Actuarial Changes:

What Do They Mean for Public Pension Funds?

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ILLINOIS PUBLIC PENSION FUND ASSOCIATION

Preparing Pension Funds for Tomorrow

Why Do We Fund?

- Benefit Security For Participants
- Budgetary Control For Plan Sponsors
- Intergenerational Equity

Purposes Of Funding

- In the public sector, the primary purpose is the funding of the pension plan and equity across all generations of taxpayers

1. Taxpayers hold the risk

2. Actuarial funding method determines annual contributions which are aimed to create a stable, sustainable benefit program

3. Balance sheet liability usually not an issue because actuarial liability is not shown on the balance sheet (new GASB rules may change this)

Purposes Of Funding

The “Funding Myth”

The “Funding Myth”

- Funded Percentage –

  A Quick Ratio Of Assets To Liabilities

  Easy To Measure Assets---Difficult To Measure Liabilities

The "Funding Myth"

The Hole In The Ground

The "Funding Myth"

- Filling The Hole – Each Year's Contribution

The Fundamental Equation Of Pension Funding

The Fundamental Equation Of Pension Funding

$$C + I = B_{(+e)}$$

The Fundamental Equation Of Pension Funding

FUTURE

$$C + I = B$$

PAST

Actuarial Impact of the New Pension Law

- For the first time the new pension law **mandates** actuarial methodology for Public Safety funds.
  - Actuarial calculations must use the Projected Unit Credit Method.
  - Assets must be valued using a specific actuarial smoothing method.

Actuarial Funding Methods

- There are several funding methods which all have the same ultimate goal: "guarantee" that there will be enough money available to pay the benefits when they come due

- However, each funding method has characteristics which will make one more appropriate than others in certain situations
  - Front load
  - Back load
  - Level payroll
  - Level contributions

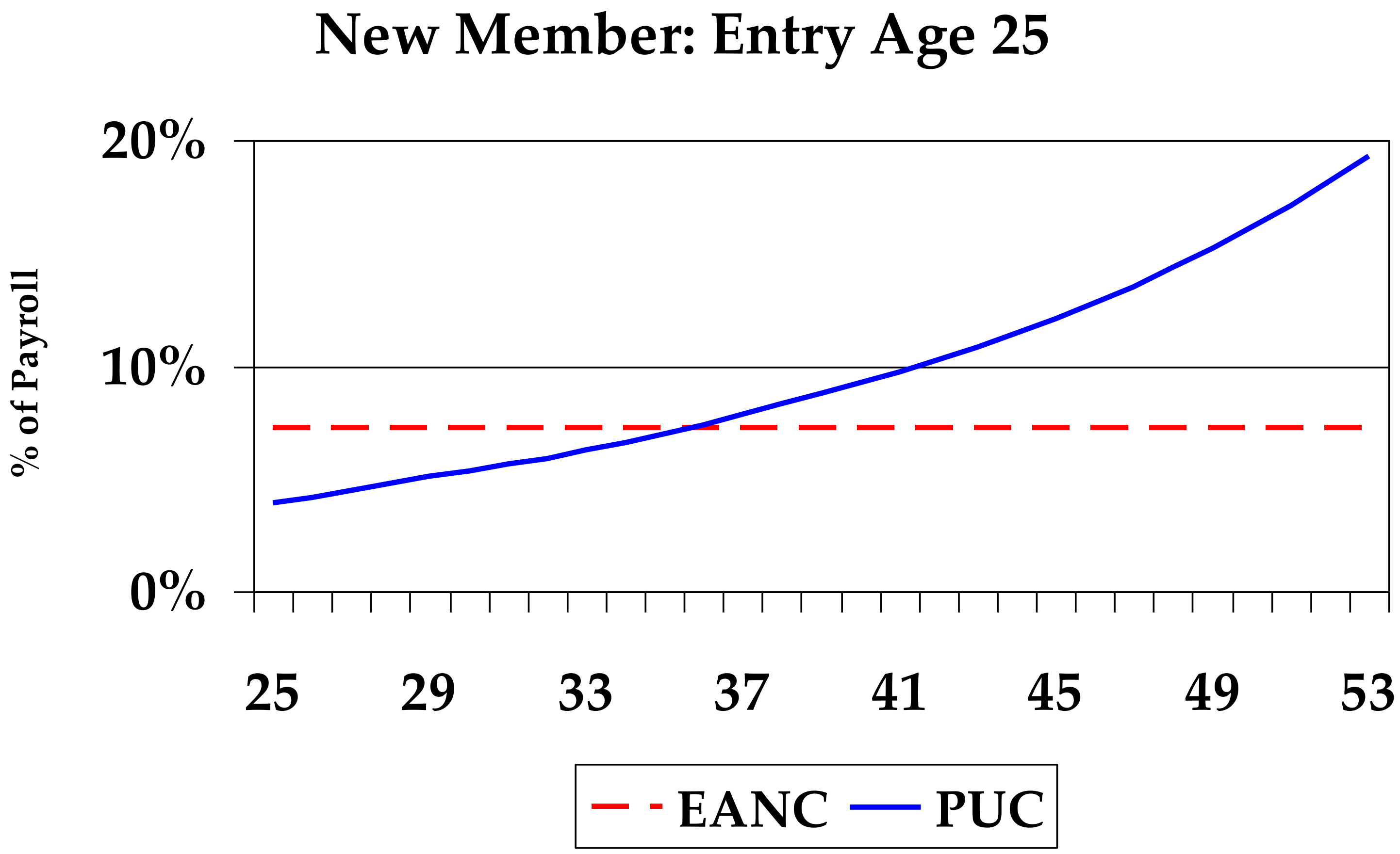
Entry Age Normal Cost

- Entry age normal attempts to create level contributions throughout the working career of the employee
  - Can be level dollar or a level percent of payroll
  - By far the most utilized funding method in the public sector
  - More costly early in the career of an employee

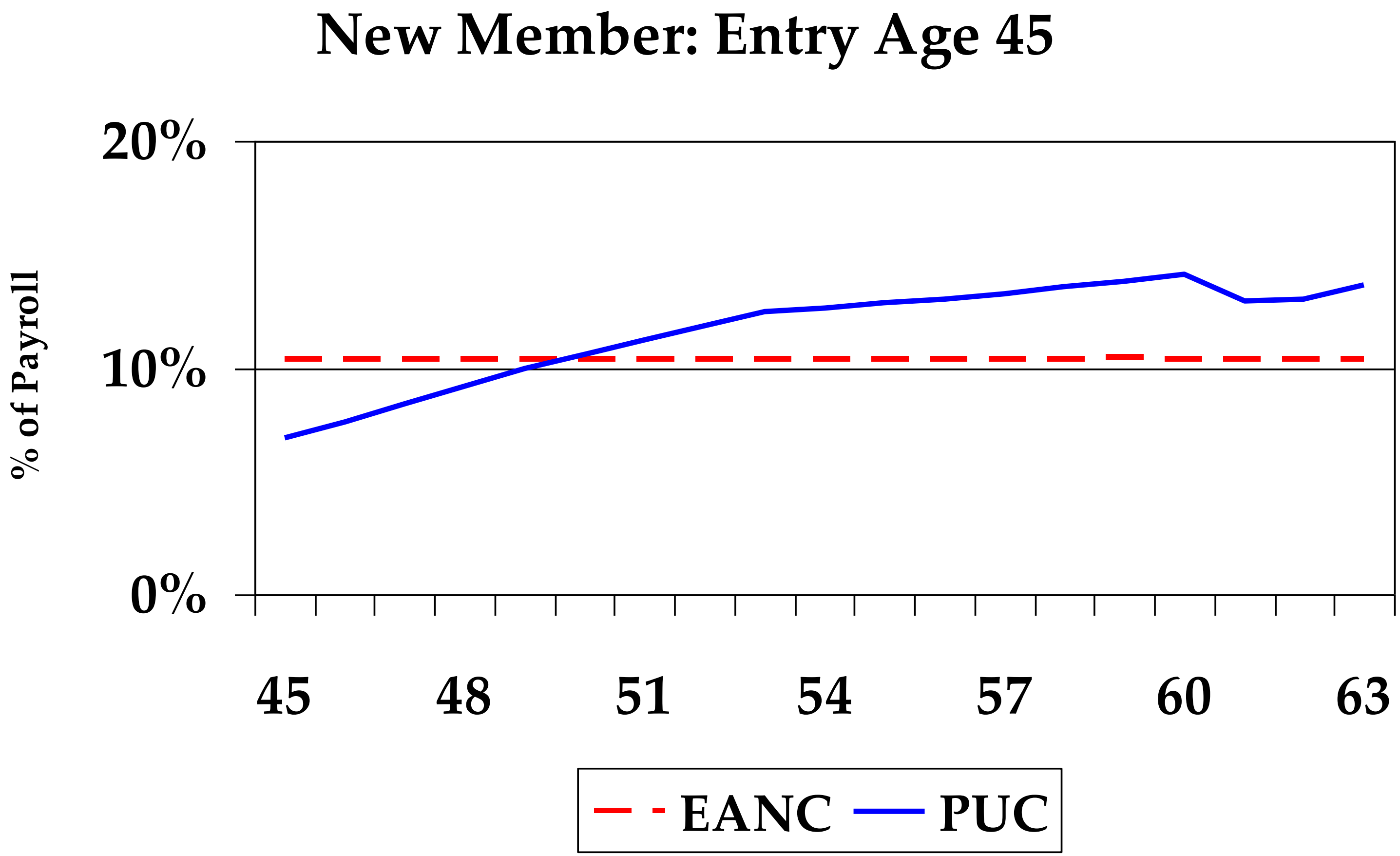
Projected Unit Credit (PUC)

- Projected Unit Credit attempts to fund the "true" present value of the benefits as they accrue, no spreading of costs
  - Creates lower costs early in an employee's career
  - Costs increase dramatically as retirement nears
  - Most common method in private sector valuations

Entry Age Normal vs. PUC



Entry Age Normal vs PUC



Actuarial Value of Assets (AVA)

New Tax Law

1) On March 30, 2011, the actuarial value of the fund's assets shall be equal to the market value of the assets as of that date.

2) In determining the actuarial value of the fund's assets for fiscal years after March 30, 2011, any actuarial gains or losses from investment returns incurred in a fiscal year shall be recognized in equal annual amounts over the 5-year period following that fiscal year.

The Contribution Requirement

- The contribution is set to be the sum of:
  - The normal cost for the year and
  - The amortization of the UAAL [90% under law]

- Another way to look at it:
  - The contribution for the current year

    plus
  - The contribution to make up any shortfall that may have occurred due to past experience or plan changes

Key Issues

- Selection of Assumptions should be a team approach (Board and Municipality/District).

- Assumptions should be evaluated at regular intervals by performing a “gain and loss” analysis. The larger the fund, the more frequent and detailed the analysis.

Actuaries At Work

0023

** TOTAL PAGE.207 **

Key Issues

Reasonableness Of Assumptions Is The Most Important Aspect!

Talk To Your Actuary!!

We Got Trouble
Right Here in Illinois
With a Capital "T"
and that rhymes with "C"
and that stands for
COGFA

Comparison of Statutory Language regarding the annual actuarial requirement

Prior to January 1, 2011:

The Normal Cost …

Plus

…the annual amount necessary to amortize the fund's unfunded accrued liabilities over a period of 40 years from July 1, 1993, as annually updated and determined by an enrolled actuary…

40 ILCS 5/4-118(a)

Comparison of Statutory Language regarding the annual actuarial requirement

After January 1, 2011:

The Normal Cost…

Plus

…an annual amount sufficient to bring the total assets of the pension fund up to 90% of the total actuarial liabilities of the pension fund by the end of municipal fiscal year 2040, as annually updated and determined by an enrolled actuary…

40 ILCS 5/4-118(a)

Comparison of Language

Prior	Current
the annual amount necessary to amortize the fund's unfunded accrued liabilities over a period of 40 years from July 1, 1993, as annually updated and determined by an enrolled actuary	**an annual amount sufficient to bring** the total assets of the pension fund up to 90% of the total actuarial liabilities of the pension fund by the end of municipal fiscal year 2040, as annually updated and determined by an enrolled actuary

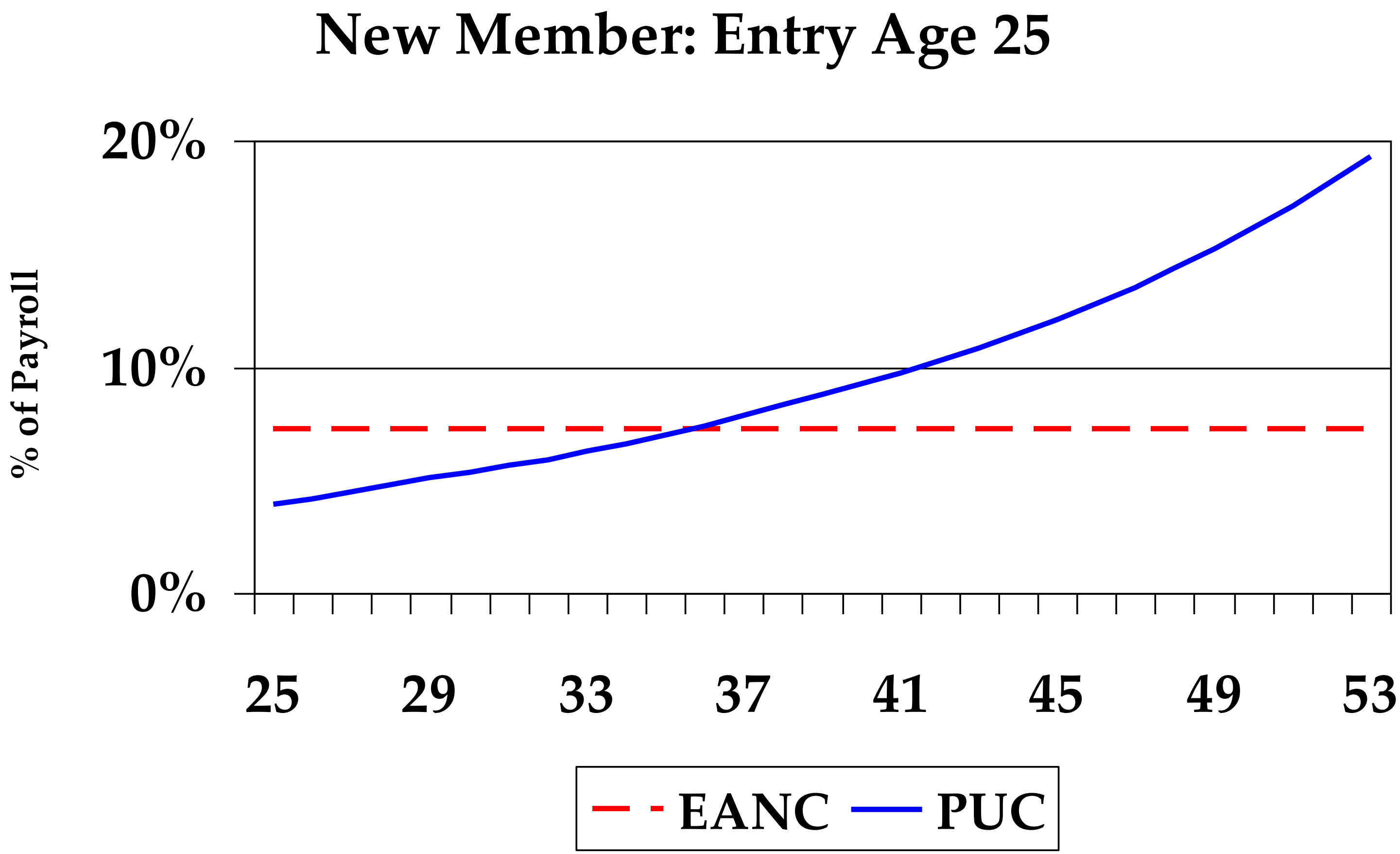
Comparison of Language

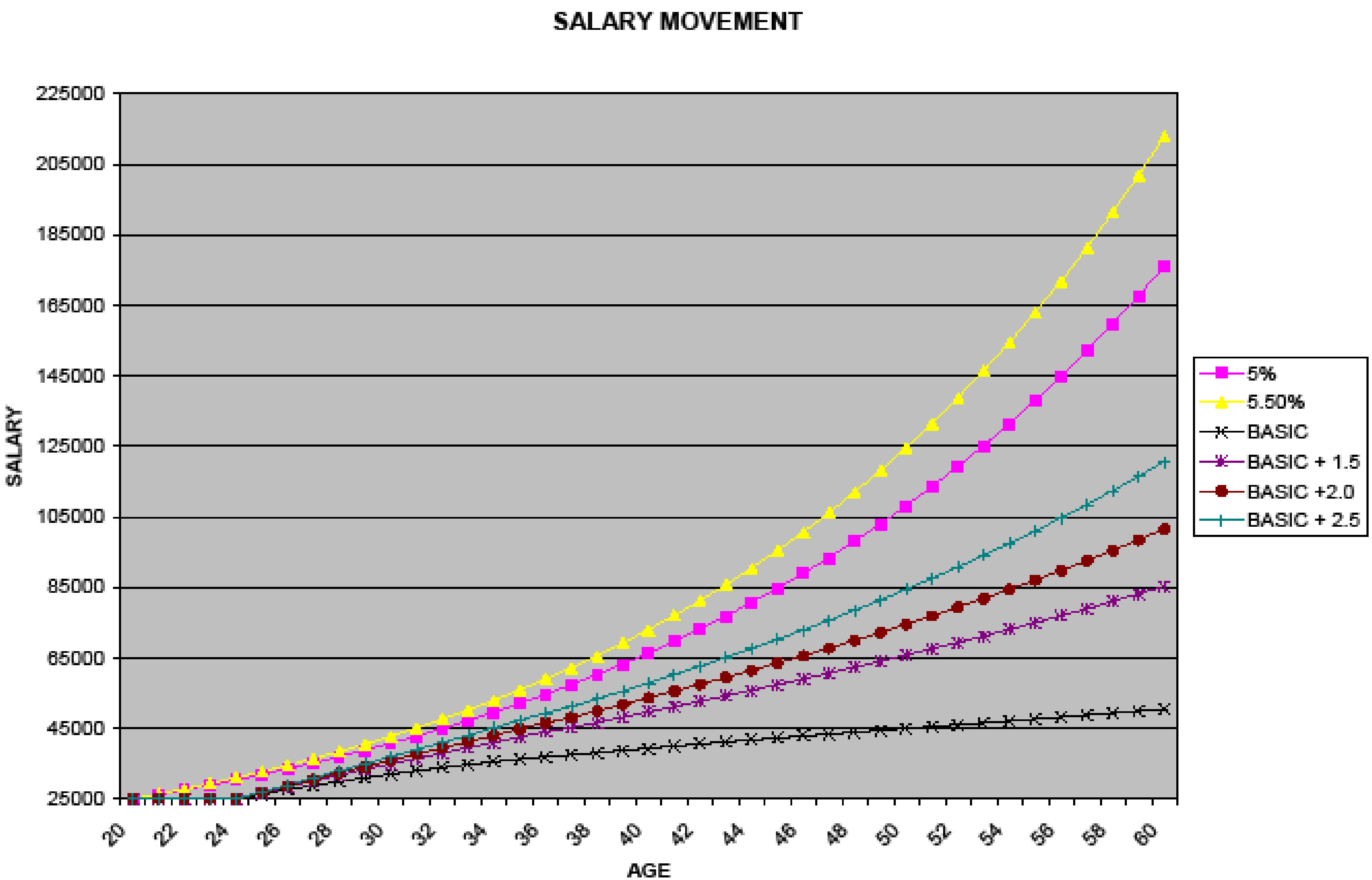
Prior	Current
"Necessary Condition"	*"Sufficient Condition"*
Must be there for the effect to be true	*Whenever A is present, B will follow*
If absent, cannot occur.	

So What is Supposed to Happen?

Switch from EANC to PUC

Entry Age Normal vs. PUC




SALARY MOVEMENT
225000
205000
185000
165000
145000
125000
105000
85000
65000
45000
25000
SALARY
20
22
24
26
28
30
32
34
36
38
40
42
44
46
48
50
52
54
56
58
60
AGE
5%
5.50%
BASIC
BASIC + 1.5
BASIC +2.0
BASIC + 2.5

But what does COGFA think?

Excerpts from the New York Times article September 18, 2010

The Illusion of Pension Savings

Earlier this year, Illinois said it had found a way to save billions of dollars. It would slash the pensions of workers it had not yet hired. The real-world savings would not materialize for decades, of course, but thanks to <u>an actuarial trick,</u> the state could start counting the savings this year and use it to help balance its budget.

Actuaries, including some who serve on the profession's governing boards, got wind of what Illinois was doing and began to look more closely.

Excerpts from the New York Times article September 18, 2010

The Illusion of Pension Savings

"In a plan that is not well funded, I wouldn't recommend it," said Norm Jones, chief actuary for Gabriel Roeder Smith & Company, an actuarial firm that helps Illinois and a number of other states that have adopted the method. He said the firm's actuaries informed officials of the risks and it was the officials' decision to use the technique.

"Responsible funding methods do not work this way," said Jeremy Gold, an independent actuary in New York who has been outspoken about the distortions built into pension numbers. He said the technique was much like the mortgages with very low teaser rates that proliferated during the housing bubble.

Excerpts from the New York Times article September 18, 2010

The Illusion of Pension Savings

Dubious pension numbers in Illinois are not easily shrugged off after a warning shot fired by the Securities and Exchange Commission in August.

Actuaries must disclose their methods and assumptions, but this one has been hidden in plain view because it often goes by the name of a method that is widely used and is accepted by the Governmental Accounting Standards Board.

The technique falls into a family of complex and subtle calculations called “cost methods,” which actuaries use to spread pension costs over many years. Few outside of the profession know how the cost methods work or what their names mean.

Excerpts from the New York Times article September 18, 2010

The Illusion of Pension Savings

Illinois issued public documents this year naming its cost method as one that did not permit the cost of future employees' benefits to be factored into the current year's contributions. The apparent contradiction caught actuaries' attention.

Sandor Goldstein, an actuary who helps the state operate some of the pension funds in its big system, acknowledges that Illinois's disclosures are "somewhat misleading." He also said he had warned the state that its funding method "may not be an appropriate one."

Illinois's pension funds are more fragile than most, but their survival is essential to thousands of people. The state's teachers and certain other workers do not participate in Social Security, so for them, the pension fund is their only source of retirement income.

Excerpts from the New York Times article September 18, 2010

The Illusion of Pension Savings

Frank Todisco, senior pension fellow at the American Academy of Actuaries, declined to comment on the situation in Illinois, but said the Actuarial Standards Board was working on revised standards that, if adopted, would clarify actuarial assumptions and lead to more detailed descriptions of risk.   It can easily take several years to revise an actuarial standard. That may not be fast enough to help Illinois's pension system, which continues to sink.

"When you're in a deep hole, it's a long way out," said Mr. Jones.

"THE ACTUAL TRICK"

- *Closed Group Method–* Traditional actuarial approach to perform a valuation of the current members of the group.

- *Open Group Method–* First developed in the 1970's to model alternative population and experience scenarios to evaluate their effects on potential asset growth and future funding levels. <u>Not designed to determine statutory contribution amounts.</u>

"THE ACTUARIAL TRICK"

Closed Group Method

Used for determining annual contributions for funding purposes.

Relies on a "Stationary Population"

Uses traditional actuarial methodology

“THE ACTUARIAL TRICK”

Open Group Method

(Projected Actuarial Valuation)

Used for analyzing assumptions and cost methods

Considers scenarios of population growth and/or decline

Uses statistical analysis to develop scenarios of possible outcomes and analyzes probability models for sensitivity.

"THE ACTUARIAL TRICK"

Open Group Method

(Projected Actuarial Valuation)

Step 1: Project the financial characteristics for the analysis period assuming the actuarial assumptions used in the regular valuation are exactly fulfilled.

Step 2: Project the population characteristics for the analysis period assuming a population growth and/or decline.

Step 3: Develop probability models of the potential liabilities and funding levels which can occur.

Step 4: Apply statistical techniques to measure the likelihood of each alternative scenario. Monte Carol simulation.

Step 5. Modify the financial assumptions selected in Step 1 and repeat the analysis.

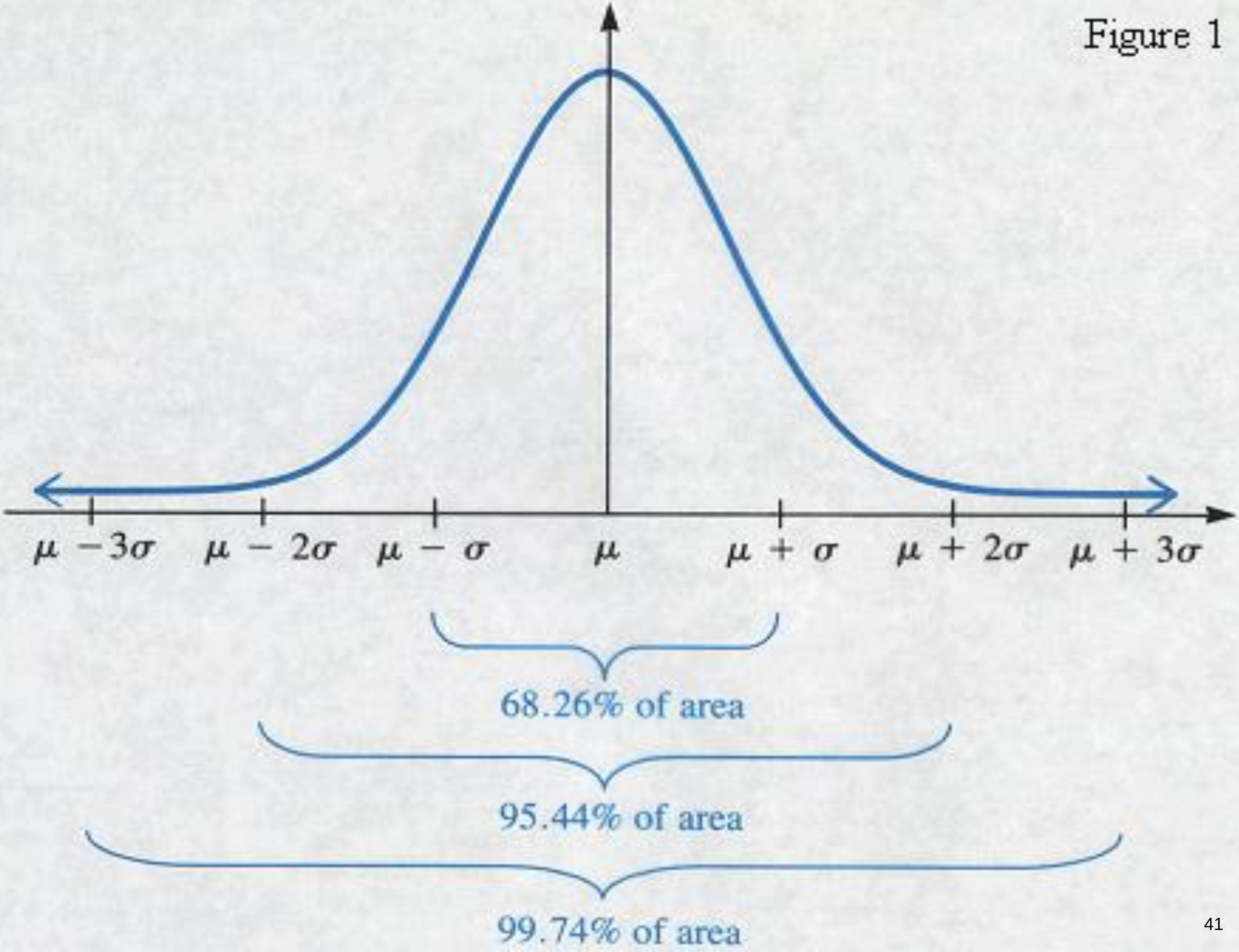
"THE ACTUARIAL TRICK"

If one were to apply the technique to determine a statutory contribution, here is how it should be done.

- Perform 30 annual actuarial valuations using the current participants in the fund and the selected actuarial assumptions.
- For each valuation make an additional assumption of new entrants, examining all possible reasonable characteristics: age at hire, salary at hire.
- For each valuation make an additional assumption of future growth rate in the population.
- Graph all of the results to determine the mean and standard deviation of the distribution.

THE GRAPH WOULD LOOK LIKE THIS:

Figure 1



$\mu - 3\sigma$
$\mu - 2\sigma$
$\mu - \sigma$
μ
$\mu + \sigma$
$\mu + 2\sigma$
$\mu + 3\sigma$
68.26% of area
95.44% of area
99.74% of area

"THE ACTUARIAL TRICK"

Determine the confidence limit (95% –99%) and test each valuation within the confidence limit for a contribution percentage.

Apply a "Monte Carlo Simulation" analysis to determine the appropriate contribution percentage.

What Does *Monte Carlo Simulation* Mean?

A problem solving technique used to approximate the probability of certain outcomes by running multiple trial runs, called simulations, using random variables. (Approximately 10,000 simulations)

"THE ACTUARIAL TRICK"

Open Group Method

(Projected Actuarial Valuation) –

How Illinois Does it!

Step 1: Project the financial characteristics for the analysis period (30 years) assuming the actuarial assumptions used in the regular valuation are exactly fulfilled.

“THE ACTUARIAL TRICK”

Open Group Method

(Projected Actuarial Valuation) –

How Illinois Does it!

Step 2. Project the population characteristics for the analysis period (30 years) assuming a constant population which replaces the current tier 1 participants with tier 2 participants.

“THE ACTUARIAL TRICK”

Open Group Method

(Projected Actuarial Valuation) –

How Illinois Does it!

Step 3: Net the results from Steps 1 and 2 and target a 90% funding level in 2040 on the final group.

"THE ACTUARIAL TRICK"

Open Group Method

(Projected Actuarial Valuation) –

How Illinois Does it!

Step 4. Guess at a contribution amount (% of pay) that will work and test to see if it remains level during the period. Keep guessing until you get close and then STOP!

“THE ACTUARIAL TRICK”

Open Group Method

(Projected Actuarial Valuation) –

How Illinois Does it!

MAJOR PROBLEM

The methodology includes all possible outcomes, using the assumptions stated, and therefore includes analyses of poorly funded groups going bankrupt.

"THE ACTUAL TRICK"

Open Group Method

(Projected Actuarial Valuation) –

How Illinois Does it!

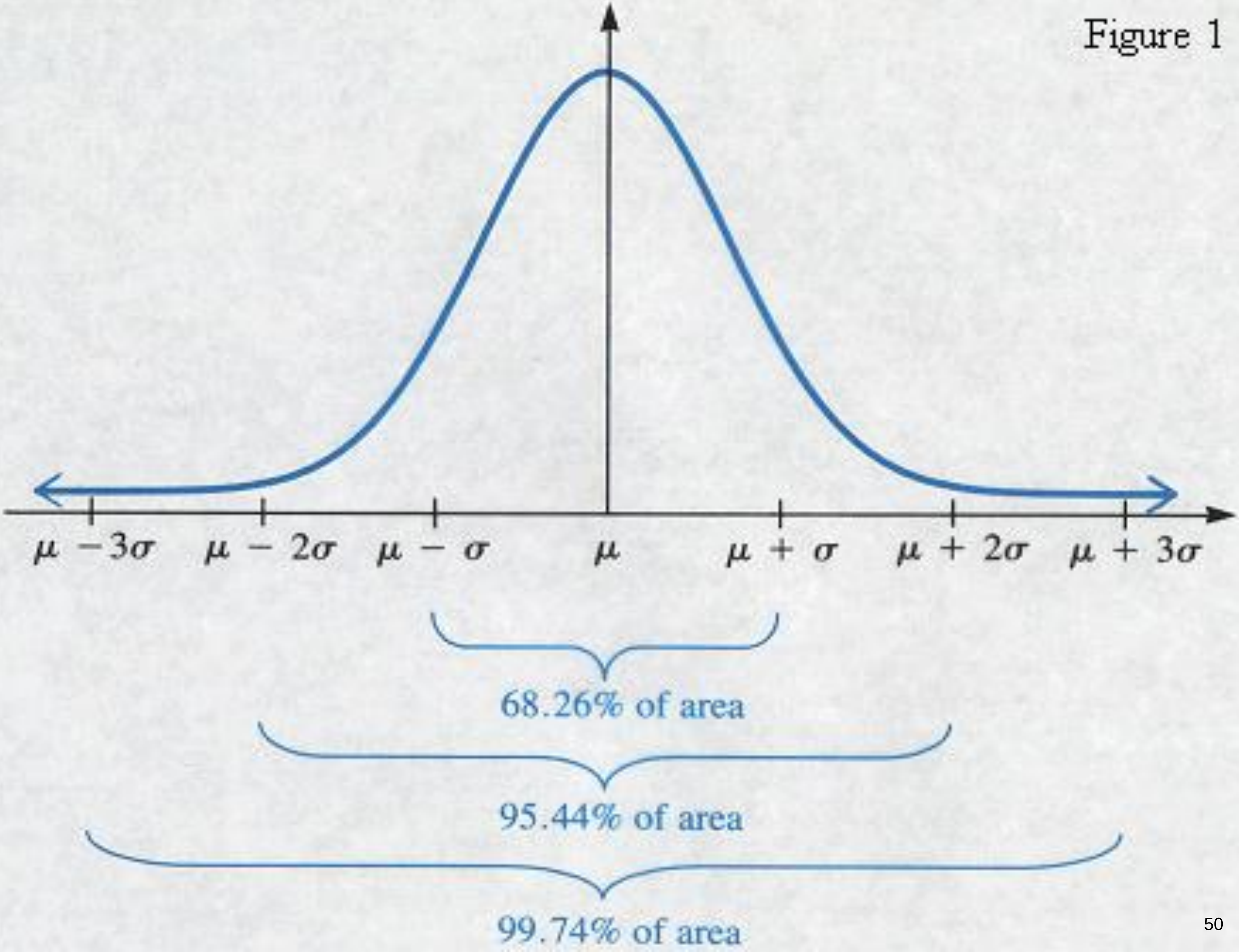
ANOTHER MAJOR PROBLEM

There are no assumptions made for population growth or shrinkage, thus the estimates are faulty.

"THE ACTUARIAL TRICK"

1980 Census	*Municipality*	*2010 Census*
66,116	Arlington Hts.	73,153
99,637	Springfield	118,033
58,113	Champaign	80,286
19,811	Bellwood	18,853
28,229	Wilmette	26,300
53,305	Schaumburg	71,301
5,260	Grayslake	21,698
3,369	Montgomery	15,335
42,300	Naperville	143,661

Figure 1


$\mu - 3\sigma$
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$\mu - \sigma$
μ
$\mu + \sigma$
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$\mu + 3\sigma$
68.26% of area
95.44% of area
99.74% of area

"THE ACTUARIAL TRICK"

Open Group Method

(Projected Actuarial Valuation) –

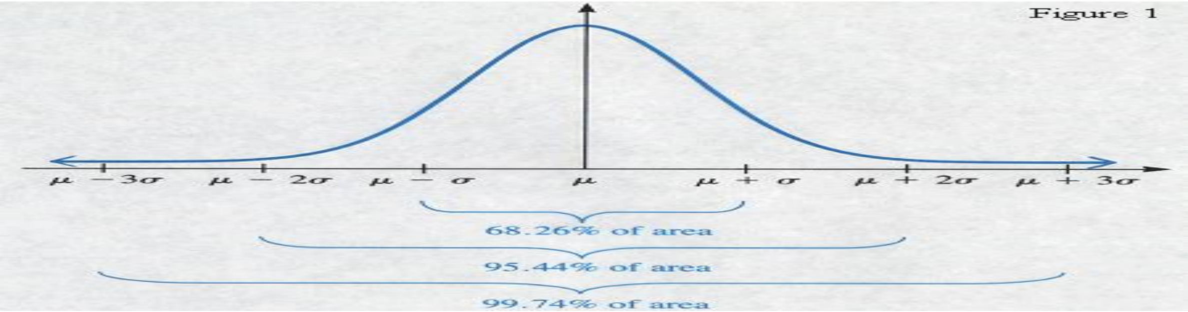
How Illinois Does it!

ANOTHER MAJOR PROBLEM

Because the group size is so small, the graph really looks like this.

"THE ACTUARIAL TRICK"

How Illinois Does it!



The statistics fail because there is no usable confidence limit.

"THE ACTUARIAL TRICK"

Open Group Method

(Projected Actuarial Valuation) –

How Illinois Does it!

COGFA

doesn't seem to understand or care!

BUT

we may have a Partner
Right Here in Illinois
With a Capital “P”
and that rhymes with “G”
and that stands for

GASB

"THE ACTUARIAL TRICK"

GASB "Preliminary Views" indicate that disclosure of actuarial liabilities for Comprehensive Annual Financial Reporting (CAFR) must be calculated using the **Entry Age Normal Cost** method as a level percentage of payroll and must use **a closed group** for these calculations.

Breaking News!!!!

Wall Street Journal – January 25, 2011

The Securities and Exchange Commission has launched an inquiry into public statements by Illinois officials about the state's underfunded pension fund, according to a report.

The Wall Street Journal claimed the inquiry was focused on public statements concerning a measure passed last year intended to shore up the retirement system.

The newspaper said one issue being examined is whether Illinois was taking future savings and treating them as current reductions in the cost of the pension fund. A measure Illinois took to save costs was to raise the retirement age for newly hired Illinois workers.

January 26, 2011– Illinois unveiled overhauled reporting standards in its latest bond offering statement that also announced a rise in unfunded pension liabilities to $75.7 billion and revealed a pending SEC inquiry.

Breaking News!!!!

Wall Street Journal – January 25, 2011

In October Moody's Investor Services downgraded Illinois general obligation bonds following concerns over its unfunded pension liabilities.

The ratings agency revised its outlook on the state from stable to **negative**, affecting $25bn of debt in the state.

Moody's said Illinois reported a very large negative fund balance for the last fiscal year and faced fragile economic conditions and continuing uncertainty over its ability to meet pension funding obligations.

So far, Illinois has incurred over $7bn in long-term debt and $3.8bn of pension funding debt.

Q & A