Methodological Notes

This appendix provides background information and additional detail regarding the assumptions and methodology used in IBO's analysis of the Chapter 96 reopener legislation. The appendix is divided into three sections. The first section provides an overview of the pension systems covering employees of New York City. The second part reviews the major actuarial assumptions employed in IBO's pension analysis. Finally, the third section gives a description of the methodology employed by IBO in its analysis of the Chapter 96 reopener.

NEW YORK CITY PENSION SYSTEM

New York City contributes to five separate pension systems. An employee's pension system membership is determined by occupational title and employment agency. The five pension systems are:

- New York City Employees' Retirement System (NYCERS). This system covers most of the civilian workforce. The system also covers certain uniformed employees such as correction officers, uniformed sanitation titles, fire alarm dispatchers and emergency medical technicians. Additionally, former and retired members of the New York City Housing and Transit Police are members of NYCERS.
- New York City Teachers Retirement System (TRS). This pension system covers teachers and pedagogical personnel of the Department of Education (DOE) and the former Board of Education (BOE). Paraprofessionals of the Department of Education have the option of joining TRS. Full-time teachers at the City University of New York have the option of joining TRS.
- Board of Education Retirement System (BERS). This system covers those personnel of the DOE and BOE who are not eligible to join the TRS. Additionally, employees of the School Construction Authority, the DOE's Office of the Special Commissioner of Investigations, and school crossing guards employed by the New York Police Department are also eligible to join BERS.
- New York City Police Pension Fund. This retirement system covers all uniformed personnel of the New York Police Department. Additionally, it covers former uniformed members of the New York City Housing and Transit Police Departments (formerly, members of NYCERS), who were later merged into the city's police department.
- New York City Fire Pension Fund. This retirement system covers all uniformed employees of the city's fire department, except personnel of the Emergency Medical Service, who are part of NYCERS.

The Chapter 96 reopener only affects NYCERS and BERS members.

NYCERS and BERS Pension Plan Overview. Public employee pension benefits are protected benefits under the pension diminution clause of the New York State Constitution. Consequently, any change in a retirement plan's benefits and features can only apply to either new members or to current members who elect to accept a new retirement plan. When major changes have occurred, the systems designate the new terms a "Tier."

For NYCERS and the BERS, there are currently four tiers, and the reopener only applies to Tiers II and Tier IV. Tier I membership is granted to those eligible employees who were members before July 1, 1973. Tier II membership is granted to those eligible employees who were members between July 1, 1973 and prior to July 27, 1976. Tier III membership is granted to those eligible employees who became members from July 27, 1976 to August 31, 1983. However, because Tier III provisions had a retirement allowance reduction for civilian employees equal to 50 percent of the Social Security benefit they accrued while they were in city public employment, virtually all former Tier III civilian members are now in the Tier IV plan, which has no such reduction. Tier IV membership is granted to those eligible employees who became members on or after September 1, 1983.

The basic Tier IV retirement plan allows an eligible employee to retire at age 62 with at least five years of creditable service, commonly referred to as the standard Tier IV "62/5" retirement plan. However, within Tier IV, there are a bevy of special retirement plans. These retirement plans are based primarily on occupation. For example, a deputy sheriff can retire at any age after 25 years of creditable service.

In addition, the original Chapter 96 legislation established the "57/5" retirement plan for most new employees who were hired after June 28, 1995. New employees are mandated into this program if they were not employed in an eligible position on that date and subsequently become a member. Most NYCERS and BERS civilian members who did not participate in either the original Chapter 96 "25/55" plan or the 57/5 plan remained in the basic Tier IV 62/5 plan.

While Tier I allows an eligible individual to retire as early as age 55 without penalty, both Tier II and Tier IV standard retirement programs only allows an unreduced retirement allowance at age 62. Thus, the Chapter 96 reopener will allow the opportunity for Tier II and Tier IV members to retire as early as age 55 without any penalty.

Tier II and Tier IV Pension Details. There are three Tier II plan types. The Article 11 Modified Career Pension Plan (Plan C) and the Modified 55 Year Increased Service Fraction Plan (Plan D) allow BERS and NYCERS members to retire without penalty at age 62. Plan C and Plan D members have the option to retire as early as age 55; however, there is an actuarial reduction in one's pension allowance. The reduction depends on retirement age, with a steeper percentage reduction beginning at age 55 and decreasing accordingly the closer one gets to the age 62 normal retirement age.

The Tier II Career Pension Age 55 Improved Retirement Plan (CPP 25/55) allows Tier II members to retire as early as age 55 after the completion of 25 years of creditable service. Like the Chapter 96 25/55 retirement plan, though, there is no provision in the CPP retirement plan for vesting if one does not have the age or creditable service requirements. Consequently, those Tier II members who are enrolled in this program will not benefit from the Chapter 96 reopener.

Member Contributions. All Tier II members contribute basic member contributions (BMCs) towards their retirement allowance. These basic member contributions are based on a set percentage of creditable pay determined by the age when an employee first becomes a NYCERS or BERS member. BMCs are maintained in an Annuity Savings Fund account (ASF) and are required for the first 25 years of creditable employment. BMCs are reduced by additional employer contributions (currently 2.0 percent of gross pay); these contributions are commonly referred to as Increased Take-Home-Pay (ITHP) contributions.

Employees in the Tier II CPP 25/55 retirement plan must currently contribute additional member contributions (AMCs) in order to have the opportunity to retire as early as age 55 without penalty. These AMCs are in effect for the first 25 years of creditable service.

All NYCERS and BERS members in the basic Tier IV retirement plan must make member contributions of 3.0 percent of all wages, including overtime. This 3.0 percent basic Tier IV membership contribution expires on the member's 10th anniversary of membership in NYCERS/ BERS or the date the member accumulates 10 years of creditable NYCERS/ BERS service, whichever comes first. There are no AMCs for those municipal workers who are enrolled in the basic Tier IV 62/5 program.

Pension Benefit Calculations. Under the Tier II Plan C pension plan, members who have completed 25 years of creditable service and are age 62 will receive a pension allowance equal to 55.0 percent of their final average salary (FAS). For those members who have service credit beyond 25 years, there is an additional retirement allowance equal to 1.7 percent times FAS times years of additional service after June 30, 1968; plus 1.2 percent of FAS times years of service for all additional service before July 1, 1968; plus an additional annuity based on the actuarial value of additional ITHP contributions and interest (after the completion of 25 years of creditable service); plus an annuity based on excess employee contributions. As stated previously, if a member retires earlier than age 62, their retirement allowance is actuarially reduced.

Under the Plan D Tier II plan, members are eligible for an unreduced pension at age 62 or a reduced pension as early as age 55 if he or she has at least five years of creditable service. The amount of the pension allotment equals 1.53 percent times FAS times years of service after June 30, 1968; plus 1.20 percent times FAS times years of service before July 1, 1968; plus an annuity based on additional ITHP contributions and interest; and an annuity based on excess member contributions.

The Tier II CPP 25/ 55 retirement plan pension formula is the same as the formula for plan C, except there are no actuarial reductions for those who elect to retire as early as age 55. FAS under Tier II is defined as the greater of the average annual wages, including overtime, earned during any three consecutive calendar-year periods or the final 36 months immediately preceding the employee's retirement date. Moreover, the salary earned during any year of the three year average cannot exceed 120.0 percent of the average of the two previous years.

Under the Tier IV 62/5 service retirement plan, members outside the "physically taxing" titles cannot receive a normal service retirement before the age of 62. For those Tier IV members with 20 or less years of NYCERS creditable service, the normal service-based retirement allowance consists of 1.67 percent times years of service times FAS. Similar to the Tier II CPP 25/55 plan, FAS is defined as the greater of the average annual wages, including overtime, earned during any three consecutive calendar-year periods or the final 36 months immediately preceding the employee's retirement date. However, if the salary earned during any year of the three year average exceeds the average of the previous two years by more than 10.0 percent, the amount in excess of 10.0 percent is disallowed for the computation of the FAS.

For those members with 20 or more years of NYCERS creditable service, the normal service based individual retirement allowance consists of 2.0 percent times years of service times FAS. For participants with 30 or more years of creditable service, the pension calculation consists of 2.0 percent times FAS times 30, plus 1.5 percent times FAS times years of creditable service in excess of 30.

OVERVIEW OF MAJOR STUDY ASSUMPTIONS

For purposes of comparability, this study followed most of the assumptions proposed by the New York City Office of the Actuary, although there were several important modifications on IBO's part.

Interest Rate Assumption. IBO followed the Actuary's use of an actuarial interest rate assumption of 8.0 percent for the five pension funds, over the long term.

Staffing Assumptions. The Actuary's estimate of the pension costs that would result from the Chapter 96 reopener used a broader definition of employees eligible for the Chapter 96 reopener. This difference in headcount estimates primarily concerns NYCERS members. In its fiscal note, the Office of the Actuary does not distinguish between city employees and non-city employees who are NYCERS members and who are otherwise subject to this potential legislation, since the Office of the Actuary was calculating overall pension costs, rather than the direct cost to the city. Thus, the Office of the Actuary included in its estimate the following employee cohorts who are also members of NYCERS but not employees of the City of New York: the MTA New York City transit, MTA Bridges and Tunnels, the New York City Housing Authority, Off-Track Betting Corporation, the New York City Health and Hospital Corporation, the New York City School Construction Authority, the New York City Housing Development Corporation, New York City Residential Mortgage Insurance Corporation, the New York City Municipal Water Authority, and some New York State employees.

In contrast, since IBO focused on city costs, we have only included qualified employees who work for New York City.

IBO also excluded from our estimate of potentially affected NYCERS and BERS members those employees who were not on the city payroll as of June 28, 1995 and are currently in the Tier IV 57/5 plan. All other Tier IV 62/5 employees are included in the calculation. Additionally, with respect to Tier II retirement plan members, IBO only included those employees who are in either the Article 11, Plan C or D retirement programs

IBO further assumed that only employees who would benefit, based on age, accumulated service time and current salary, would elect to sign up for the reopener. Using the pension allotment of 50 percent of FAS as the baseline metric for determining whether the Chapter 96 option actuarially benefits an employee, IBO estimated that this proposal would only benefit those Tier IV employees who were younger than 37 when they entered city service and those who are not age 61 or over. Thus, this Chapter 96 option primarily affects those city employees who came in at a relatively early age and who have a higher wage profile than the typical municipal employee.

In addition, IBO has also excluded those employees who are in titles that allow them to sign up for membership in a NYCERS special occupational retirement program. These programs include several titles such as fire alarm dispatcher, emergency medical technician, deputy sheriff, special officer, district attorney investigators, and police communication technicians. IBO excludes not only members who signed up for these irrevocable special retirement programs, but also excludes members who were eligible to sign up for these special retirement programs, but chose not to sign up. For example, a police communication technician who was on the active payroll on June 28, 1995 and chose not to participate in the original Chapter 96 program and subsequently declined to join the special police communication technician retirement program was excluded from our list of employees who could potentially sign up for this retirement option.

There are primarily two reasons for excluding those titles that are eligible for special occupational retirement benefits. First, those incumbents that are in a special occupational retirement program initially elected this retirement option as an irrevocable election and thus, IBO assumes that this election cannot be subsequently changed. Secondly, for those current Tier IV 62/5 incumbents who are in an eligible title that is covered by a special occupational program, IBO assumes that if the incumbent declined participation in the original Chapter 96 25/55 program and subsequently declined participation in a special retirement plan for an eligible title, then the chances are fairly remote that this individual would elect the Chapter 96 reopener, especially given the steep employee cost of joining this early-retirement plan.

IBO also excluded all United Federation of Teachers-represented employees who are members of BERS. Additionally, IBO also excluded from potential participants those BERS members who may be otherwise eligible and are currently employed by the School Construction Authority or any charter school.

Based on these assumptions, IBO estimates that there are 17,048 active employees potentially eligible to elect the Chapter 96 reopener currently on the city payroll. We estimate that 7,983 will choose to elect this option. In contrast, the Office of the Actuary expects a total of 9,410 to elect this option, a difference of 1,427 employees. IBO also estimates that the average beneficiary of this program will be almost 50 and have approximately 22 years of creditable service.

Wage Assumptions. IBO's cost estimate is based on fiscal year 2007 salaries of these 7,983 individuals. This is done to be consistent with the current pension lag methodology that is currently used in determining pension valuations. Under the current pension lag methodology, fiscal year 2009 pension costs are based on the pension liabilities accrued through June 30, 2007.

IBO's assumptions about wages are consistent with those of the Office of the Actuary. General wages are assumed to rise 3.0 percent each year. Annual growth in other forms of pay—including night differentials, wage progression increments, and salary increases that result from promotions—is assumed to gradually slow to 1.5 percent in year 15 and remain at that rate. NYCERS civilian employees are assumed to earn 4.0 percent in overtime annually, while no overtime is assumed for BERS employees.

The Office of the Actuary also allows for dual overtime assumptions that account for the estimated probability that employees planning their retirement will attempt to boost their FAS base before retirement in the hopes of accruing a bigger pension allotment. For eligible Tier II and Tier IV members, this dual overtime assumption is applicable to the final three years before retirement. With respect to general civilian NYCERS and BERS members, the dual overtime assumptions are the same as the general overtime assumptions, with no marginal increase in expected overtime compensation for these affected employees.

Mortality and Gender Assumptions. IBO's baseline mortality estimates begin with the assumption that both men and women who elect early retirement under the Chapter 96 program would normally retire at age 62. We expect 62.3 percent of the participants will be female, reflecting the composition of the city's civilian workforce and the fact that a significantly greater share of potential Chapter 96 retirees is members of NYCERS rather than of BERS.

In estimating the mortality rates for employees who elect the Chapter 96 reopener, IBO used the most recent versions of the Office of the Actuary's "Probabilities of Mortality after Service Retirement" valuation tables (**link to table**).

The tables, which specifically account for improvements in future mortality rates based on such factors as improvements in medical technology, show mortality rates for employee cohorts by gender after service retirement. While it is important to note that the differential in the rates of mortality improvement for women has slowed relative to that of men in recent years, the difference remains statistically significant. IBO assumes that the average life expectancy of men and women who choose participate in the Chapter 96 program is 77 and 83, respectively.

Finally, IBO assumes that the mortality rates for the cohort of employees who choose to retire early is no different than the rates for employees who choose not to participate.

Member Contributions. Because the retroactive AMCs will be significant, IBO assumes that many participants will have a deficit in their Retirement Reserve Fund (RRF), an account that holds the AMCs of BERS and NYCERS members. As a result, these members' pension checks will be actuarially reduced to reflect the deficit or they will take out pension loans against their member contributions.

RESEARCH METHODOLOGY

Overview. This study estimates the difference in actuarial present value under two scenarios. One scenario involves the calculation of the actuarial present value of pension benefits for employees who elect to take advantage of the early-retirement provisions of the Chapter 96 reopener. The other scenario involves calculating the actuarial present value of pension benefits for these same employees under the status quo. The differences in the actuarial present value, normalized at time, are then spread out annually on a discounted basis of 8.0 percent from fiscal year 2009 until the expected date of retirement for the typical Chapter 96 participant.

Simulations. The first step was to compute the estimated final average salary of the elected cohort under the two scenarios. The FAS is determined by an individual's last three years of earnings, with salary, overtime, and other forms of pay (merit wage) estimated using assumptions consistent with those of the Office of the Actuary.

IBO then estimated the average annual pension allotment, based on years of service, which is a percentage of FAS under the two scenarios. Under the baseline scenario, the calculated pension amount is higher than under the early retirement scenario, because an individual who works additional years will have a higher FAS than a Chapter 96 early retiree, as well as a higher percentage multiplier.

In order to estimate the actuarial present value of the pension payments that will be required under both scenarios, it is necessary to have three pieces of information: the series of uniform payments (the pension), the interest rate (which is the actuarial interest rate assumption of 8.0 percent), and the duration of the expected payments. In order to estimate the duration of these pension payments, it is necessary to estimate expected mortality. Since mortality varies significantly between men and women, IBO's mortality estimates are gender-specific.

After calculating the estimated actuarial present value of the pension obligation under both scenarios, IBO then computed the estimated annual pension payments needed to fund that obligation on a discounted basis starting from the average age of entry into the pension system to the expected date of retirement, which differs under the status quo and Chapter 96 scenarios.

Subtracting the difference in the necessary discounted annual payments under the two scenarios gives us the shortfall between what has been contributed under the assumption that workers would not retire till age 62 and what those payments would have needed to be if it had been known from the start of a worker's career that they would be retiring at age 55. The future value of that difference is then computed over the average working lifetime of those expected to elect the Chapter 96 reopener.

Since the city cannot retroactively make pension payments—along with the investments earnings garnered from these pension payments—to make up that difference, the time frame for calculating the additional annual pension payment needed to cover the difference between the two scenarios covers only the period between fiscal year 2009 and the new expected retirement age of the Chapter 96 cohort. With a reduced time frame to make up the difference, the additional annual payments are quite large. The compressed time frame accounts for most of the additional pension cost.

Next IBO adjusted the necessary additional annual pension payment to take into account the additional member contributions that would be required of employees who elect Chapter 96. Similar to how employer contributions were treated, IBO estimated the future value of these AMCs at retirement and estimated the annual payment on a discounted basis using the period from fiscal year 2009 to the expected fiscal year of retirement. This offset was then subtracted to yield the estimated first year additional pension costs for New York City.

NYCERS and BERS Annual Wage Increase			
Years of Service	General Wage Increase	Merit Wage Increase	Total Wage increase
0	3.00%	5.00%	8.00%
1	3.00%	4.20%	7.20%
2	3.00%	3.50%	6.50%
3	3.00%	3.00%	6.00%
4	3.00%	2.70%	5.70%
5	3.00%	2.50%	5.50%
6	3.00%	2.40%	5.40%
7	3.00%	2.30%	5.30%
8	3.00%	2.20%	5.20%
9	3.00%	2.10%	5.10%
10	3.00%	2.00%	5.00%
11	3.00%	1.90%	4.90%
12	3.00%	1.80%	4.80%
13	3.00%	1.70%	4.70%
14	3.00%	1.60%	4.60%
15	3.00%	1.50%	4.50%
16	3.00%	1.50%	4.50%
17	3.00%	1.50%	4.50%
18	3.00%	1.50%	4.50%
19	3.00%	1.50%	4.50%
20	3.00%	1.50%	4.50%
21	3.00%	1.50%	4.50%
22	3.00%	1.50%	4.50%
23	3.00%	1.50%	4.50%
24	3.00%	1.50%	4.50%
25	3.00%	1.50%	4.50%
26	3.00%	1.50%	4.50%
27	3.00%	1.50%	4.50%
28	3.00%	1.50%	4.50%
29	3.00%	1.50%	4.50%
30	3.00%	1.50%	4.50%

SOURCES: IBO; Office of the Actuary, "Proposed Changes in Actuarial Assumptions and Methods for Determining Employer Contributions for Fiscal Years Beginning On or After 7/1/2005."

Male and Female Probabilities of Mortality After Service Retirement Valuation Tables		
Age	**Males**	**Females**
55	1.04%	0.38%
56	1.11%	0.44%
57	1.18%	0.50%
58	1.25%	0.57%
59	1.32%	0.64%
60	1.39%	0.71%
61	1.55%	0.81%
62	1.71%	0.89%
63	1.87%	0.97%
64	2.04%	1.07%
65	2.20%	1.16%
66	2.38%	1.27%
67	2.56%	1.40%
68	2.74%	1.53%
69	2.92%	1.64%
70	3.11%	1.74%
71	3.34%	1.95%
72	3.58%	2.17%
73	3.81%	2.38%
74	4.05%	2.59%
75	4.29%	2.80%
76	4.88%	3.16%
77	5.48%	3.53%
78	6.08%	3.89%
79	6.68%	4.25%
80	7.27%	4.61%
81	8.00%	5.13%
82	8.72%	5.65%
83	9.45%	6.17%
84	10.17%	6.69%
85	10.90%	7.21%
86	12.03%	8.22%
87	13.17%	9.24%
88	14.30%	10.25%
89	15.44%	11.26%
90	16.57%	12.27%
Average Life Expectancy	**77**	**83**

SOURCES: IBO; Office of the Actuary, "Proposed Changes in Actuarial Assumptions and Methods for Determining Employer Contributions for Fiscal Years Beginning On or After 7/1/2005."