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A STUDY OF SENSITIVITY TO ACTUARIAL ASSUMPTIONS THROUGH THE CASE OF USPS FINANCIAL DEFICIT

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ABSTRACT

The U.S. Postal Service Office of Inspector General (OIG) suggested that a large surplus in its pension fund with the Civil Service Retirement System (CSRS) and the Federal Employees' Retirement System (FERS) could help USPS ease their financial burden. However, a recent update forecasts a smaller surplus mainly due to the change in the interest rate environment. By comparing the forecast with alternatives, this paper will illustrate how sensitive the results are to different forecasting assumptions.

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Chapter 1

Introduction

Effective in FY2007, the U.S. Postal Service has to contribute to the Postal Service Retiree Health Benefits Fund established by the Postal Accountability and Enhancement Act in 2006 (PAEA2006, Section 803). Instead of funding its retirees' actual health care costs annually on a pay-as-you-go basis, USPS now needs to prefund these obligations. The Postal Service makes a payment of approximately $5,5 billion on September 30 at the end of every fiscal year to meet this obligation ("The U.S. Postal Service's Financial Condition: Overview and Issues for Congress"). Many argued that this is the burden that is creating the "financial crisis" for the Postal Office.

On the other hand, the United States Office of Personnel Management's Board of Actuaries projected a large surplus in the pension fund through Civil Service Retirement System (CSRS) and Federal Employees' Retirement System (FERS) of $11.4 billion (RARC-WP-13-001). The USPS argues that the Postal Service has opportunities to ease the financial burden if they could use some of the surplus.

An updated forecast in the same year (RARC-WP-13-002) done by the same group reevaluated the forecast and projected that the surplus decreased to $2.6 billion as of FY 2011 from originally projected $11.4 billion. The report found several reasons contributed to the decline including: forecast interest rate decreases, forecast expected lifespan increases, and actual experience was less favorable than expected.

The result of the set of reports shows that the projected liabilities are very sensitive to some of the assumptions used when doing the projection, especially the interest rate used to discount liabilities. The goal of this paper, starting with introduction on the background of pension plans, is to illustrate the sensitivity of the projection to its underlying assumptions.

Chapter 2

Background on Retirement Plan Design

A retirement plan or pension plan is a mechanism for an employee to transfer part of his or her current income stream into retirement income. Usually, a person begins participating in a retirement plan when he or she is employed. Two major types of retirement plan employers offered are defined benefit plans and defined contribution plans. Traditionally, defined benefit (DB) plans were more commonly used than defined contribution (DC) plans. Nowadays, most employers provide either defined contribution plan or some combination of defined benefit and defined contribution plan.

To be eligible to participate, an employee is generally required to be at least 21 years old and to have a year of service within the company, regardless of which type of pension plan the employer would offer. The major differences between the two types of pension plans are the promise, funding, benefit accumulation methods, and benefit payout methods. Defined Benefit plans promise a monthly benefit at retirement, while Defined Contribution plans only promise the employer's annual contribution made while the employee is working. More details regarding the characteristics of the plans will be discussed in the subchapters. During the accumulation phase, an employer may change or terminate a defined benefit or defined contribution plan, but may not reduce the promise that is already accrued in the plan. In a defined benefit plan, the employer may change the rate at which future benefits are earned; in a defined contribution plan, the employer may change the amount of employer's future contribution.

Retirement occurs when a person elects to permanently stop employment – for example on or after a person reaches the normal retirement age defined in the plan documents (often age

65, but sometimes as early as age 62, or at large companies with unions: age 55 if the employee has 30 years of service). The normal retirement age or full retirement age is the age at which a person may first become entitled to full or unreduced retirement benefits.

Defined Benefit (DB) Plans

In a defined benefit pension plan, the worker is promised a specific stream of benefits starting at retirement. The promised benefit can be a specific amount; however, usually it is calculated based on salary history and years of service. The benefit pays out to the employee in the form of a life annuity or its actuarial equivalent.

Defined benefit plans are primarily funded by employers; and employees make little or no contribution to the fund. Employers are required to make contributions to a trust fund in order to fulfill the obligations. The minimal and maximal amounts employers contribute to these funds are set by federal regulations. Employers failing to meet these requirements must pay a penalty.

In defined benefit plans, employers bear the financial risk. They are responsible for the amounts put into the trust fund so that assets are sufficient to cover the promised benefits. In the event that the employer terminates a defined benefit pension plan that does not have sufficient funds to pay all of the promised benefits, the benefits are protected by federal insurance through the Pension Benefit Guaranty Corporation (PBGC) within certain limitations.

If an employee leaves the company before the normal retirement age, he or she will vest a minimum percentage of the benefit as stated in the plan document. Vesting in a retirement plan means ownership. The employee is always 100% vested in his or her own contributions, and may become 100% vested in his or her employer contribution after certain years of services to the company, such as 5 years. After vesting in a benefit, but before the normal retirement age, the employee owns 100% of the accrued benefit (in a DB plan) or the account balance (in a DC plan) and the employer cannot forfeit it for any reason. The benefit (and the assets which back the promise) generally stays with the plan until the employee files a claim for it at retirement or separation.

Defined Contribution Plans

A defined contribution plan is similar to a savings account. In a 401(k) arrangement, the employee takes the initiative to contribute to the account. The employer matches a certain percentage to the same account (for example, 50% of the employee's contribution). The employee often has the opportunity to make decisions about where to invest, and bears the financial risk. The benefits of the plan depend on the contributions made by both the employee and the employer along with the performance of the account's investments. When an employee retires, he or she receives the balance of the account.

Unlike defined benefit plans, there are neither federal regulations on the amount employers and employees contribute to the account, nor guarantees on the benefits in a defined contribution plan. As in DB plans, there are tax benefits to both the employer and employees. The amount contributed to defined contribution pension plans are tax deductible for employers and employees, but the employees will have to pay tax on them when received (i.e. taxes are deferred). Moreover, investment incomes earned on the pension fund are not taxable until received by the employee.

Similar to defined benefit plans, employees are always 100% vested in his or her own contributions. However, vesting requirements for employer contributions may vary for different plans. The exact vesting schedule is determined by the plan document and law, and can range from immediate vesting to 100% vesting after 3 years of services, or to a vesting schedule that increases employee's vested percentage for each year of service with the employer.

Chapter 3

Background on the Federal Retirement System

Most federal employees are covered either under the Civil Service Retirement System (CSRS) or under the Federal Employees' Retirement System (FERS). The Civil Service Retirement Act, effective on August 1, 1920, established a retirement system, CSRS, for certain Federal employees (opm.gov). When the Federal Employees' Retirement System was established in 1987, CSRS was replaced by the FERS. Newly hired federal employees could no longer participate in CSRS.

CSRS is the defined benefit plan for federal employees hired before January 1, 1987. FERS is the retirement system for US federal civilian employees hired after that date. It was established by the Federal Employee Retirement System Act of 1986 to make the federal retirement plan more like those in private sector. FERS consists of three major components: the FERS basic retirement annuity or the Basic Benefit Plan, which is a defined benefit plan; mandatory participation in Social Security; and the Thrift Saving Plan (TSP), a defined contribution plan similar to a 401(k) plan.

CSRS – Civil Service Retirement System

Congress passed the Civil Service Retirement Act of 1920 (P.L. 66-215) to provide pension benefits for civilian federal employees (Federation of American Scientists, 2012). The Civil Service Retirement System is a defined benefit, contributory retirement system (opm.gov). Under CSRS, the employing agency matches the employees' contributions to the Civil Service Retirement and Disability Fund (CSRDF). In general, employees contribute 7, 7 1/2, or 8 percent of their pay to CSRDF. Employees covered under CSRS do not pay Social Security retirement, survivor and disability (OASDI) tax, nor do they earn Social Security benefits. However, they are required to pay the Medicare tax (currently 1.45 percent of pay) (opm.gov).

Predominately, the normal retirement age for a worker with at least 30 years of service is age 55 (or the age at which they reach their 30^{th} anniversary if after age 55 but before age 60); for a worker with at least 20 years of service, it is age 60; and for a worker with 5 or more years of service it is age 62 (opm.gov). The basic annuity is computed based on the length of service and "high-3" average salary. "High-3" average salary is the highest average basic pay earned in any 3 consecutive years of services.

Table I: CSRS Annuity Formula

Years of Service	**What You Receive**
First 5 years of service	1.5 percent of your high-3 average salary for each year
Second 5 years of service	**Plus** 1.75 percent of your high-3 average salary for each year
For all years of service over 10	**Plus** 2 percent of your high-3 average salary for each year

Source: CSRS Information – Computations (OPM.gov)

For example, for someone who retires with 35 years of service and high-3 average salary of $100,000, he will receive 1.5(5) + 1.75(5) + 2(25) = 66.25 percent of his high-3 average salary. His CSRS base annuity is $66,250 or $5,520 per month.

Similar to the federal requirement to private companies that offer defined benefit plans to establish a trust fund to fulfill their pension obligations, Congress requires federal agencies and their employees to contribute to the CSRDF. There are three main reasons that Congress would like to enforce this requirement: the CSRDF allows benefits to be paid on time regardless of any delays that Congress may experience in passing its annual appropriations bills; the balance in the trust fund signals whether the future pension payments will increase because the contribution rate and benefit structure are fixed; and prefunding pension obligations forces federal agencies to recognize their full personnel costs when requesting annual appropriations from Congress rather than only recognizing the obligations of the Office of Personnel Management (Federation of American Scientists, 2012).

FERS – Federal Employees' Retirement System

Federal employees hired after 1984 are mostly covered under FERS. FERS is a retirement plan that provides benefits from three different sources: the Basic Benefit Plan, Social Security, and the Thrift Savings Plan.

Federal employees are fully vested in the FERS basic retirement annuity after five years of service. The FERS normal retirement age or minimum retirement age (MRA) for an employee is according to the schedule shown in Table II.

Table II. Minimum Retirement Age Under FERS

Year of Birth	**Minimum Retirement Age**
Before 1948	55 years
In 1948	55 years and 2 months
In 1949	55 years and 4 months
In 1950	55 years and 6 months
In 1951	55 years and 8 months
In 1952	55 years and 10 months
In 1953-1964	56 years
In 1965	56 years and 2 months
In 1966	56 years and 4 months
In 1967	56 years and 6 months
In 1968	56 years and 8 months
In 1969	56 years and 10 months
In 1970 and after	57 years

Source: FERS Information – Eligibility (OPM.org)

Under FERS, an employee that has completed at least 10 years of services can retire with a reduced benefit at the normal retirement age. The retirement benefit is permanently reduced by 5 percent multiplied by the difference between 62 and the retiree's age at the time the annuity begins.

All federal employees who are enrolled in FERS pay Social Security taxes and earn Social Security benefits. Employees may take the Social Security and the TSP part with them when they leave the Federal system before retirement. The Basic Benefit and Social Security parts of FERS require employees to contribute each pay period. Their agency withholds the cost of the Basic Benefit and Social Security from their employee's pay as payroll deductions. Their agency pays its part too. Then, after retirement, the employee receives annuity payments each month for the rest of their life.

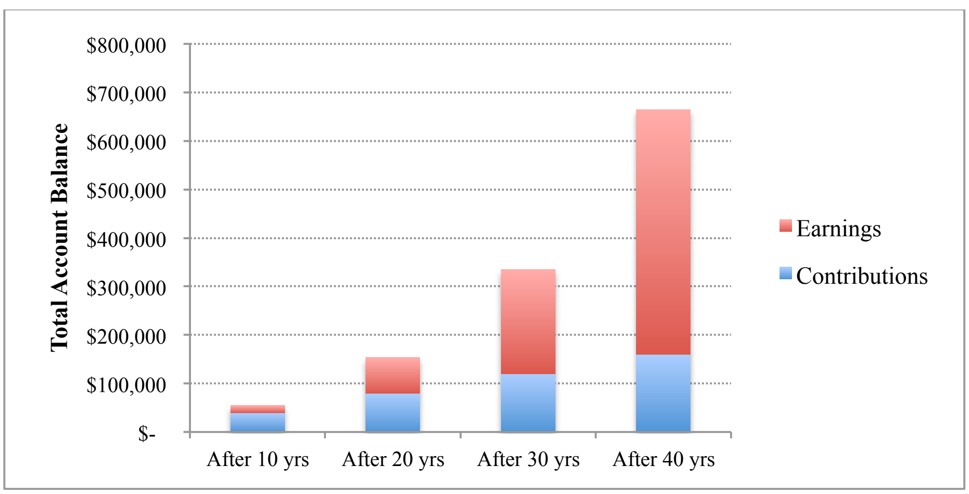
The Thrift Savings Plan (TSP) is administered by the Federal Retirement Thrift Investment Board. For employees enrolled in FERS, they are automatically set up with a TSP account. The federal agency that hired the employee will deposit 1 percent of the employee's basic pay into the TSP account each pay period. Employees have the option to make their own contributions to the TSP account. Contributions to TSP accounts are tax-deferred.

TSP – The Thrift Savings Plan

The Thrift Saving Plan (TSP) is a defined contribution plan similar to the 401(k) plans provided by private sector employers. It was established by Congress in the Federal Employees' Retirement System Act of 1986. The retirement benefits one receives under TSP are determined by the contributions put into the account during his or her years of services and the accumulated investment income. (tsp.org)

For federal employees covered under CSRS, the TSP is a supplement to the CSRS annuity. For federal employees covered under FERS, the TSP is one part of a three-part retirement package. Since workers in middle and upper ranges of the federal pay scale are unlikely to achieve adequate retirement income from Social Security and the FERS basic annuity, TSP is especially important to them. The chart below illustrates the savings potential of a TSP account.

Figure I: Earnings Potential of TSP Account



* Information in this chart assumes an annual salary of $40,000, employee and agency contributions of 5% each, and a 6% average annual rate of return.

* *Source: Summary of the Thrift Savings Plan*

Chapter 4

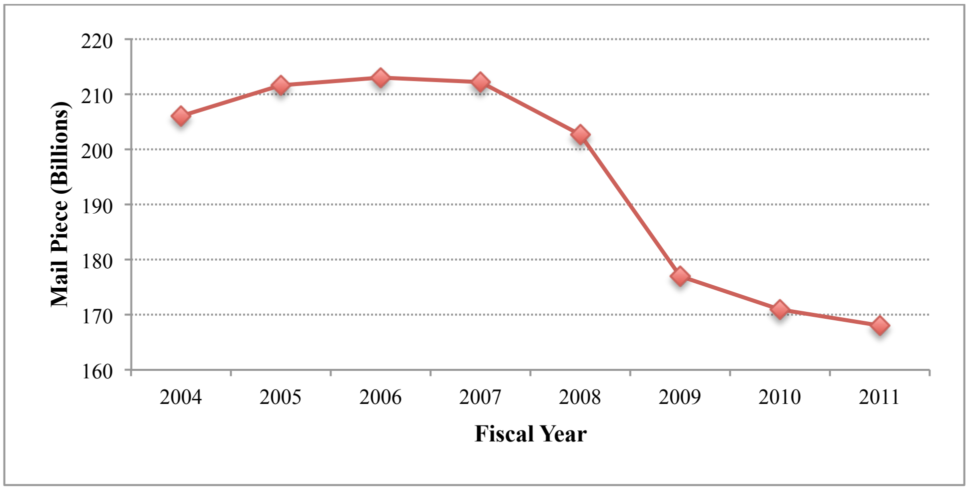
USPS Funding Crisis

The United States Postal Service (USPS) is an independent agency of the United States government responsible for providing postal service in the United States. During the Second Continental Congress in 1775, Benjamin Franklin was appointed the first postmaster general. In 1792, the cabinet-level Post Office Department was created. Since 1971's Postal Reorganization Act, the USPS has become a self-supporting government agency that covers its operating costs with revenues generated through the sales of postage and related products and services.

First Class mail volume peaked in 2001 and declined 25% from 2001 to 2010, due to increasing use of email and the World Wide Web for correspondence and business transection ("First Class Mail Volume, 1926-2010"). FedEx and UPS directly compete with USPS express mail and package delivery services. In recent years, USPS has experienced significant financial challenges. After running modest profits from FY2004 through FY2006, the USPS lost $25.4 billion between FY2007 and FY2011. Were it not for congressional action to reduce a statutorily required payment to the Postal Service Retiree Health Benefits Fund (RHBF), the USPS would have lost an additional $9.5 billion ("The U.S. Postal Service's Financial Condition: Overview and Issues for Congress").

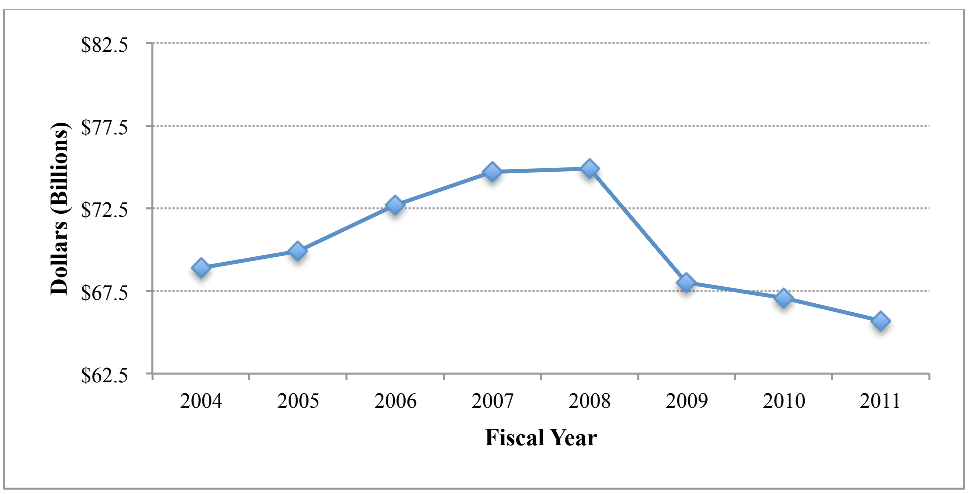
Total mail volume peaked in FY 2006 with 213.1 billion mail pieces, slid to 212.2 billion in FY 2007, and dropped to 202.7 billion in FY 2008. In the same time frame, USPS operation revenues held steady with a slight increase largely due to postage increases. A large decline occurred in FY2009 and decreased further in FY2010 and FY 2011. Operation revenues decreased with the mail volume from FY2009 to FY 2011 as well.

Figure II: The USPS's Mail Volume, FY2004 – FY 2011



Source: USPS.com – Postal Facts

Figure III: The USPS's Operating Revenues, FY 2004 – FY 2011



Source: USPS.com – Postal Facts

During this same period, the USPS has significantly increased operating expenses. In 2006, Congress passed the Postal Accountability and Enhancement Act (PAEA). The PAEA established the RHBF and requires the USPS to prefund its future retirees' health benefits at a cost of approximately $5.6 billion per year for 10 years. (P.L. 109-435) Instead of funding its retirees' actual health care costs annually on a pay-as-you-go basis, USPS now needs to prefund these obligations. Using the Office of Personnel Management's (OPM's) valuation methodology, the USPS reported that the unfunded obligation was $46.2 billion as of the end of FY2011 ("The U.S. Postal Service's Financial Condition: Overview and Issues for Congress").

Table III: Postal Service Retiree Health Benefits Fund Payments Under PAEA

(As of FY2011)

Fiscal Year	Payment Due Per PAEA (billions)	Status of Payment
2007	$5.4	Paid in full
2008	$5.6	Paid in full
2009	$5.4	$1.4 billion paid
2010	$5.5	Paid in full
2011	$5.5	No Payment
2012	$5.6	Due September 30, 2012
2013	$5.6	Due September 30, 2013
2014	$5.7	Due September 30, 2014
2015	$5.7	Due September 30, 2015
2016	$5.8	Due September 30, 2016

Source: Postal Accountability and Enhancement Act
(P.L. 109-435, §803; 120 Stat. 3251-3252; 5 U.S.C §8909(d)(3)(A).)

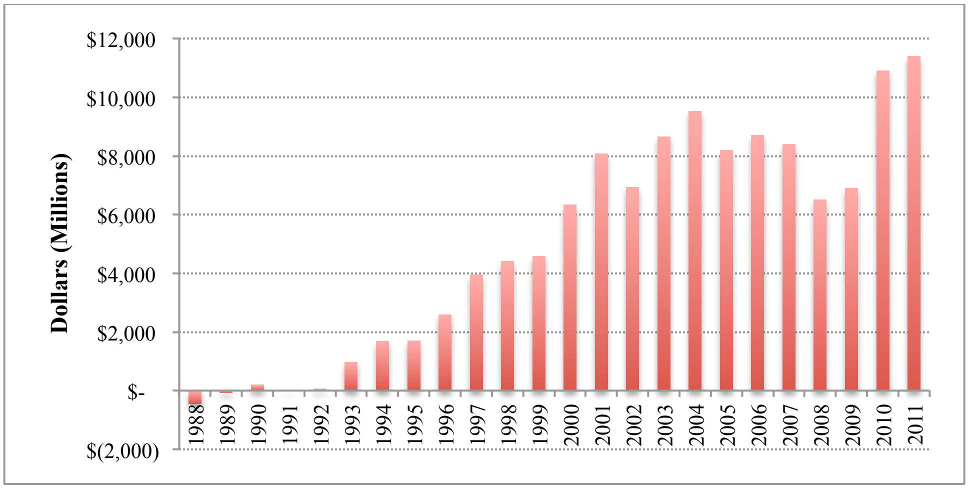
USPS Office of Inspector General (OIG) found through a self-initiated project that one of the greatest opportunities for the cost savings has been the over funded pension plan, including the Civil Service Retirement System (CSRS) and the Federal Employees Retirement System (FERS), and the prefunding of retiree health care benefits (FT-MA-12-002).

From the original Hay Group's Report in October 2012 (RARC-WP-13-001), USPS has funded its pension benefit obligations at nearly 105 percent and was overfunded by $13.1 billion as of September 30, 2011. Most of this pension surplus, $11.4 billion, is from the Federal Employees' Retirement System (FERS). In addition, there is a $1.7 billion surplus in the Civil Service Retirement System (CSRS) fund.

Hay Group found that the primary reason for the FERS surplus is that some Postal Service characteristics differ from the characteristics of the rest of the federal government.

However, the law does not allow the Office of Personnel Management (OPM) to alter the contribution formula for USPS, nor can it refund current or future surpluses. Under current OPM assumptions, Hay Group found the surplus for USPS will likely continue and increase over time.

Figure IV: USPS FERS Surplus



Source: Hay Group Report Evaluation of the USPS Postal Service Fund for Employees Enrolled in the Federal Employees Retirement System.

If USPS-specific assumptions for valuing the retirement liabilities are implemented based on the distinctive characteristics of USPS FERS population, Hay Group found that the surplus from FERS in FY2011 increases from $11.4 billion to $24.0 billion, which is an overfunding of 37 percent. Most of the change is attributable to assuming that USPS employees will continue to receive smaller pay increases than OPM assumed. If the same USPS-specific assumptions are applied to CSRS, the Hay Report projected the Postal Service pension surplus increases to $25.7 billion.

In December 2012, however, an updated OIG report (RARC-WP-13-002), which included an actuarial report by the Hay Group report, wrote that based on new economic and demographic assumptions by the OPM Board of Actuaries in charge of setting assumptions for FERS, the estimated surplus of FERS dropped from $11.4 billion to $2.6 billion as of FY2011.

With USPS-specific assumptions applied, the projected surplus increased almost $9 billion from OPM estimate to $11.46 billion.

Chapter 5

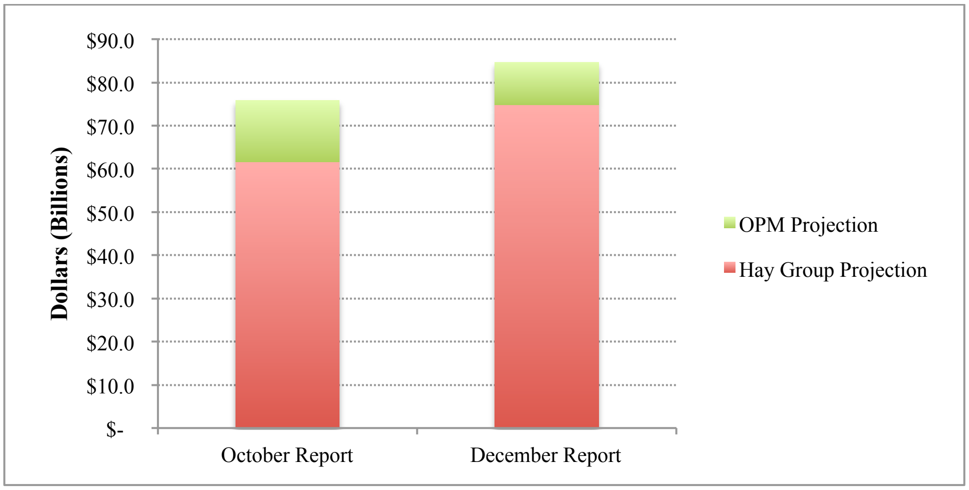
Demonstrations on Sensitivity to Actuarial Assumptions

The amount of the FERS annuity is based on the employee's years of service and high-3 salary. Annuities are paid starting at retirement for the rest of the retiree or survivor's lifespan. After retirement, annuitants who have reached age 62 also receive cost of-living adjustments (COLAs) based on inflation (RARC-WP-13-001). When projecting future liabilities, both OPM and Hay Group make assumptions about retirement patterns, future salary growth, life expectancy, inflationary increases in benefits, and discount rate on the fund's asset.

The United States Postal Service Office of Inspector General (OIG) released a white paper: *Causes of the Postal Service FERS Surplus* in October 2012 that explored Hay Group's finding on the persistent surplus in FERS program. Hay Group found that the surplus resulted from the difference between the USPS-specific characteristics in its FERS population and OPM assumed characteristics for FERS population. In December of 2012, OIG released an updated paper with new projection in USPS future FERS liabilities and surpluses based on the new set of economic and demographic assumptions issued by the Board of Actuaries in charge of setting assumptions for FERS in July 2012. Figure V shows the projected liabilities in FERS that the USPS has as of FY2011.

From Figure V, though both OPM and Hay Group projections show increases in USPS liabilities, the difference between OPM projections and Hay Group projections shrunk from $14.3 billion as in October report to $9.9 billion as in December report. The main reason for the increase in liabilities or decline in surplus, and the shrunk in the difference is due to the change in the interest rate experience.

Figure V: Liability Projection Comparisons



Source: *Causes of the Postal Service FERS Surplus* (RARC-WP-13-001)
Causes of the Postal Service FERS Surplus – Update (RARC-WP-13-002)

The modified duration (DM) or the volatility is the most common used factor to measure the interest rate risk. It is the negative of the derivative divide by the price – representing the rate of change as a percent of price.

$$DM = -\frac{\left(\frac{dP}{di}\right)}{P}$$

The modified duration under Hay Group projections is approximately 43.96.

$$DM \approx -\frac{\left(\frac{61.6 - 75.1}{5.75\% - 5.25\%}\right)}{61.6} = 43.96$$

Thus, for every 1 percent decrease in interest rate, the liability goes up 43.96 percent under Hay Group assumptions. The change in value due to changes in interest rates is greater for longer duration liabilities. This is a very high duration for a pension plan. That is because there are many years between the average current age of the employee and the time when the average pension payments are made. It is accentuated by the fact that FERS pensions increase annually by the Cost-of-Living assumption which lengthens the duration to the average payment. Thus, you can see that changing interest rates can have a huge impact on pension liabilities, especially those in FERS.

According to the report *Causes of the Postal Service FERS Surplus* (RARC-WP-13-001), in order to estimate the impact of using USPS specific assumptions, Hay Group assumed FY2012 through FY2022 pay increases in accordance with USPS's forecast, plus 0.10 percent adjustment for promotion increases. For FY2023 and beyond, Hay Group assumed USPS pay increase levels consistent with OPM predictions. The analysis was performed for the period of January 1, 2002 through January 1, 2011. The average annual growth assumption, for the time period studied, was 4.11 percent under OPM assumptions. Hay Group found, using these USPS-specific salary increases, the Actuarial Accrued Liability is $65.0 billion, a decrease of $10.9 billion from OPM projection.

Table IV: USPS Forecast Team's Projected Pay Increases for FERS Employees

Fiscal Year	Weighted Average Percentage Increase
2012	0.33%
2013	2.27%
2014	2.39%
2015	2.13%
2016	2.39%
2017	2.52%
2018	2.55%
2019	2.57%
2020	2.56%
2021	2.55%
2022	2.55%

Source: Causes of the Postal Service FERS Surplus (RARC-WP-13-001)

In the report, the Hay Group also suggested that based upon the Hay Group's Experience Study of USPS FERS population, USPS's past demographic experience, which examined the turnover, disability, and retirement experience of employees, are different from OPM's demographic assumptions for non-USPS federal employees. Using USPS specific demographic assumptions result in a $0.9 billion reduction in the FERS liability.

In addition, mortality experience of non-disabled annuitants was studied in this research. The USPS-specific mortality experience suggested a reduction of $0.8 billion in the Actuarial Accrued Liability.

Table V: Estimate of FERS Surplus as of September 30, 2011

Based on Alternate Pay Increase and Demographic Assumptions

	OPM Assumptions	**USPS-Specific Assumptions**
Assumed Investment Return Rate	5.75%	5.75%
Salary Increase Assumptions:		
General Salary Increase	3.75%	USPS
Merit Salary Increase	OPM	USPS
Assumed Post-Retirement COLA Increases	2.40%	2.40%
Active Demographic Assumptions	OPM	USPS
Annuitant Mortality Assumption	OPM	USPS
Assets	$87.3B	$87.3B
Actuarial Accrued Liability	$75.9B	$63.3B
Surplus	$11.4B	$24.0B

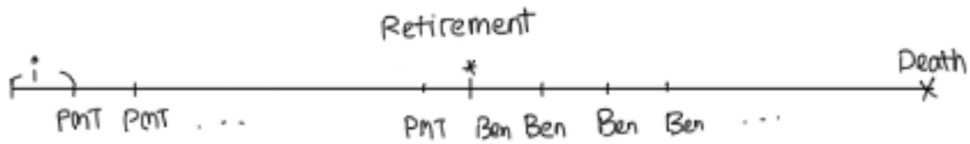
Source: Causes of the Postal Service FERS Surplus (RARC-WP-13-001)

The updated report found the main reasons for the increase in the liability are: the assumed interest rate reduced from 5.75 percent to 5.25 percent, increased the estimated liability; OPM's new demographic assumptions and improvements in mortality experience increased the liability; and actual 2011 experience for both the assets and liability were less favorable than initially assumed, resulting in an experience loss. *(RARC-WP-13-002)*

In actuarial notation, the present value of the pension plan or FERS liabilities could be written as:

$$PV = \sum 10{,}000 \times {}_{65-age|}\ddot{a}_{age}$$

assuming age is the current age of the employee, \$10,000 is payment of FERS base annuity, 65 is the normal retirement age, and the summation is over all employees.



For individual employees, as the interest decreases, the present value of projected liabilities increases. For example, assume a fixed amount of X is promised to payout as retirement benefit to the employee n years from now; USPS put PMT amount into the account every year in order to fulfill the obligation, and i is the interest rate. If X and n are fixed, as interest i decreases, PMT has to increase to fulfill the obligation n years later.

Improvements in the mortality experience would have the same effect to the present value of liabilities because more payments need to be paid out and the present value of the deferred annuity thus increases. Increase in the value of the deferred annuity at retirement implies the predicted amount X increases. Therefore, larger PMT is needed holding all else constant.

Furthermore, assets and liabilities experience directly affects the predicted surplus since surplus equal to Assets minus Liabilities. Figure VI illustrates the updated estimate of FERS surplus.

Table VI: Updated Estimate of FERS Surplus as of September 30, 2011

Based on Alternate Pay Increase and Demographic Assumptions

	OPM Assumptions	**USPS-Specific Assumptions**
Assumed Investment Return Rate	5.25%	5.25%
Salary Increase Assumptions:		
General Salary Increase	3.25%	USPS
Merit Salary Increase	OPM	USPS
Assumed Post-Retirement COLA Increases	2.40%	2.40%
Active Demographic Assumptions	OPM	USPS
Annuitant Mortality Assumption	OPM	USPS
Assets	$86.60B	$86.60B
Actuarial Accrued Liability	$84.00B	$75.14B
Surplus	$2.60B	$11.46B

Source: Causes of the Postal Service FERS Surplus – Update (RARC-WP-13-002)

Chapter 6

Conclusion

When designing a pension plan and determining the contribution each party has to make in order to fulfill the future obligations, there are many actuarial assumptions that have to be determined. Many assumptions, such as retirement patterns, future salary growth, life expectancy, inflation, and discount rate on the fund's assets are difficult to predict and they often change thru time.

The two reports by the Hay Group illustrated exactly how projections are sensitive to the underlying assumptions. The accuracy of the proposed USPS-specific assumptions is beyond the scope of this paper. These reports demonstrate how even little changes in some assumptions (particularly the interest rate used to discount liabilities) contribute to changes in liabilities.

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EDUCATION

The Pennsylvania State University University Park, PA

Schreyer Honors College Anticipated 05/2013

Smeal College of Business

Bachelor of Science in Actuarial Science

Bachelor of Science in Economics

Minor in Japanese Language

WORK EXPERIENCE

ING West Chester, PA

Actuarial Summer Intern 05/2012 – 08/2012

- Generated automatic processes using Excel/VBA to consolidate quarterly reports
- Perfected documentation of various reporting processes performed at the corporate level
- Proposed a new method to calculate the option adjusted spread of strategic asset allocation

The Pennsylvania State University University Park, PA

Teaching Assistant 01/2012 – 12/2012

- RM 411 Actuarial Mathematics I, RM 410 Compound Interest and Annuities
- Facilitate communication between a hundred students, other teaching assistants and the instructor
- Assist students with coursework and administrative issues online and through weekly office hours

Huatai Insurance Company of China Beijing, China

Non-paid Summer Intern 06/2010 – 07/2010

- Administered records for company's automobile insurance customers
- Developed organization skills through maintaining accurate database of customers' profile

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ACTIVITIES

Penn State Actuarial Science Club University Park, PA

Student Relationship Chair 05/2012 – Present

- Manage the mentorship program launched by the club
- Designate matches between juniors and seniors based on the characters of students
- Collaborate with other officers to organize club events such as major meeting and career fair

Junior Liaison 08/2011 – 05/2012

- Communicated effectively to junior actuarial students about various club events
- Motivated junior actuarial students to get involved in events hosted by the club

PLEN Women & Public Policy Seminar Washington D.C.

Participant 01/2011

- Discovered how business is regulated and funded, and the role of the global economy
- Explored healthcare initiatives and the future of reform at state and national level