fund expenses were absent from this estimate, and we used data from an asset management firm used by several downstate pension funds to estimate that the total investment expenses are 0.48%, as a share of assets.

Under a consolidated structure, we estimate that annual total expenses will decrease by 25%. The breakdown by expense type is shown in Table 2 below.

TABLE 2. Changes in Annual Administrative, Investment-Related, and Trustee-Related Expenses Under Consolidation (in millions)

| | Administrative Expenses | Investment-Related Expenses | Trustee-Related Expenses | Total Expenses |
|--|-------------------------|-----------------------------|--------------------------|----------------|
| Under Current Structure (As Reported to IL DOI) | \$16 | \$34 | \$4 | \$54 |
| Under Current Structure (Estimated by AEG) | \$16 | \$66 | \$4 | \$86 |
| Consolidated Structure | \$9 | \$51 | \$4 | \$65 |
| Net Annual Savings | \$6 | \$14 | \$0.5 | \$21 |
| <i>Percent change</i> | <i>-40%</i> | <i>-22%</i> | <i>-11%</i> | <i>-25%</i> |

Source: Anderson Economic Group analysis of base data from Illinois Department of Insurance and annual reports for other state pension funds; Investopedia

Note: Net numbers may not reflect exact difference due to rounding.

Note that the savings associated with consolidation would accrue annually while any costs associated with the transition would be incurred only once. We estimated the present value of annual savings over time to show when annual savings would offset the initial transition costs. The discount rate we use is 7%, which is a common discount rate used for statewide pension funds.

TABLE 3. Present Value of Total Accrued Annual Savings After Consolidation, by Year (millions)

| Year | Accrued Savings |
|------|-----------------|
| 1 | \$21 |
| 2 | \$40 |
| 3 | \$59 |
| 4 | \$76 |
| 5 | \$92 |
| 6 | \$107 |
| 7 | \$121 |
| 8 | \$134 |
| 9 | \$147 |
| 10 | \$158 |

Source: Anderson Economic Group analysis using base data from Illinois Department of Insurance

We provide a more detailed explanation of our methodology in “Changes in Expenses Under Potential Consolidation” on page A-1.

TRANSITION COSTS

Consolidation means bringing all downstate police and fire assets under one investment authority and combining over 600 diverse portfolios. The associated costs of this transition include both explicit and implicit costs. Explicit costs are fixed costs like commissions and broker fees to make trades during the course of consolidation. Implicit costs are the costs associated with the unknown price movement (and resulting foregone gains or losses) during the time that funds are not invested.

We assume that assets under the consolidated fund structure would be invested like the portfolios of other Illinois statewide pension funds.² The allocation of

2. The target portfolio reflects an average asset allocation across the Teachers Retirement System (TRS), Illinois Municipal Retirement Fund (IMRF), State Employees Retirement System (SERS), and State Universities Retirement System (SURS).

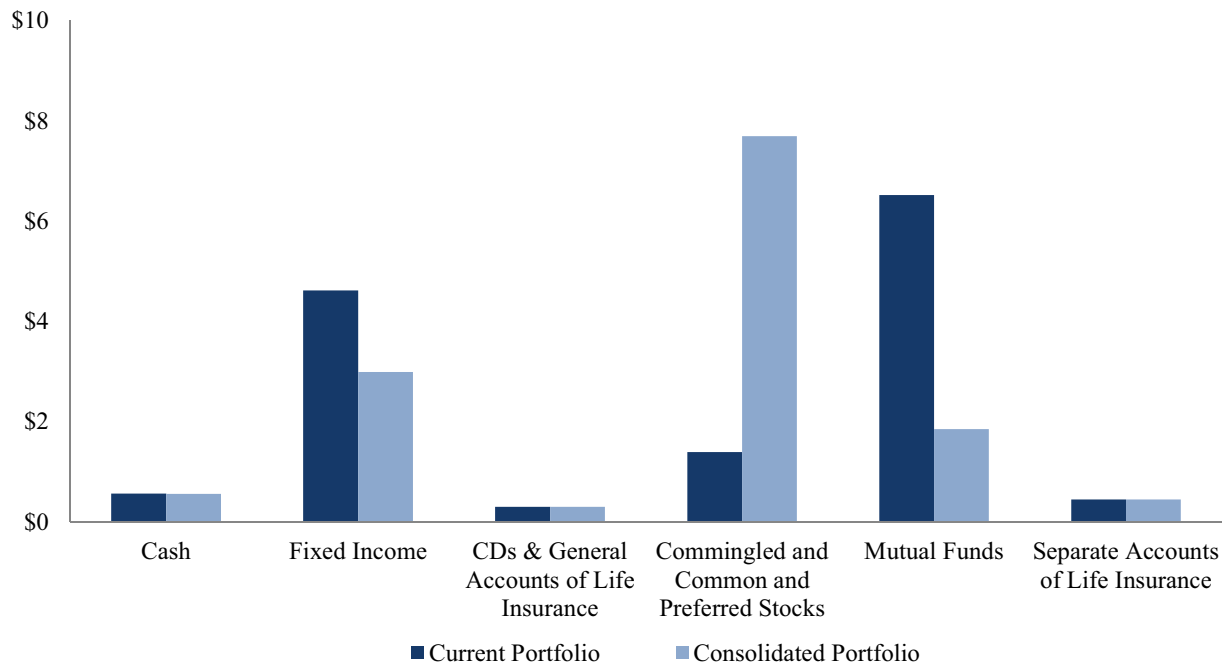
assets under the status quo and under our projected consolidated fund are shown in Figure 3 on page 8.

Based on industry average commission fees and bid-ask spreads, we estimated the explicit costs of the total trades made during the transition. We estimated a range of implicit costs to account for the unknown price movement of assets during the transition.

The percent of the current portfolio to be transferred in-kind significantly affects implicit costs. Implicit costs arise during the period between when an asset is sold and when the funds from that asset are reinvested. During that period, the returns (or losses) that would otherwise accrue from those investments are foregone.

Assets that are transferred in-kind do not leave the market. As the amount of assets transferred in-kind decreases, the portion of assets that are sold during the transition increases, and the risk of losses increases. Similarly, as the amount transferred in-kind increases, the portion of assets that are sold during the transition decreases, and risk exposure of the transition decreases.

FIGURE 3. Current Portfolio and Consolidated Portfolio Asset Allocation (billions)



Source: Anderson Economic Group analysis of base data from Illinois Department of Insurance, financial reports from TRS, SERS, SURS, and IMRF

In order to organize over 600 portfolios under one investment authority, it will be necessary to sell a portion of the existing assets, even beyond the amount required to achieve the new asset allocation. We estimated implicit costs for two scenarios. In scenario 1, 20% of the downstate portfolios are transferred in-kind and the remainder is sold and reinvested. In scenario 2, 40% is transferred in-kind and the remainder is sold and reinvested.³ The actual amount transferred in-kind will depend on a more detailed analysis of each fund’s asset holdings as well as the transition manager’s discretion.

We show the range of costs for each scenario in Table 4 and Table 5 below, and in Figure 4 and Figure 5 on page 10. Note that a negative cost reflects a net savings. These transition savings will materialize if the transition period happens to occur during a period when the market declines, meaning that if the funds had remained invested in their asset portfolios, the value of the funds would have declined.

TABLE 4. Transition Costs, 20% Transferred In-Kind (millions)

| | Moderate Volatility | High Volatility |
|---------------|---------------------|-----------------|
| Explicit Cost | \$13 | \$13 |
| Implicit Cost | -\$68 to \$72 | -\$138 to \$142 |
| Total Cost | -\$55 to \$85 | -\$125 to \$154 |

Source: Anderson Economic Group analysis of data from Illinois Department of Insurance; Black Rock, Inc.; The Vanguard Group

TABLE 5. Transition Costs, 40% Transferred In-Kind (millions)

| | Moderate Volatility | High Volatility |
|---------------|---------------------|-----------------|
| Explicit Cost | \$7 | \$7 |
| Implicit Cost | -\$52 to \$55 | -\$106 to \$109 |
| Total Costs | -\$46 to \$62 | -\$99 to \$116 |

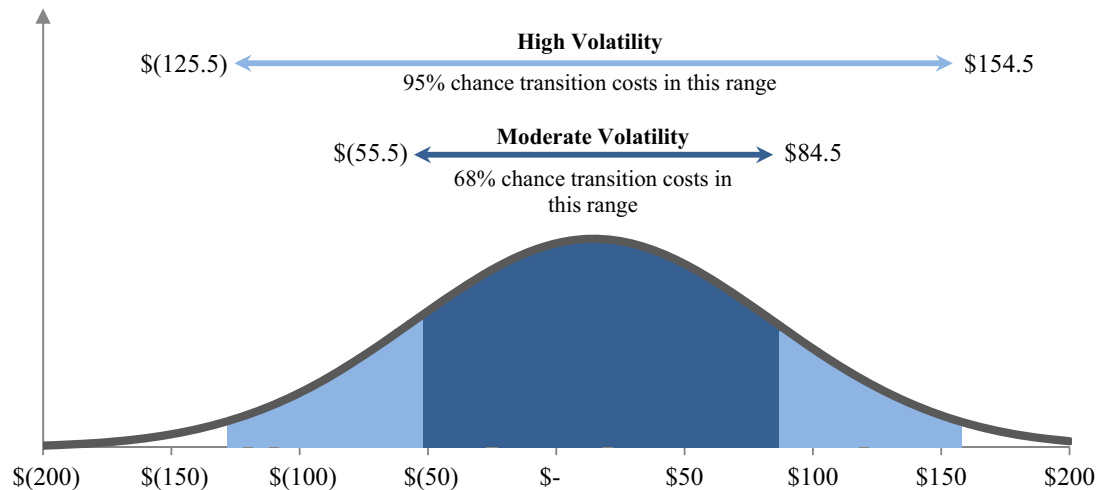
Source: Anderson Economic Group analysis of data from Illinois Department of Insurance; Black Rock, Inc.; The Vanguard Group

Moderate volatility represents the possible change in market returns during the transition within one standard deviation of the mean. High volatility is the possible change in market returns within two standard deviations of the mean. This

3. This range was determined by conducting interviews with asset managers and reviewing reports that modeled similar transitions. In each scenario, the 20% or 40% figure includes approximately 9% of assets which will be necessarily transferred in kind because they are too costly or impossible to liquidate (i.e. certificates of deposit, and separate and general accounts of life insurance companies). The scenario where 40% of assets are transferred in kind is a near-maximum amount of assets required to be transferred in kind in order to achieve the target asset allocation of the consolidated fund.

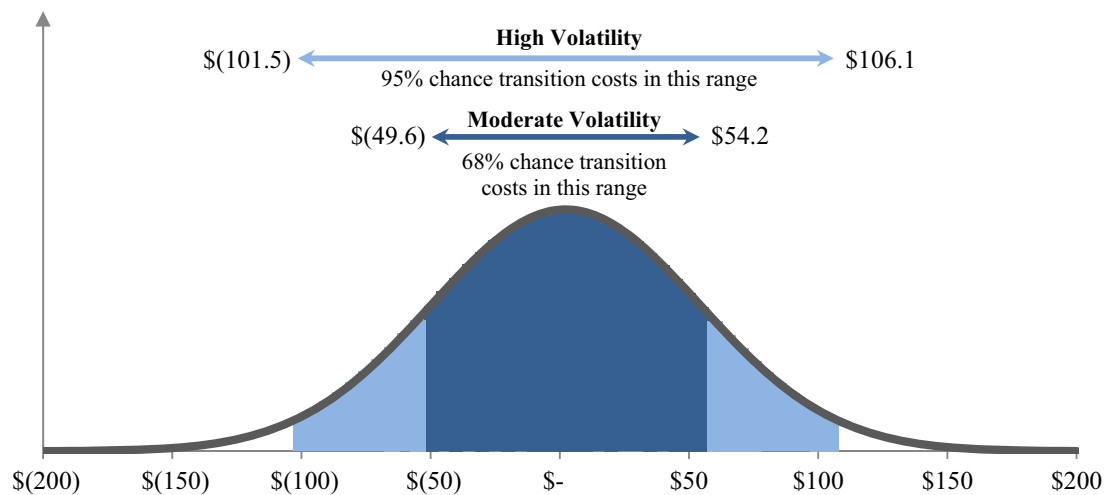
volatility represents a range of probable costs. If 20% of assets are transferred in-kind, then there is a 68% chance that total cost will be between -\$55 (or a transition savings of \$55 million) and \$85 million. There is a 95% chance that total costs will range from -\$125 to \$155 million.

FIGURE 4. Range of Transition Costs from Consolidating Downstate Police and Fire Pension Funds, 20% Transferred in Kind



Source: Anderson Economic Group analysis of base data and information from Illinois Department of Insurance; Black Rock, Inc.; and the Vanguard Group.

FIGURE 5. Range of Transition Costs from Consolidating Downstate Police and Fire Pension Funds, 40% Transferred in Kind



Source: Anderson Economic Group analysis of base data and information from Illinois Department of Insurance; Black Rock, Inc.; and the Vanguard Group.

We provide a more detailed explanation of our methodology in “Changes in Expenses Under Potential Consolidation” on page A-1.

Appendix A. Methodology

In this section, we summarize our sources and methodology. We also provide details about important assumptions for this report.

CHANGES IN EXPENSES UNDER POTENTIAL CONSOLIDATION

Administrative and Investment-related Expenses

To estimate the changes in administrative and investment-related expenses, we compared the expenses of the downstate funds in their current structure with the expenses of comparable consolidated funds.

We used the annual statements of other consolidated state pension funds in Illinois and across the US to estimate the average administrative and investment-related expense ratios under a consolidated structure. We show these expense ratios in Table A-1 below.

TABLE A-1. Comparable Consolidated Funds

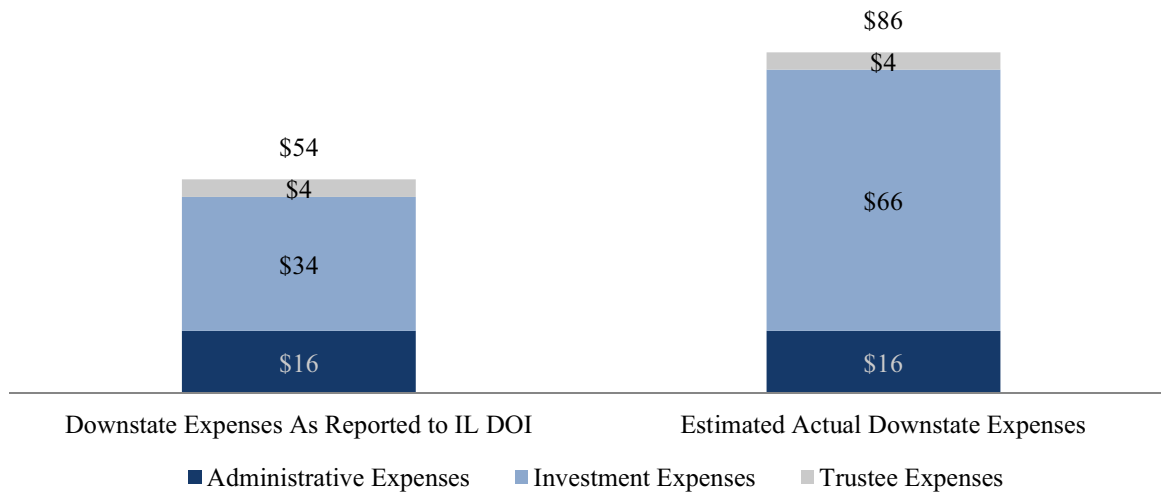
| | Administrative Expense Ratio | Investment Expense Ratio | Total Expense Ratio |
|--|-------------------------------------|---------------------------------|----------------------------|
| Alabama Retirement System | 0.07% | 0.07% | 0.14% |
| Arizona Public Safety Retirement System | 0.09% | 0.55% | 0.65% |
| Chicago Municipal Employees' Fund | 0.13% | 0.40% | 0.53% |
| Chicago Police Fund | 0.05% | 0.05% | 0.10% |
| Chicago Teachers Pension Fund | 0.12% | 0.30% | 0.42% |
| Cook County Employees Retirement Fund | 0.05% | 0.31% | 0.35% |
| Illinois State Employees Retirement System | 0.10% | 0.17% | 0.27% |
| Illinois State University Retirement System | 0.07% | 0.32% | 0.39% |
| Illinois Teachers Retirement System | 0.04% | 1.25% | 1.28% |
| Illinois Municipal Retirement Fund | 0.07% | 0.28% | 0.35% |
| Iowa Municipal Fire and Police Retirement System | 0.07% | 0.74% | 0.81% |
| Minnesota Public Employee Retirement System | 0.01% | 0.09% | 0.11% |
| Nevada Police and Fire Retirement System | 0.03% | 0.12% | 0.14% |
| New Jersey Police and Fire Retirement System | 0.02% | 0.01% | 0.02% |
| Ohio Police and Fire Fund | 0.13% | 0.32% | 0.45% |
| South Carolina Police Officers Retirement System | 0.05% | 0.99% | 1.04% |
| Average Expense Ratios | 0.07% | 0.37% | 0.44% |

Source: Annual Financial Reports

We used detailed financial reports for downstate police and fire funds to calculate the combined administrative, investment-related, and trustee-related expense ratios of the downstate police and fire funds. It is clear that investment-related expenses reported to the Department of Insurance do not reflect all investment-related fees incurred by the downstate pension funds. This is partially based on the difference between the downstate fund investment-related expense ratio and comparable consolidated fund investment-related expense ratios. The DOI reports that downstate police and fire funds report investment-related expenses that are, on average, about 0.25% of total assets. Comparable consolidated funds report investment-related expense ratios closer to 0.37%. Since most fees associated with managing mutual funds are netted out of earnings rather than charged as a fee, we assumed that the “missing” investment fees from the DOI data were mutual fund expenses.

We were provided data from an asset management firm that works with downstate police and fire pension funds in Illinois. The firm oversees billions of dollars in investments. They estimate that the average expense ratio for mutual funds in their portfolio for downstate pension funds is 0.52%. When we multiply this expense ratio by the share of assets in mutual funds and add it to the reported DOI expenses, we get total estimated investment expenses of 0.48%.

Figure A-1. Difference Between Reported and Estimated Expenses (in millions)



To analyze the changes in administrative and investment-related expenses, we assumed that a consolidated police and fire pension fund would operate with similar levels of expenses as other comparable consolidated funds. To estimate these expenses we multiplied the administrative and investment-related expense ratios of the comparable consolidated funds by the combined total assets of the downstate police and fire pension funds.

To ensure that we were properly estimating administrative expenses, we considered two other methods: administrative expenses as a share of total liabilities and administrative expenses per active or retired member. We found that, among the consolidated pension funds we reviewed, these values were more variable than administrative expenses as a share of assets. We also found that one method provided a marginally higher estimate while the other provided a marginally lower estimate than the method using administrative expenses as a share of assets.

TABLE A-2. Administrative and Investment-related Expenses Under Consolidated Structure

| Expense Type | Expense Ratio of Comparable Consolidated Funds | x | Combined Downstate Police and Fire Assets (billions) | = | Downstate Police and Fire Expense Under Consolidated Structure (millions) |
|----------------------------|---|----------|---|----------|--|
| Administrative Expense | 0.07% | x | \$14 | = | \$9 |
| Investment-Related Expense | 0.37% | x | \$14 | = | \$51 |

Source: Anderson Economic Group analysis of data from the Illinois Department of Insurance and Annual Reports

Trustee-Related Expenses

For our analysis we assumed a potential consolidation of the downstate police and fire funds would be structured so that local trustees would remain to act as agents for the state-wide fund. This assumption is based on policies outlined in Senate Bill 3444. Currently, the local trustees oversee all aspects of their respective pension funds, and local trustees are required to fulfill 16 hours of training each year. Consolidation of the downstate funds reduces the responsibility of local trustees to only determining pension benefits and reduces the educational requirements to 16 hours over a period of two years. We assumed that direct education costs would decrease by one-half and that indirect education costs, like travel and conference fees, would decrease by one-third.

The breakdown of administrative, investment-related, and trustee-related expense ratios before and after consolidation is shown in Table A-3 below.

TABLE A-3. Downstate Police and Fire Fund Expense Ratios

| | Administrative Expense Ratio | Investment-related Expense Ratio | Trustee-related Expense Ratio | Total Expense Ratio |
|--|---|---|--|----------------------------|
| Downstate Police Funds (As Reported to DOI) | 0.11% | 0.25% | 0.03% | 0.36% |
| Downstate Fire Funds (As Reported to DOI) | 0.12% | 0.24% | 0.03% | 0.36% |
| Combined Police and Fire Funds (Estimated Actual Expense Ratio) | 0.11% | 0.58% | 0.03% | 0.72% |
| Consolidated Structure | 0.07% | 0.37% | 0.02% | 0.47% |

Source: Anderson Economic Group analysis of base data from Illinois Department of Insurance and Annual Reports

Transition Costs

Transition costs are associated with consolidating the assets into a single investment pool with an organized investment program. The full cost of the transition process includes both implicit and explicit costs. Implicit costs are the unknown price movement of the asset during the transition (i.e. the foregone gains or losses that would have been realized if the asset were not sold). Explicit costs are fixed costs like commissions.

To estimate the transition costs we had to first determine a target portfolio of the consolidated downstate police and fire funds. We assumed that the target portfolio would be similar to the average asset allocation of the statewide pension funds in Illinois. The target portfolio should also include enough cash to cover expenses, pensions, and benefits during the time of transition. Based on a time line outlined in Illinois SB3444, we allocated enough cash to cover six months of expenses and pension payouts.

Because of their inherent illiquidity, we also assumed that CD's (certificates of deposits) and annuity contracts (general and separate) would be transferred in-kind. Portions of the liquid asset pool would be transferred in-kind, too. We estimated implicit costs for two scenarios. In scenario 1, 20% of the current portfolio is transferred in kind, and, in scenario 2, 40% is transferred in-kind. Each scenario includes approximately 9% of illiquid assets that will necessarily be transferred in-kind. Note that the 40% scenario represents a near-maximum estimate of the portion of assets that can be transferred in kind while still achieving the new asset allocation.

Amount of the current portfolio that is transferred in-kind in both scenarios:

- CDs and General Accounts of Life Insurance: 2.2%

- Separate Accounts of Life Insurance: 3.2%

Under Scenario 1, the additional amount of the current portfolio that is transferred in-kind:

- Government and Municipal Bonds: 8.4%
- Commingled, Common and Preferred Stock: 2.3%

The rest of the current portfolio is sold and bought in the following way.

- Government and Municipal Bonds, and Other Fixed-Income Assets: \$3.46B is sold and \$1.83B is bought
- Commingled, Common and Preferred Stock: \$1.08B is sold and \$7.37B is bought
- Mutual Funds: \$6.51B is sold and \$1.85B is bought
- Total trade: \$22.10B

Under Scenario 2, the additional amount of the current portfolio that is transferred in-kind:

- Government and Municipal Bonds: 20.6%
- Commingled, Common and Preferred Stock: 10.0%

The rest of the current portfolio is sold and bought in the following way.

- Government and Municipal Bonds, and Other Fixed-Income Assets: \$1.76B is sold and \$138M is bought
- Commingled, Common and Preferred Stock: \$9M is sold and \$6.31B is bought
- Mutual Funds: \$6.51B is sold and \$1.85B is bought
- Total trade: \$16.58B

We used data from The Vanguard Group about the bid/ask spread for long-term bonds and the S&P 500 for fixed income and equity asset classes, respectively. We reviewed previous reports that modeled similar transitions, and fee structures from leading asset management firms, to determine the commission fees for fixed income and equity assets.

TABLE A-4. Industry Average Commission Fees and Bid-Ask Spread

| Type of Asset | Commission | Bid-Ask Spread |
|---------------|------------|----------------|
| Fixed Income | 0.05% | 0.075% |
| Equities | 0.05% | 0.020% |

Source: The Vanguard Group

We used daily historical asset return indices for the S&P 500 and Core Aggregate Bonds to simulate the price movement of equity and fixed income assets

for a trading period of two days. In other words, we simulated the potential returns lost while the fixed income assets are out of the market. Using the simulated returns, we estimated a range of implicit costs according to market volatility. Here we refer to volatility as the number of standard deviations from the mean. High volatility is the change in return prices two standard deviations from the mean. Medium volatility is the change in return prices one standard deviation from the mean. Low volatility is the mean change in return prices.

Based on annual reports for individual downstate funds, we determined that investments classified as mutual funds consisted of about 90% equity and 10% fixed income assets. We used this proportion to determine the market volatility of mutual funds.

The simulated returns are show in Table A-5 below.

TABLE A-5. Simulated Returns by Level of Market Volatility

| Asset Class | High Volatility | Medium Volatility | Low Volatility |
|--------------|-----------------|-------------------|----------------|
| Equities | ±0.0209 | ±0.0114 | ±0.0006 |
| Fixed Income | ±0.0055 | ±0.0028 | ±0.0001 |
| Mutual Funds | ±0.0148 | ±0.0073 | ±0.0002 |

Source: Anderson Economic Group analysis of historical asset returns data

WORKS CONSULTED

We used the following reports and data for our analysis.

- Google Finance daily market returns for select Exchange Traded Funds 2013-2018.
- Illinois Department of Insurance “Public Pension Fund Detailed Financial Data Report Police and Fire,” Fiscal Year 2016, <http://insurance.illinois.gov>.
- Illinois Department of Insurance “Public Pension Fund Detailed Financial Data Report Police and Fire,” Fiscal Year 2017, <http://insurance.illinois.gov>.
- Illinois Department of Insurance, “Retirement Systems Profile Reports,” Fiscal Year 2016, <http://insurance.illinois.gov>.
- Black Rock, “Transition Management Guide 2017,” <http://www.blackrock.com>.
- Forbes, “The Heavy Toll of Investment Fees,” <http://www.forbes.com>.
- Illinois General Assembly, “Senate Bill 3444,” <http://ilga.gov>.
- Investopedia, “Settlement Date,” <http://www.investopedia.com>.
- Investopedia, “When is an expense ratio considered high and when is it considered low?,” <http://www.investopedia.com>
- Municipal Fire and Police Retirement System of Iowa, “Annual Report,” Fiscal Year 2017, <http://www.mfprsi.org>.
- Ohio Police and Fire Pension Fund, “2017 Popular Annual Report,” <http://www.op-f.org>.

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Appendix B. About Anderson Economic Group

Anderson Economic Group, LLC is a boutique consulting firm founded in 1996, with offices in East Lansing, Michigan and Chicago, Illinois. We specialize in strategy, valuation, public policy, and market analyses. The public policy team at Anderson Economic Group has a deep understanding of actuarial policy, fiscal analysis, and economic modeling.

Our consultants are often published on topics within their respective fields of expertise. Publications from our team include:

- *The Impact of Easing Investment Restrictions on Downstate Illinois Police and Fire Pension Funds*, 2018.
- *The Impacts of Funding Reforms and Investment Returns on Pension Fund Solvency for Illinois' Downstate Police and Fire Pension Funds*, published in 2015.
- *The Impact of Direct Infrastructure Transfer on Illinois Police and Fire Pension Funds*, published in 2017.
- *Proposed Reforms to Chicago Pensions: What's at Stake and How Much it Will Cost*, published in 2014.
- *Impact and Interpretation of a Payroll Floor for the Michigan Public School Employee Retirement System*, published in 2017.
- *Pension Buyouts for Illinois Teachers: Estimating Savings and Reduced Liabilities for the State of Illinois*, published in 2017.
- *Oregon Public Sector Workforce Issues: The Cost of Employee Replacement and Evidence of a Labor Shortage*, 2018.

Past clients of Anderson Economic Group include:

- *Governments*: The government of Canada; the states of Michigan, North Carolina, and Wisconsin; the cities of Detroit, Cincinnati, and Sandusky; counties such as Oakland County, and Collier County; and authorities such as the Detroit-Wayne County Port Authority.
- *Corporations*: Bank of America Merrill Lynch, InBev USA, ITC Holdings Corp., Ford Motor Company, First Merit Bank, Labatt USA, Lithia Motors, Meijer, Inc., National Wine & Spirits, Nestle, and Relevent Sports; automobile dealers and dealership groups representing Toyota, Honda, Chrysler, Mercedes-Benz, General Motors, Kia, and other brands.
- *Nonprofit organizations*: Convention and visitor bureaus of several major cities; higher education institutions including Michigan State University, Wayne State University, and University of Michigan; trade associations such as the Michigan Manufacturers Association, Service Employees International Union, Automation Alley, Business Leaders for Michigan, and the Illinois Public Pension Fund Association.

Please visit www.AndersonEconomicGroup.com for more information.

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Mr. Horwitz is a Senior Consultant at Anderson Economic Group, serving as the Director of the Public Policy and Economic Analysis practice area. Mr. Horwitz has extensive expertise on state and local economic conditions and on the economic and fiscal impacts of public policy. He has provided research, analysis, and expert testimony on policy in a range of fields, including state and local taxes, retirement benefits, business incentives, energy policy, and economic development.

Mr. Horwitz has advised governments, trade organizations, and corporations across the country on economic issues and the impacts of policy. His work also includes economic impact studies on universities, hospitals, museums, retailers, and large-scale events. His work has been featured in Bloomberg Businessweek, NPR Marketplace, Chicago Sun-Times, Detroit News, Crain's Chicago Business, and on WBEZ Radio.

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