

**PENNSYLVANIA
529 GUARANTEED SAVINGS PLAN**

**Annual Actuarial Report on the Pennsylvania 529
Guaranteed Savings Plan Fund**

June 30, 2018

Prepared by
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August 13, 2018

The Honorable Joseph M. Torsella
Treasurer, Commonwealth of Pennsylvania
State Finance Building, Room 129
Harrisburg, PA 17120

Dear Treasurer Torsella:

We have completed our actuarial analysis of the Fund ("the Fund") for the Pennsylvania Tuition Account Guaranteed Savings Plan ("the Plan") as of June 30, 2018. This report presents our findings with respect to the Fund's expected cash flows and status of the Fund.

This report also presents our analysis of Plan Credit Rates effective September 1, 2018 through August 31, 2019.

The analysis of the funding of the Plan was prepared for the Pennsylvania Treasury ("Treasury") for the purposes of assessing the status of the Fund in accordance with Section 306(b)(3) of Act 11 of 1992. The analyses have been prepared in accordance with generally accepted actuarial principles and practices commonly applicable to similar types of arrangements.

The rates for Plan Credits for September 1, 2018 through August 31, 2019 are self-supporting. That is, contributions made at these rates are anticipated to generate an additional amount of actuarial reserve.

Currently the expected value of liabilities is \$1,676,818,497 and the value of assets plus projected future fees is \$2,044,552,081, for a difference of \$367,733,584 or 21.93% of liabilities. For comparison purposes, the corresponding amounts from June 30, 2017 were expected value of liabilities of \$1,674,615,593 and value of assets plus projected

future fees of \$1,943,760,541, for a difference of \$269,144,948 and a ratio of 16.07% of liabilities.

In determining the amounts for June 30, 2018, we have made three changes to assumptions. The portion of appropriated expenses allocated to GSP work and new business has increased, some fees paid by account owners from the 2016 - 2017 academic year were refunded and fees were waived for part of the 2017 - 2018 academic year, and expenses paid to the administrative services provider have changed.

Subsequent to the date of this analysis, a change will take place involving the premiums paid by contract owners. Premiums paid for the 2017 - 2018 academic year will be refunded. Additionally, premiums will be waived for all amounts received during the 2018 - 2019 academic year. The premium refund for 2017 - 2018 will decrease the actuarial reserve by \$1,217,804 to \$366,515,780 which is 21.84% of liabilities. These changes are not included in the body of the report as it reflects the Plan as constituted on June 30, 2018.

* * * * *

We appreciate the opportunity to serve the Commonwealth of Pennsylvania. Any questions about the report should be directed to me at (770) 752-5656.

Very truly yours,



John T. Condo, FSA, MAAA, Ph.D.
Vice President

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I. EXECUTIVE SUMMARY

The following are the key findings of our analysis.

New Rates

Rates for Plan Credits for September 1, 2018 through August 31, 2019 are equal to the cost of academic credits at each of the participating colleges and universities plus premiums of 2.5% at The Pennsylvania State University, University of Pittsburgh and State Related Average; and zero for all other tuition levels. Our analysis shows that these rates produce a positive actuarial reserve equal to 9.16% of deposits.

Status of the Fund

As of June 30, 2018, the Fund's assets exceed its liabilities by \$367,733,584.

Value as of June 30, 2018	Assets and Liabilities
Cash & Invested Assets	\$2,011,973,092
Value of Future Revenues ¹	\$32,578,989
Total Liabilities	\$1,676,818,497
Actuarial Reserve	\$367,733,584
Actuarial Reserve as a Percent of Liabilities	21.93%

Methodology

In making our projections of the actuarial reserve in the table immediately above, we assume that the Plan will not accept any additional contributions. This is a conservative limitation that provides a static "snapshot view" of the Plan as of June 30, 2018.

A dynamic view of the Plan, which would include a reasonable projection of future contributions, provides a more realistic view of the Plan since the Plan is run with the intention of continuing to accept contributions.

¹ Future revenues are the annual account maintenance fees assessed against GSP accounts. Treasury personnel have informed us that the fees are assessed against the tuition value of each account.

Investment Strategy

The investment strategy of the Fund is designed to enable Treasury to meet the actuarially determined Plan liabilities. The market value composition of the Fund as of June 30, 2018 is 27% fixed income including cash and cash equivalent, 50% equities, and 23% alternative investments. Treasury has selected outside investment managers to invest a portion of the portfolio and manage funds held for liquidity purposes and several select portfolios in house.

By law, Treasury is allowed to direct investments under the "prudent person" rule. This rule allows discretion in determining asset allocation and in choosing particular securities.

The objective of the allocation of 60% - 70% of the portfolio to equity and alternative investments is to provide higher portfolio returns than would be available from a portfolio consisting mainly of fixed income investments. We have not reviewed the strategy nor are we expressing an opinion on the strategy.

Assumptions

Key economic assumptions are listed below.

Key Assumptions	
Net Yield on Investments	
All future years	6.000%
Tuition Inflation	
Community Colleges	4.50%
SSHE	4.25%
The Pennsylvania State University - Main Campus	6.25%
The Pennsylvania State University - Branch Campuses	4.00%
University of Pittsburgh	6.00%
University of Pittsburgh - Branch Campuses	4.00%
Pennsylvania College of Technology	5.25%
Temple University	5.50%
Lincoln University	4.75%
State Related Average	6.00%
Thaddeus Stevens College of Technology	4.50%
Pennsylvania Private Colleges & Universities	5.25%
Ivy League Universities	5.25%

The tuition inflation assumptions are based on a combination of statistical models of tuition increases, actuarial judgment and input from Treasury personnel regarding the likely trajectory of tuition increases.

II. RELIANCES & COMPLIANCE WITH ACTUARIAL STANDARDS OF PRACTICE

In making the projections on which this report is based, we relied on the following information supplied to me as indicated below.

- Tuition amounts at Pennsylvania colleges and universities, public, private and State-Related, supplied by the staff of the Pennsylvania Treasury Department,
- Tuition amounts at Ivy League universities, supplied by staff of the Pennsylvania Treasury Department,
- Market value of assets of the Plan's fund, supplied by the staff of the Pennsylvania Treasury Department,
- Inventory of Plan credits by institution, year sold and anticipated matriculation year, supplied by staff of the Pennsylvania Treasury Department,
- Assumptions regarding future investment returns on the Plan's fund, supplied by Treasury based on consultation with the Plan's Investment Advisor,
- Assumptions regarding the Plan's anticipated asset allocation, supplied by Treasury based on consultation with the Plan's Investment Advisor, and
- Information on expenses of the Plan, supplied by the staff of the Pennsylvania Treasury Department based on consultation with the Plan's investment advisor.

There are no actuarial standards of practice that apply specifically to prepaid tuition plans or guaranteed college savings programs. However, there are two general standards that we believe apply:

- Actuarial Standard of Practice #23 "Data Quality". This standard sets guidelines on review of data supplied by a third-party. We have performed reasonableness and consistency checks on the data supplied to us by personnel of the Plan and by the records administrator, and are in compliance with this standard. Our review of the data was not an audit of the data.
- Actuarial Standard of Practice #41 "Actuarial Communications". This standard sets general guidelines for actuarial communications. This report is in compliance with this standard.

III. PLAN CREDIT RATES - SEPTEMBER 1, 2018 THROUGH AUGUST 31, 2019

The Pennsylvania Guaranteed Savings Plan allows account owners to save for future “qualified higher education expenses” with a guarantee that their savings, adjusted by any applicable premiums and fees, will at least keep pace with tuition inflation at one of several tuition levels designated by the account owner. Contributions into an account are divided by the Plan Credit Rate for the designated tuition level for the academic year in which the contribution is made to determine the number of Plan Credits attributable to the contribution. The annual Plan Credit Rates are recommended by us and approved by Treasury. We recommend that prices for 2018/19 be set at current tuition.

Adequacy Analysis

We have projected financial results for a hypothetical cohort of GSP credits purchased from September 1, 2018 through August 31, 2019. For these credits we included the premiums.

Our projection shows that these credits are anticipated to generate a positive actuarial reserve of 9.16% of deposits.

IV. DESCRIPTION OF THE PLAN

The Plan was created in 1992 by the Pennsylvania Legislature to provide for the advance purchase of tuition as both a means and an incentive to provide for future higher education expenses. By Act 2000-58, effective August 21, 2000, it was amended, making the Plan a guaranteed college savings Plan with growth indexed to tuition inflation. The Plan is administered by the Tuition Account Programs Bureau ("the Bureau"), within the Pennsylvania State Treasury. The Plan is summarized below. This summary is provided for explanation purposes only, and the Plan will be governed by the provisions of the enabling legislation and Bureau procedures.

Contributions

To join the Plan, an account owner must pay an enrollment fee. The fee is currently \$50. Contributions may be made in any amount of \$15 or more. At the time of joining the Plan, the account owner must designate a beneficiary and the anticipated date of matriculation into postsecondary education.

All contributions for a specific beneficiary are accumulated in an account ("the Account"). The Investment Performance Value of the Account is the sum of all contributions times the actual annual net earnings rate of the fund compounded annually. The Tuition Credit Value of the Account is based on tuition inflation.

Categories of Credits Available

An account owner can save at any one of the following five "average" tuition levels:

- Community Colleges,
- Universities in the State System of Higher Education,
- State Related Universities, defined as the following schools:

Pennsylvania State University, including the Pennsylvania College of
Technology

University of Pittsburgh

Temple University

Lincoln University

Any other postsecondary school which is later designated "state-related" by the
Commonwealth.

- Ivy League Colleges or
- Private Four-Year Colleges.

Additionally, an account owner can save at the tuition level for any one of the “public institutions.” An account owner may, however, change the designated tuition level at any time and the change is made retroactive for each contribution made to the account.

Additionally, for specific “public institutions” and public institutions average tuition levels, there are separate Plan Credit Rates for state residents/out-of-state residents and, in the case of community colleges, for district and out-of-district residents.

Residency Requirements

There is also a residency requirement associated with joining the Plan. Either the account owner or the beneficiary must be a resident of the Commonwealth of Pennsylvania at the time the account is opened.

Using the Account

Contributions must be in the Plan account for approximately one year before any growth related to the contribution may be used for higher education expenses. If the beneficiary is attending a public institution, the tuition level is converted, if necessary, to that of the specific public institution branch campus and/or major of the beneficiary; and payouts from the account will be made at the actual tuition rates charged. If the beneficiary is attending a private or out-of-state institution of higher education, or an elementary or secondary school, pay-outs from the account will be based on the designated tuition level; specifically, if the tuition level is a specific public institution, payment will be made at the actual tuition of that institution; if the tuition level is one of the average levels, payment will be made at the average actual tuition of the schools used to determine the Plan Credit Rate for that Tuition Level.

Refunds

If the beneficiary dies or becomes disabled, the Investment Performance Value of the account, but not less than the amount contributed less fees, will be returned to the account owner.

If the beneficiary is awarded a scholarship, the account owner may obtain a refund equal to the amount that could have been paid from the account had the scholarship not been awarded. Provided, however, that the refund for any one year may not exceed the amount of the scholarship. Requested transfers from the Guaranteed Savings Plan to the Pennsylvania 529 Investment Plan, as well as rollovers to other Section 529 plans, are calculated in the same manner as at-will terminations as discussed below.

If the beneficiary decides at the time of matriculation not to attend school, or if the beneficiary does not gain admission to an eligible institution, or if the contract is

terminated for any other reason, it is considered an “at-will” termination. These at-will terminations receive refunds that are the lesser of the Investment Performance Value of the Account and the Tuition Credit Value of the Account, but in no event less than the sum of the contributions.

Change of Beneficiary

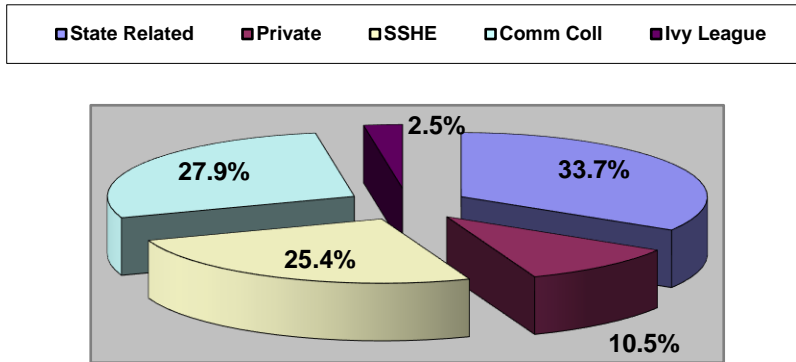
An account owner may request a change of beneficiary to a substitute who is a family member of the immediately-preceding beneficiary.

V. SUMMARY OF CONTRACT DATA AND CURRENT ASSETS

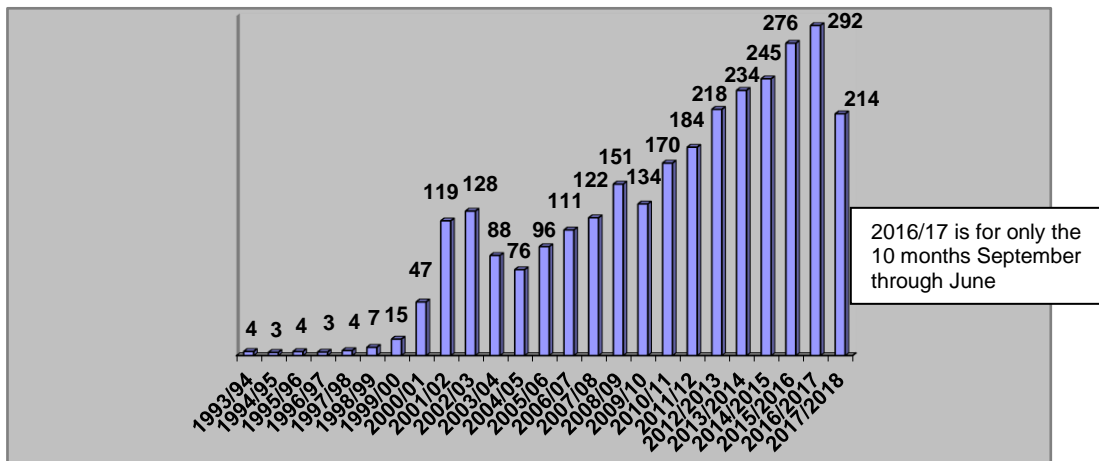
Contract Data

Data on the number of outstanding contracts, contributions, Plan Credit equivalents and beneficiary account values was provided by the Bureau. This data was divided by residency status, tuition level, and year of matriculation. The graphs below summarize the data provided concerning these Plan Credits.

Distribution of Credits by Institution Type



Distribution of Credits by Year of Contribution (000's)



Current Assets

The assets currently held by the Fund are an important part of the determination of the actuarial status of the Plan. The investment strategy for those assets is also critical to the yield and to the vulnerability of the Plan's actuarial status to changes in the return earned on investments.

Fund Investments

Treasury administers assets of the Fund and has outside investment managers invest a large portion of the Fund, except for liquidity funds and several select portfolios that are invested by Treasury. The total market value of assets held as of June 30, 2018 is \$2,011,973,092. The allocation between asset classes is shown in the table below.

Market value of assets held as of June 30, 2018		
	<u>Amount (000's)</u>	<u>% Of Total</u>
Equities	999,667	50%
Alternative Investments	465,673	23%
Fixed Income (Including cash & cash equivalents)	546,633	27%
TOTAL	2,011,973	100.0%

Investment Strategy

The investment strategy is designed to achieve a rate of return in excess of anticipated increases in tuition rates at each tuition level. The Fund's asset allocation anticipates that the amount invested in equities and alternative investments will remain in the range of 60% - 70% of total assets. The Plan's investment authority is governed by the "prudent person" rule rather than by statutory limitations on various classes of investments.

VI. ACTUARIAL METHODS AND ASSUMPTIONS

Methods

The actuarial method for the determination of the status of the Fund consists of projecting future tuition rates, future expenses based on the average anticipated number of Plan Credits and future utilization of Plan Credits. Future benefits and expenses are discounted using the assumed investment yield as the interest discount rate. The assumed discount rate is based on the current and anticipated mix of assets of the Fund.

For the projection of future benefits, the analysis proceeds as follows:

- Project future tuition rates for all years under consideration. Future tuition is based on the assumptions for tuition inflation. These assumptions vary by postsecondary school.
- Determine the nominal cost of future use of accounts based on the assumptions regarding utilization of accounts and the length of time the average beneficiary will take to complete his college education.
- Determine the nominal value of administrative expenses pertinent only to the ongoing administration of existing contracts.
- Determine the present value of future account usage and future expenses based on the investment yield assumptions.
- Perform projections for all of the Plan's beneficiaries to determine if the Fund is adequate in the aggregate, and make sufficient provision for overhead expenses.
- In making our projections of the actuarial reserve, we assume that the Plan will not accept any additional contributions. This is a conservative limitation that provides a static "snapshot view" of the Plan as of June 30, 2018.

Assumptions

Actuarial assumptions used to determine financial soundness of programs are of two general types: economic and demographic. Demographic assumptions determine the expected exposure to financial claims and generally answer the question "How and when will people use their account?" Economic assumptions are concerned with the expected level of account usage and answer the question "What is the expected value of account usage?" The assumptions that we used were those that were approved by the Pennsylvania Treasury, after consultation with us.

Economic Assumptions

Economic assumptions are used to estimate the annual tuition rates at two and four year colleges, increases in Fund expenses, and Fund earnings on assets invested. Because inflation is a major component of the rate of increase in tuition rates and of investment returns, we considered these rates together. We believe that the difference in these rates is more important than the absolute level of the rates. The following paragraphs describe the economic assumptions used in this study.

Federal Income Tax

We assumed that Fund earnings are exempt from Federal Income Tax.

Annual Tuition Rates

Tuition increases vary at the different participating institutions. Accordingly, our assumptions vary by institution. Our assumptions were guided by our observations of historic tuition increases, trends in postsecondary enrollment in Pennsylvania and the level of legislative appropriations for postsecondary schools in Pennsylvania.

The assumptions for the different categories of institutions are shown in the table below.

Tuition Inflation	
Community Colleges	4.50%
SSHE	4.25%
The Pennsylvania State University - Main Campus	6.25%
The Pennsylvania State University - Branch Campuses	4.00%
University of Pittsburgh	6.00%
University of Pittsburgh - Branch Campuses	4.00%
Pennsylvania College of Technology	5.25%
Temple University	5.50%
Lincoln University	4.75%
State Related Average ²	6.00%
Thaddeus Stevens College of Technology	4.50%
Pennsylvania Private Colleges & Universities	5.25%
Ivy League Universities	5.25%

These rates are based on statistical models built with 30 years of historical tuition increases, combined with our professional judgment regarding future increases, as well as input from Treasury staff regarding likely trajectories of tuition increases.

Fund Earnings Rate

Our investment yield assumption, net of fees, is as follows:

6.000% for all future years.

This assumption was agreed to by Treasury based upon the recommendation of the Fund's Investment Advisor. Although we do not expect the Fund to realize this exact return in any year, we believe it represents a reasonable earnings rate over the time horizon of this report. In some years the Fund will have yields in excess of the assumed rate, while in other years the Fund will earn less than this rate.

Annual Expenses

Appropriations for expenses in fiscal year 2018/19 are \$3,200,000. This includes expenses for non-GSP and marketing activities in the amount of \$1,540,000. As our projections do not include provisions for non-GSP work or new business, these expenses can be excluded leaving \$1,660,000 to be included in our analysis. For projection purposes, we have assumed that \$300,000 of this annual total is fixed, while

² The State Related Average is calculated from the results of all other State Related campuses rather than projected directly from assumptions.

the balance is variable in proportion to the number of outstanding Plan Credits. That is, we project that the variable portion attributable to the existing Plan Credits will decline in the future proportionately with the projected decline in the number of Plan credits.

The Plan also incurs expenses to pay its administrative services provider. The administrative services provider charges a fee of 0.14% of assets under management on an annual basis.

We have included these expenses in our projections.

As the investment earned rate assumption is now reported net of expenses, investment expenses are no longer part of this analysis.

Demographic Assumptions

The demographic assumptions used in this report are based on our experience with similar types of liabilities. Our choice of assumptions is based on recent experience and our best estimates as to future events. These assumptions are as follows:

Mortality and Disability

We assumed that there would be no contract cancellations due to mortality or disability.

At-Will Termination of Contract

Because individual accounts are under no obligation to make additional contributions, we anticipate low termination rates. We have assumed that at-will terminations are 1.0% each year. This assumption is supported by at-will termination experience.

Matriculation Percent

All beneficiaries are assumed to matriculate at the matriculation date specified in the application, except for those who are projected to terminate.

Utilization of Benefits

Because account owners have flexibility in how much they contribute to their accounts over time, the utilization of accounts once the beneficiaries enroll in college will vary. Even if all account owners contributed the same amount, the utilization of the Plan would vary since students progress through college at different rates, depending on their course load, attendance during the Summer semester, and whether any sabbaticals are taken during postsecondary education.

Our assumptions for utilization of accounts are based on judgmental factors and on review of actual benefit payouts.

Account usage for those saving at Community College tuition levels are assumed to be 70% in the first year and 30% in the second year. Usage at all other tuition levels are assumed to be 30% first year, 25% second year, 20% third year, 15% fourth year and 10% fifth year.

Within an academic year, account usage is assumed to be 50% for the Fall semester, 40% for the Spring semester and 10% for the Summer semester.

Dropout Rate

All beneficiaries are assumed to use 100% of their account once they have enrolled in college.

Frequency of Beneficiary Replacement

Since all surviving beneficiaries are expected to matriculate and are expected to use their accounts until completion, the assumption is made that no replacement of beneficiaries will occur.

VII. STATUS OF THE FUND AS OF JUNE 30, 2018

In determining the status of the Fund, we estimated the future disbursements for higher education expenses of beneficiaries, expenses and refunds for terminated contracts. We also projected the future assets based on current assets and expected earnings on assets. We believe these estimates are reasonable based on the information available and our past experience and judgment.

The estimates of the prospective assets and liabilities of the Fund are summarized in the table on the following page and demonstrate the financial position of the Fund. The value of all assets is \$2,044,552,081 while the expected value of all liabilities is \$1,676,818,497. The expected present value of the excess of liabilities over assets is \$367,733,584.

The Plan's actuarial reserve is the amount of funds over and above that amount which is necessary to meet account usage and expenses on our baseline assumptions.

The actuarial reserve will change from year to year due to positive and negative cash flows and due to the change in the present value of future account usage and expense payments because of the passage of time. The actuarial reserve will also change due to the variance of experience from the assumptions. These variances include tuition increases, investment income and expenses.

The actuarial reserve will also change due to the growth of the Plan and due to the updating of the assumptions to reflect the Plan's emerging experience. The changes for the year ending June 30, 2018 are summarized in the table below.

Progression of Actuarial Reserve	
Actuarial Reserve at June 30, 2017	\$269,144,948
Projected Increase to June 30, 2018	16,162,771
Gain from Favorable Tuition Inflation	61,062,182
Gain due to Favorable Investment Experience	15,956,790
Gain due to Additional Contributions	16,582,562
Changes Due to Change In Assumptions	(11,175,669)
Actuarial Reserve at June 30, 2018	\$367,733,584

Our determination of the status of the Fund is based on the asset and contract information provided by Treasury and on the stated assumptions. Because of the uncertainty of the future, actual events are almost certain to vary from our assumptions. These differences may be material.

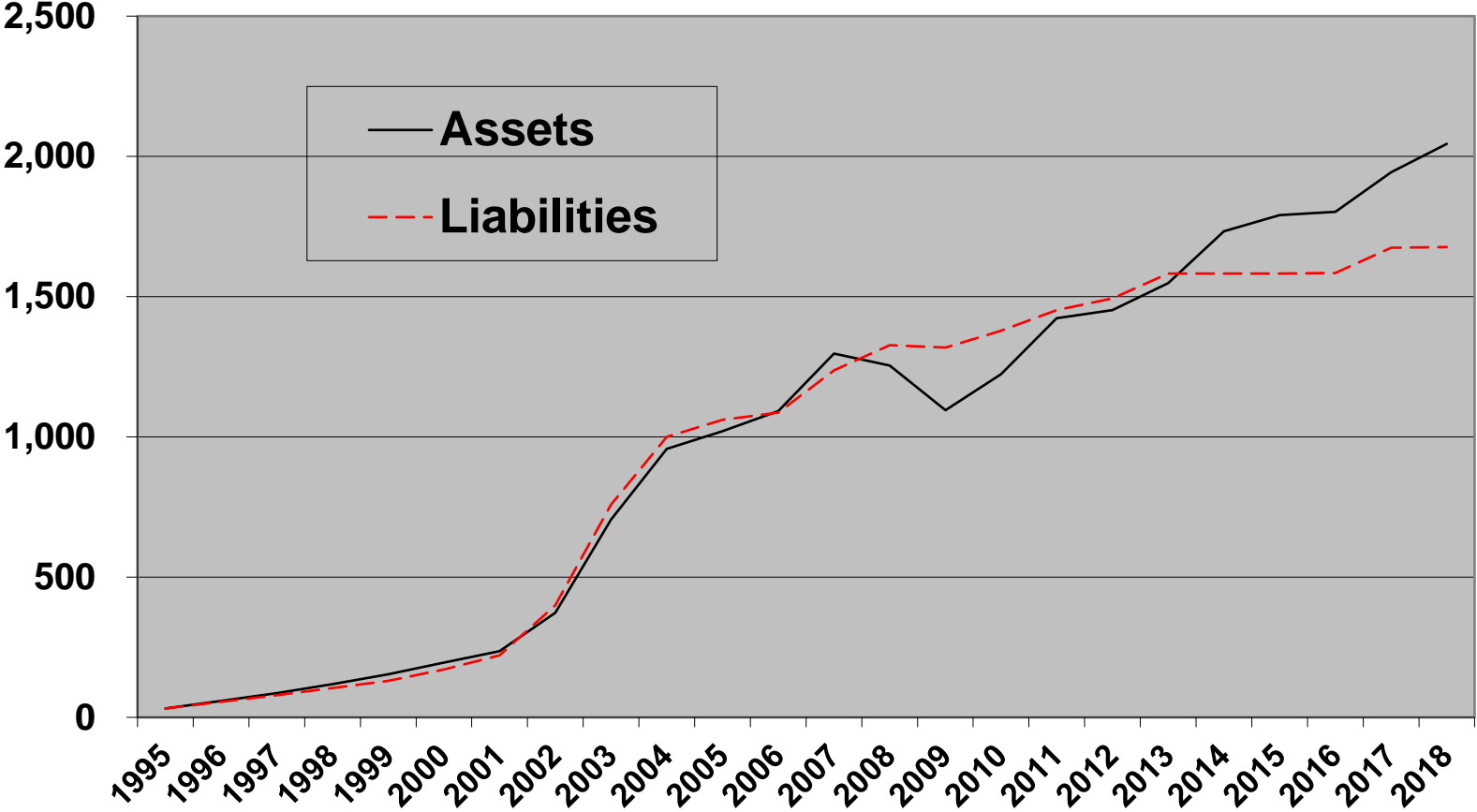
In the chart immediately below, we show the value of expected future account usage, expected future payments, current assets and expected actuarial reserve as of the end of each future year for contributions made through June 30, 2018.

PRESENT VALUE OF ASSETS AND LIABILITIES

Fiscal Year Ending	Value of Assets	Present Value of Future Account Usage And Expenses	Actuarial Reserve
2018	2,044,552,081	1,676,818,497	367,733,584
2019	1,903,556,047	1,512,850,500	390,705,547
2020	1,782,895,733	1,368,747,853	414,147,880
2021	1,660,257,093	1,221,260,340	438,996,753
2022	1,541,606,084	1,076,269,526	465,336,558
2023	1,432,155,369	938,898,617	493,256,752
2024	1,333,733,532	810,881,375	522,852,157
2025	1,255,330,202	701,106,916	554,223,286
2026	1,196,217,623	608,740,940	587,476,683
2027	1,154,113,513	531,388,228	622,725,284
2028	1,121,467,544	461,378,742	660,088,801
2029	1,095,522,590	395,828,461	699,694,129
2030	1,075,977,814	334,302,037	741,675,777
2031	1,062,387,104	276,210,780	786,176,324
2032	1,056,020,971	222,674,068	833,346,903
2033	1,057,497,913	174,150,195	883,347,718
2034	1,067,720,652	131,372,071	936,348,581
2035	1,087,152,406	94,622,910	992,529,495
2036	1,117,159,227	65,077,962	1,052,081,265
2037	1,158,348,425	43,142,284	1,115,206,141
2038	1,209,916,686	27,798,177	1,182,118,510
2039	1,270,693,299	17,647,678	1,253,045,620
2040	1,339,280,965	11,052,607	1,328,228,357
2041	1,414,992,287	7,070,229	1,407,922,059
2042	1,496,817,091	4,419,708	1,492,397,382
2043	1,584,001,996	2,060,771	1,581,941,225
2044	1,676,441,317	625,648	1,675,815,670

Historical TAP Assets and Liabilities

Millions



VIII. SENSITIVITY TESTING

We believe that when there is a significant amount of uncertainty about conditions prevailing in the future it is important to test for status under other possible assumptions.

We investigated the effect of variances in both university inflation and investment yield assumptions from those anticipated by the status test assumptions. For these projections, we assumed no future contributions. These scenarios are described below.

- 1) Tuition inflation lower than status test assumptions by 0.25% every year.
- 2) Tuition inflation higher than status test assumptions by 0.25% every year.
- 3) Investment yields higher than status test assumptions by 0.25% every year.
- 4) Investment yields lower than status test assumptions by 0.25% every year.
- 5) Tuition inflation lower and investment yields higher than status test assumptions by 0.25% every year.
- 6) Tuition inflation higher and investment yields lower than status test assumptions by 0.25% every year.

The actuarial reserve for each of these scenarios is shown below.

Sensitivity Testing Results	
<u>Scenario</u>	<u>Actuarial Reserve</u>
1	\$385,158,165
2	\$349,981,724
3	\$386,233,993
4	\$348,796,717
5	\$403,291,618
6	\$330,657,424

IX. STOCHASTIC ANALYSIS

We have retained the same model for stochastic projections as we used last year. We have updated the beginning values to reflect 2018 actual results, but otherwise have left the same structure and parameters in place.

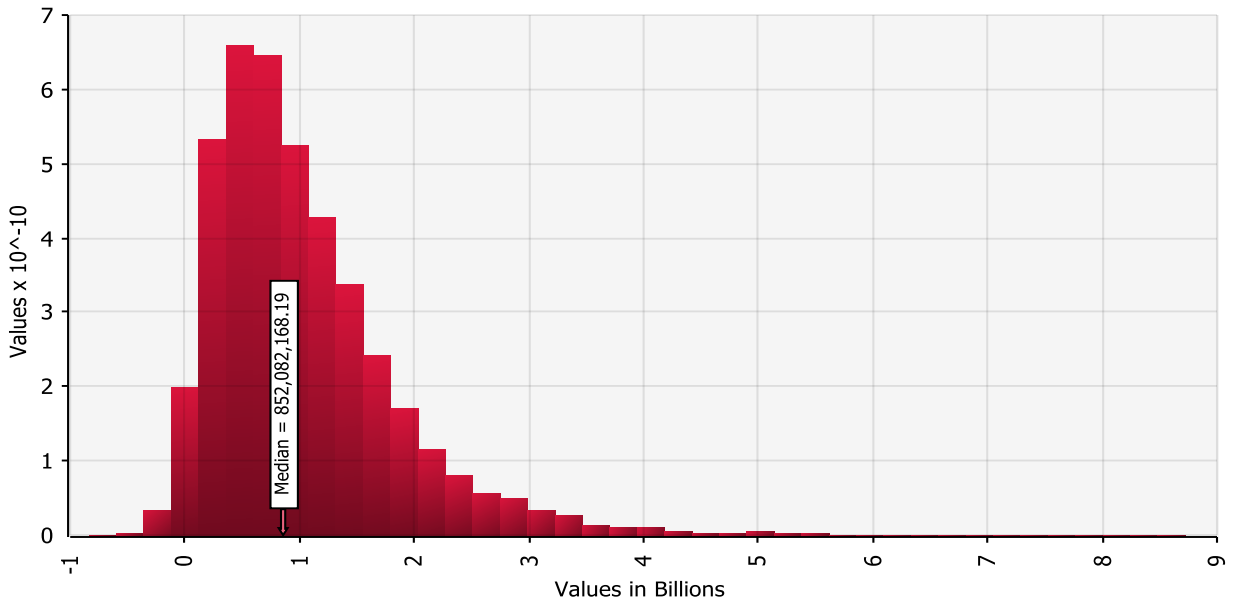
As in prior years, we ran 10,000 scenarios with varying tuition inflation and investment returns. The results are summarized in the table below and shown graphically in the chart at the end of this section

Proportion with positive Actuarial Reserve	97.7%
25% of results are better than:	1,394,941,553
50% of results are better than:	852,082,168
75% of results are better than:	465,187,448
Largest Actuarial Reserve	8,727,065,307
Smallest Actuarial Reserve	(830,733,514)
Mean Actuarial Reserve	1,026,316,444

The most important measures from the table immediately above are the Proportion with positive Actuarial Reserve and the 50% Results. The Proportion with positive Actuarial Reserve probability of 97.7% indicates that there is a better than 9/10 likelihood that the Program will have a surplus.

The 50% Results measure is a “best-estimate” measure of results. If our assumptions are neither conservative (that is they understate results) nor aggressive (that is they overstate results) then the 50% Results measure should be close to our projected result of \$367,733,584. The table above indicates that our assumptions are more conservative in aggregate than the historical values on which the stochastic analysis was based.

The Smallest Actuarial Reserve indicates what happens if economic events continue adversely for the lifetime of the current GSP Credits -high tuition increases, coupled with negative returns in the equity market until the end of the projection horizon. On the other hand, the Largest Actuarial Reserve indicates what happens if economic conditions are favorable for the remaining lifetime of the current GSP credits.



X. CHANGES IN ACTUARIAL ASSUMPTIONS

We made three assumption changes for our projections this year. These are the portion of appropriated expenses allocated to GSP work and new business has increased, some fees paid by account owners from the 2016 – 2017 academic year were refunded and fees were waived for part of the 2017 – 2018 academic year, and expenses paid to the administrative services provider have changed.

Appropriated Expenses

Total appropriated expenses remain the same as last year (\$3,200,000). The part allocated to GSP work and new business has increased from \$1,375,000 last year to \$1,660,000 this year.

Fee Refund and Waiver

During the 2017 – 2018 academic year fees paid for the 2016 - 2017 academic year were refunded for those accounts that agreed to receive plan materials (e.g. statements, confirmations, disclosure documents) by e-mail. Additionally, fees for the first quarter of the 2017 – 2018 academic year were waived.

Change in Administrative Services Provider Expense

In the past, the administrative services provider charged fees according to the following schedule.

- A specified dollar amount per year inflating at 3.5% per year,
- A specified number of basis points annually of the Plan Fund and
- A specified dollar amount annually per contract.

Under the new contract the administrative services provider charges a fee of 0.14% of assets under management on an annual basis.

Effect of Changes in Assumptions

If assumptions had been the same as last year, the Plan's actuarial reserve and funded status would have been:

\$378,909,253 Reserve

22.67% Funded Status

These changes decreased the actuarial reserve by \$11,175,669 and the funded status by 0.74%.

The components of the change are:

- Change in Appropriated Expense \$ 1,811,114 worsening of results
- Fee Refund and Waiver \$ 4,176,843 worsening of results
- Change in Administrator Expense \$ 5,187,712 worsening of results

XI. EXPECTED USE OF FUNDS

The Fund, which is comprised of contributions, fees, all interest and earnings, and any other money appropriated or made available to Treasury, is expected to pay benefits and expenses in the following proportions:

- Tuition payments - 94.5%
- Expenses - 2.2%
- Payments of refunds to account owners - 3.3%

These results are shown graphically below.

