

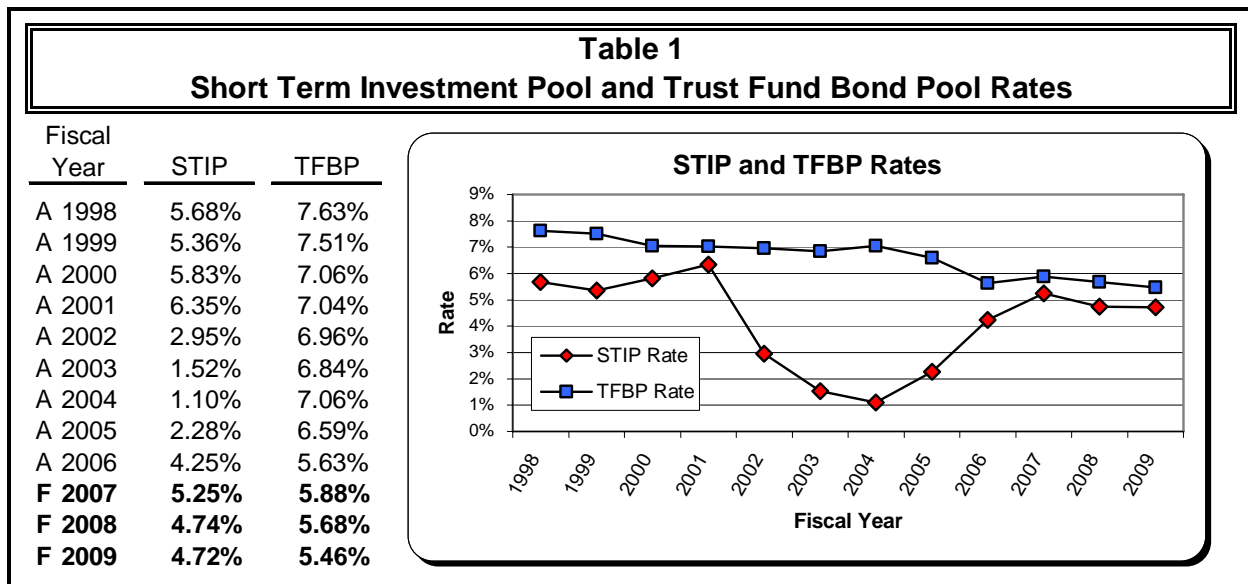
# INTEREST RATE INTRODUCTION

## Revenue Description

The Board of Investments (board) manages trust fund balances and invests agency cash balances for the state. The board invests most of the agency cash and a small part of trust fund balances in the short term investment pool (STIP). The STIP is managed like a money market account to allow daily deposits and withdrawals while still paying interest. The board also invests trust fund balances in the trust fund bond pool (TFBP). The TFBP holds a portfolio consisting primarily of long-term bonds and is managed to provide consistent interest earnings. The forecast yields for STIP and TFBP are used in the interest estimates from the treasurer's cash account, the various coal trusts, the common school trust, and several other funds.

## Historical and Projected Interest Rates

Table 1 shows actual annual percentage interest rates of STIP and TFBP in FY 1998 through FY 2006 and projections for FY 2007 through FY 2009.



The STIP yield decreased substantially from FY 2001 through FY 2004 due to a collapse in short-term interest rates. Short-term interest rates started rising in 2005 causing a 1.18% STIP yield increase up to 2.28% in FY 2005 and a 1.97% increase up to 4.25% in FY 2006. Short-term interest rates are projected to continue rising through 2007; thus the STIP rate is projected to increase to 5.25% in FY 2007. The STIP rate is then forecast to decrease to 4.74% in FY 2008 and 4.72% in FY 2009.

The TFBP yield decreased an average of 0.16% per year from FY 1998 through FY 2003. This decline occurred because older bonds with relatively high interest rates were gradually replaced by bonds with lower interest rates. Thus, the TFBP interest rate increase of 0.22% in FY 2004 was due to large capital gains from the sale of the older bonds with higher interest rates. The large decrease in yield from 6.59% in FY 2005 to 5.63% in FY 2006 was due to unusually large capital gains in FY 2005.

The TFBP yield is forecast to increase slightly in FY 2007 and then decrease in FY 2008 through FY 2009 due to a lower average bond interest rate in the TFBP portfolio. The average interest rate is expected to decline as the older bonds in the portfolio are replaced with newer bonds with lower interest rates. Capital gains are expected to return to pre-2004 levels because the sale of the older bonds with high interest rates is decreasing.

### **Forecast Methodology**

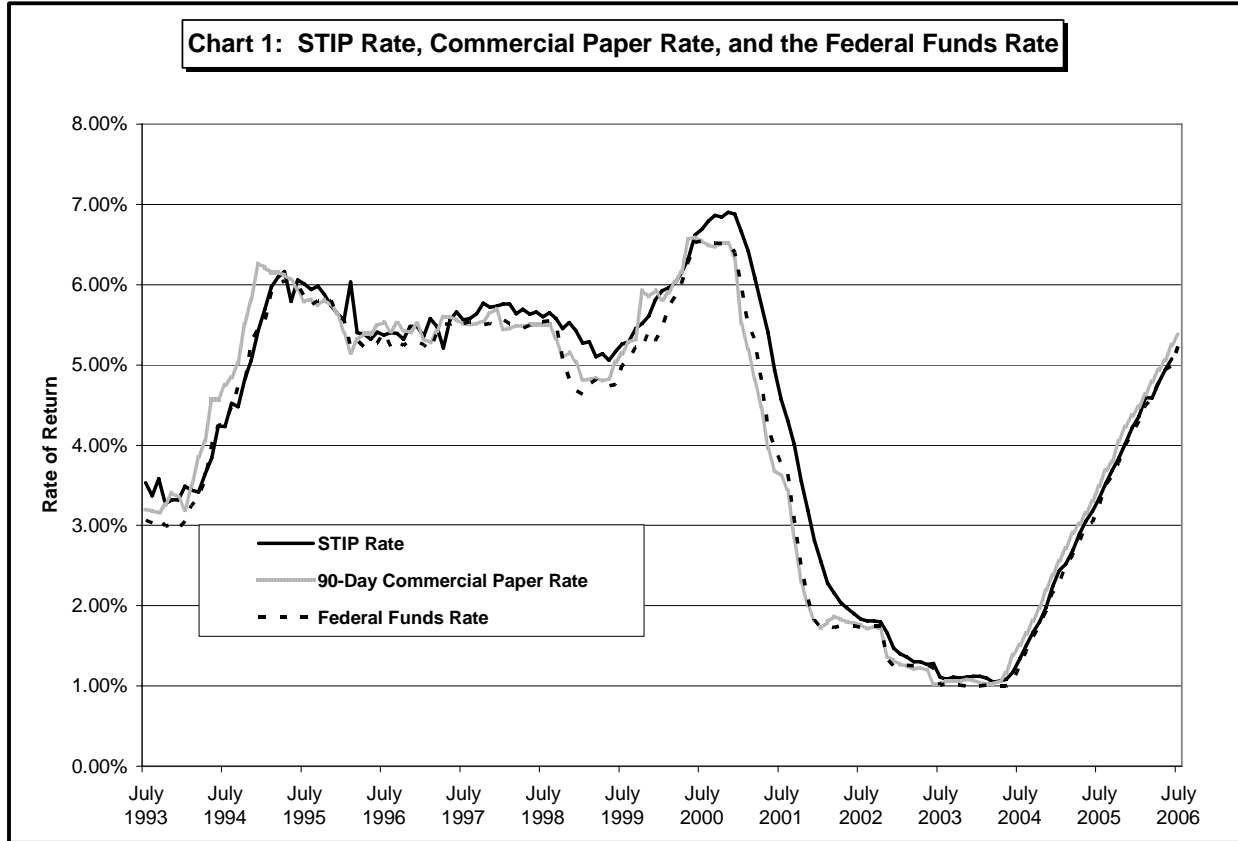
The STIP interest rate is projected by following two steps. First, the forecast interest rates for commercial paper and the federal funds rate are collected from Global Insight. Second, the forecast interest rates are included in a statistical model to forecast the STIP rate.

The TFBP interest rate is projected in the following steps. First, the interest rate for TFBP income is projected using a statistical model. Second, the capital gains income rate is projected. Third, the interest rate for the combined smaller sources of income is projected. Fourth, the three interest rates are added together and the administrative cost ratio is subtracted from the total to get the projected TFBP interest rate.

### **Short Term Investment Pool (STIP)**

STIP dollars are invested in short-term investments. About 70% of the STIP portfolio is composed of commercial paper. Variable or floating rate bonds make up about 25% of the portfolio and about 5% of STIP funds are invested in repurchase agreements and corporate fixed bonds. The STIP interest rate is the composite return on these investments.

As shown in Chart 1, the STIP rate moves with the commercial paper rate and the federal funds rate over time. This occurs because commercial paper is about 70% of STIP investment and the variable rate bonds have interest rates similar to the federal funds rate.



Estimates of commercial paper rates and the federal funds rate from Global Insight are used to predict future STIP rates. The estimated rates are included in a statistical model that forecasts the STIP rate based on the relationship of the commercial paper rate and federal funds rate with the STIP rate over time.

Table 2 shows the actual commercial paper rate, the federal funds rate, and STIP rate from FY 2001 through FY 2006. Table 2 also shows the Global Insight forecast of the commercial paper rate and the federal funds rate for FY 2007 through FY 2009, and the STIP rate forecast from the statistical model, which is 5.25% in FY 2007, 4.74% in FY 2008, and 4.72% in FY 2009.

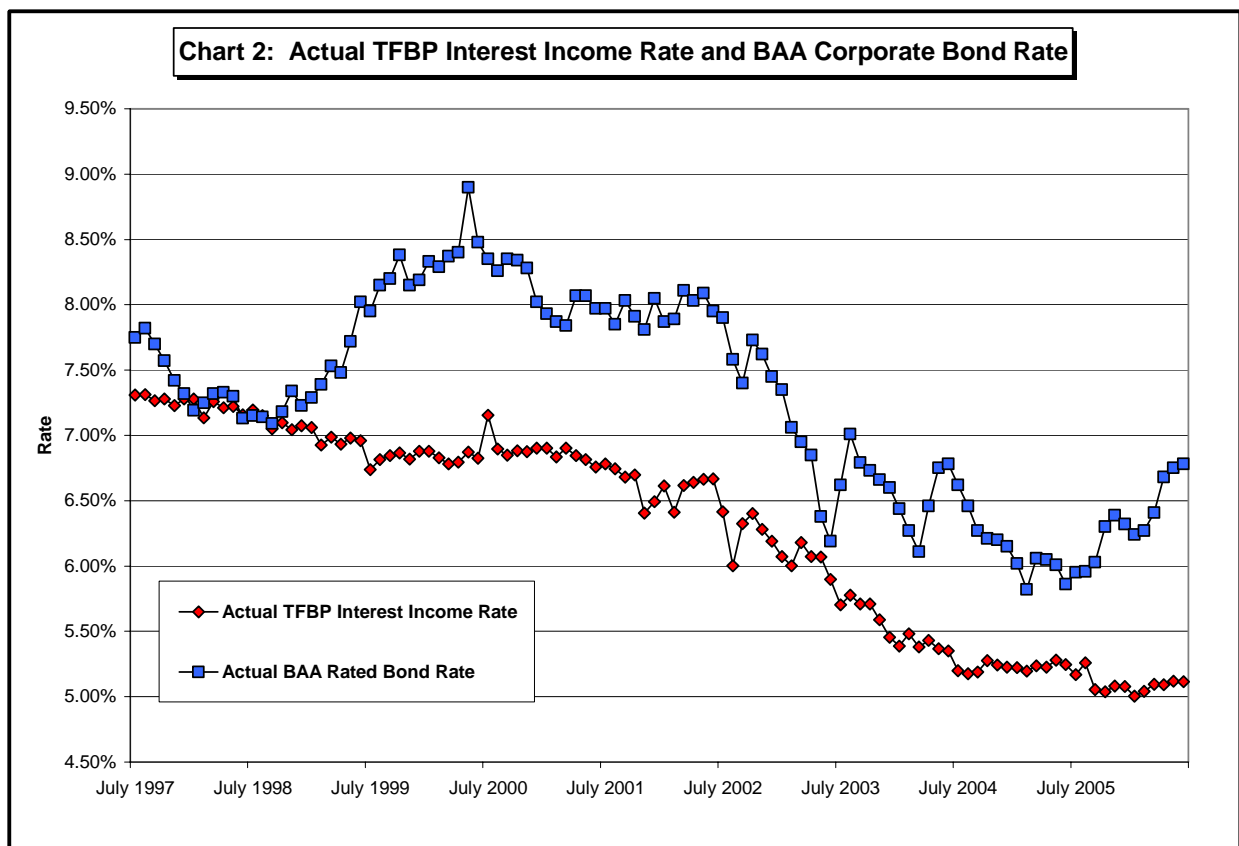
Fiscal Year	Average Annual Commercial Paper Rate	Average Annual Federal Funds Rate	Average Annual STIP Rate
A 2001	5.54%	5.73%	6.35%
A 2002	2.23%	2.28%	2.95%
A 2003	1.40%	1.42%	1.52%
A 2004	1.09%	1.01%	1.10%
A 2005	2.43%	2.20%	2.28%
A 2006	4.40%	4.20%	4.25%
<b>F 2007</b>	<b>5.15%</b>	<b>5.17%</b>	<b>5.25%</b>
<b>F 2008</b>	<b>4.58%</b>	<b>4.54%</b>	<b>4.74%</b>
<b>F 2009</b>	<b>4.59%</b>	<b>4.56%</b>	<b>4.72%</b>

## Trust Fund Bond Pool (TFBP)

TFBP income is earned through five sources. These sources are interest income, net accretion, capital gains, securities lending income, and miscellaneous income. The TFBP rate is the ratio of total income to total assets. To forecast TFBP rates, the ratio of income to assets is forecast for each of the five sources of investment income and the administrative expense is subtracted from the total of the income ratios.

### Interest Income

The largest TFBP income source is interest paid on bonds within the bond pool, which accounts for 80% to 95% of annual TFBP income. Bonds in the TFBP must be investment grade or better, so the interest rate on new purchases for the pool tends to follow the current rate of BAA bonds. "BAA" is a rating attached to bonds to identify them as investment grade bonds of moderate risk. As seen in Chart 2, the TFBP rate follows small movements in the BAA bond rate.



The Global Insight forecast of the BAA bond rate is used in the statistical model to project the TFBP interest income rate. The statistical model uses time series analysis to account for the historical movements in the BAA bond rate and the TFBP interest income rate in the forecast. The statistical model also includes a 10-year moving

average of BAA bond rate and the TFBP rate because the TFBP portfolio consists of bonds bought over a period of time. Chart 3 shows the 10-year average BAA bond rate from FY 1997 through FY 2006 and the actual TFBP interest income rate for the same period.

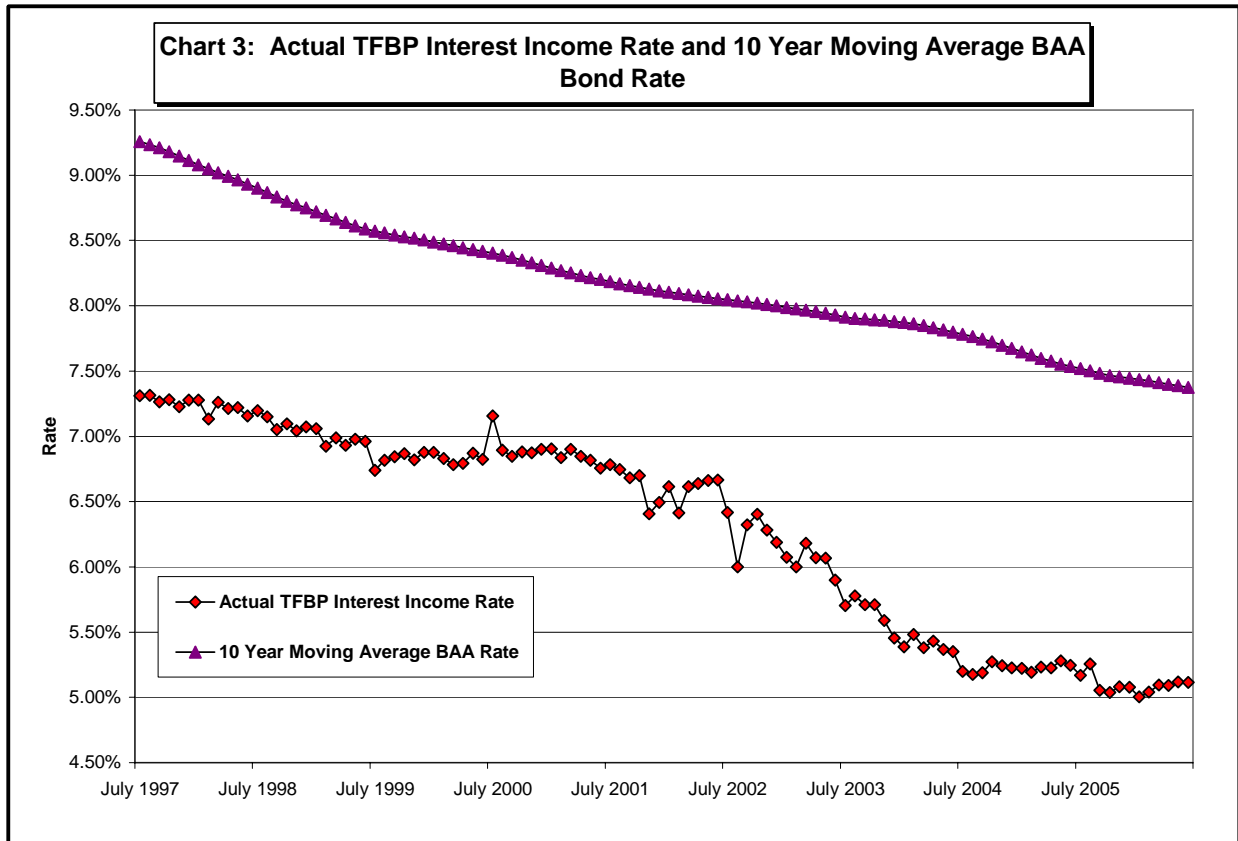


Table 3 shows the BAA bond rate, the 10-year average BAA bond rate, and the actual TFBP interest income rate from FY 2001 through FY 2006. It also shows Global Insight's projected BAA bond rate, the projected 10-year moving average BAA bond rate, and the TFBP interest income rate forecast from the statistical model.

The TFBP interest income rate is projected to decrease to 5.081% in FY 2007, and then to 4.990% in FY 2008. This decline is primarily caused by projected decreases in the ten-year moving average BAA bond rate. The TFBP interest income rate is forecast to increase in FY 2009 to 5.011%

Fiscal Year	Current BAA Bond Rate	10-Year Average BAA Bond Rate	TFBP Interest Income Rate
A 2001	8.113%	8.301%	6.885%
A 2002	7.963%	8.114%	6.618%
A 2003	7.205%	7.992%	6.159%
A 2004	6.602%	7.867%	5.528%
A 2005	6.144%	7.660%	5.226%
A 2006	6.340%	7.442%	5.096%
<b>F 2007</b>	<b>6.451%</b>	<b>7.286%</b>	<b>5.081%</b>
<b>F 2008</b>	<b>6.590%</b>	<b>7.146%</b>	<b>4.990%</b>
<b>F 2009</b>	<b>7.193%</b>	<b>7.104%</b>	<b>5.011%</b>

as projected increases in current BAA bond rate from FY 2006 through FY 2009 cause the ten-year moving average BAA bond yield to increase in FY 2009.

Capital Gains Income

Capital gains or capital losses are realized when bonds are sold from the pool. A capital gain is the difference between the book price and the sale price of the bond. The book price of the bond is the purchase price adjusted for amortization. When the average coupon rate of new issues decreases, the coupons of bonds currently held in the portfolio appear more attractive, so the market prices of these older bonds rise. When the average coupon rate of new issues increases, the interest rates of bonds currently held appear less attractive and their prices fall. Thus, capital gains income tends to move inversely with the average interest rate of new issues of similar risk. As shown in Table 4, capital gains income is usually a small proportion of bond pool income, although in FY 2004 and FY 2005 capital gains made up more than 14% of TFBP income. In FY 2001 the bond pool sustained capital losses of \$1.747 million, or about a negative 2% of total investment income. Capital gains have averaged 4.5% of total investment income since 1999 and were only 0.92% of total income in FY 2006.

<b>Table 4</b>		
<b>TFBP Capital Gains Income</b>		
<u>Fiscal Year</u>	<u>Capital Gains Income</u>	<u>% of Total Income</u>
A 1999	4,558,662	5.90%
A 2000	697,222	0.85%
A 2001	(1,747,406)	(2.08%)
A 2002	144,583	0.17%
A 2003	1,115,423	1.37%
A 2004	12,315,172	14.19%
A 2005	12,452,243	14.59%
A 2006	692,463	0.92%

Using the ten-year average BAA bond rate as a “proxy” or substitute for the TFBP interest rate, and current BAA bond rate as a proxy for the current market interest rate, capital gains should be more likely to occur when the ten-year average rate is greater than the current interest rate. This is used in a statistical model that projects the capital gains interest rate using the difference in the forecast ten-year average BAA bond rate and the forecast current BAA bond rate since 1996. Table 5 shows the difference in the rates and the actual and projected TFBP capital gains interest rate from FY 2001 through FY 2009.

<b>Table 5</b>				
<b>TFBP Difference in Bond Rates and Capital Gains Interest Rate</b>				
<u>Fiscal Year</u>	<u>Ten-Year Average BAA Bond Rate</u>	<u>Current BAA Bond Rate</u>	<u>Difference in Current BAA and Ten-Year Average Rates</u>	<u>Capital Gains Interest Rate</u>
A 2001	8.301%	- 8.113%	= 0.188%	(0.146%)
A 2002	8.114%	- 7.963%	= 0.151%	0.002%
A 2003	7.992%	- 7.205%	= 0.787%	0.093%
A 2004	7.867%	- 6.602%	= 1.265%	1.006%
A 2005	7.660%	- 6.144%	= 1.516%	0.972%
A 2006	7.442%	- 6.340%	= 1.102%	0.052%
<b>F 2007</b>	<b>7.286%</b>	- <b>6.451%</b>	= <b>0.835%</b>	<b>0.307%</b>
<b>F 2008</b>	<b>7.146%</b>	- <b>6.590%</b>	= <b>0.556%</b>	<b>0.204%</b>
<b>F 2009</b>	<b>7.104%</b>	- <b>7.193%</b>	= <b>(0.089%)</b>	<b>(0.033%)</b>

The interest rate is the ratio of capital gains income to total TFBP assets. The capital gains interest rate increased to around 1% with the increase in capital gains income in FY 2004 and FY 2005. The interest rate dropped to pre-FY 2004 levels in FY 2006 to 0.052% and the capital gains interest rate is forecast by the statistical model to increase to 0.307% in FY 2007, and then decrease to 0.204% in FY 2008, and -0.033% in FY 2009.

### Small Income Sources

As shown in Table 6, TFBP has three small sources of income: amortization income, securities lending income, and miscellaneous income. The small income sources do not follow a trend of predicted interest rates, so they are forecast using the most current rate or projecting an average of previous rates.

Amortization is the difference between par value and the price paid on a bond amortized over the expected life of the bond. The amortization income rate is the ratio of amortization income to assets. The rate of return was 0.497% in FY 2006 and is forecast to be 0.506% in FY 2007 due to an increase in amortization income in the first quarter of FY 2007. The rate of return is forecast to stay at the average FY 2006 level of 0.497% though FY 2008 and FY 2009.

Fiscal Year	Amort Income Rate	+ Securities Lending Income Rate	+ Misc Income Rate	= Total Interest Rate
A 2001	0.302%	+ 0.016%	+ 0.000%	= 0.319%
A 2002	0.325%	+ 0.033%	+ 0.000%	= 0.357%
A 2003	0.575%	+ 0.012%	+ 0.020%	= 0.607%
A 2004	0.521%	+ 0.013%	+ 0.005%	= 0.539%
A 2005	0.394%	+ 0.014%	+ 0.004%	= 0.412%
A 2006	0.497%	+ 0.007%	+ 0.005%	= 0.509%
<b>F 2007</b>	<b>0.506%</b>	<b>+ 0.006%</b>	<b>+ 0.004%</b>	<b>= 0.516%</b>
<b>F 2008</b>	<b>0.497%</b>	<b>+ 0.007%</b>	<b>+ 0.005%</b>	<b>= 0.509%</b>
<b>F 2009</b>	<b>0.497%</b>	<b>+ 0.007%</b>	<b>+ 0.005%</b>	<b>= 0.509%</b>

Securities lending income is a minor source of bond pool investment income. A small number of bond pool securities are loaned to brokers and other entities to provide security for transactions. Fees are charged for the use of these securities and collateral is collected to protect the pool from the associated investment risk. Income from investment of this collateral combined with the lending fees make up lending income. This income generally contributes less than 0.5% of bond pool annual investment income, with a five-year average of 0.25%. The FY 2006 average lending interest rate of 0.007% is projected to continue through FY 2009, with a slight decrease in FY 2007 to 0.006% due to decreased lending income in the first quarter of FY 2007.

Miscellaneous income is a very small and sporadic income source, averaging only 0.09% of annual income. The miscellaneous income rate is projected to remain at the FY 2006 level of .005% through FY 2009, with a slight decrease to 0.004% in FY 2007 due to decreased miscellaneous income receipts in early FY 2007.

The total interest rate for small sources of TFBP income is projected to increase slightly in FY 2007 to 0.516%. The rate is then projected to decrease to 0.509% in FY 2008 and FY 2009.

### Trust Fund Bond Pool Interest Rate

TFBP rate of return is the sum of rates of return from the income sources less the administrative expense ratio. The ratio of administrative expense to total assets is relatively constant within a year and increased in FY 2006 due to increased consulting expenses. This ratio is projected to stay at the FY 2006 level of 0.024% in FY 2007 through FY 2009. Table 5 shows actual and projected TFBP rates from FY 2001 through FY 2009.

<b>Table 7</b>							
<b>Trust Fund Bond Pool</b>							
<b>Interest Rate</b>							
<u>Fiscal Year</u>	<u>Interest Income Rate</u>		<u>Capital Gains Income Rate</u>		<u>Small Income Sources Rate</u>	<u>Admin Expense Ratio</u>	<u>TFBP Interest Rate</u>
A 2001	6.885%	+	(0.146%)	+	0.319%	- 0.016%	= 7.04%
A 2002	6.618%	+	0.002%	+	0.357%	- 0.020%	= 6.96%
A 2003	6.159%	+	0.093%	+	0.607%	- 0.019%	= 6.84%
A 2004	5.528%	+	1.006%	+	0.539%	- 0.017%	= 7.06%
A 2005	5.226%	+	0.972%	+	0.412%	- 0.017%	= 6.59%
A 2006	5.096%	+	0.052%	+	0.509%	- 0.024%	= 5.63%
<b>F 2007</b>	<b>5.081%</b>	<b>+</b>	<b>0.307%</b>	<b>+</b>	<b>0.516%</b>	<b>- 0.024%</b>	<b>= 5.88%</b>
<b>F 2008</b>	<b>4.990%</b>	<b>+</b>	<b>0.204%</b>	<b>+</b>	<b>0.509%</b>	<b>- 0.024%</b>	<b>= 5.68%</b>
<b>F 2009</b>	<b>5.011%</b>	<b>+</b>	<b>(0.033%)</b>	<b>+</b>	<b>0.509%</b>	<b>- 0.024%</b>	<b>= 5.46%</b>

The projected TFBP rate increases slightly to 5.88% in FY 2007 and then decreases each year from FY 2008 through FY 2009. The 0.2 percentage point decrease in FY 2008 and the 0.22 percentage point decrease in FY 2009 are primarily caused by small reductions in the interest income rate in FY 2007 and capital losses in FY 2009.

### **Data Sources**

The Board of Investments and State Street Bank provided monthly reports on STIP and TFBP investment and earnings. Forecast rates of return on commercial paper and BAA bonds are from Global Insight. Historical interest rates on 90-day commercial paper and BAA-rated corporate bonds are from the Federal Reserve website: <http://www.federalreserve.gov/releases/h15/data.htm>.