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MEMO

TO: Connecticut Retirement Security Board

DATE: July 31, 2015

FROM: Mercer

SUBJECT: Guarantees

Introduction

The Connecticut Retirement Security legislation directs the Connecticut Retirement Security Board (CRSB) to review and provide recommendations around the following design feature:

An annually predetermined guaranteed rate of return and the procurement of insurance, as necessary, to guarantee the stated rate of return.

To be comprehensive, Mercer has considered a broad range of guarantee options in this memo, including options that do not meet the statutory requirements. With that in mind, the Connecticut Retirement Security Program (the Program) can structure the guarantee in one of four ways:

1. The State of Connecticut guarantees the rate of return on the assets accumulated in the program.

2. Connecticut contracts with a third-party insurance company to provide a guaranteed rate of return on assets accumulated in the program.

3. The Program offers a stand-alone investment option, such as a stable value fund, that provides an explicit guaranteed rate of return on invested assets.

4. The Program offers a stand-alone investment option that guarantees the investment through yields generated or an insurer-provided guarantee.

The analysis below assesses the feasibility and cost (where estimable) of each option. Offering a guaranteed rate of return does not address the statutory design element of improving income replacement ratios in retirement nor does a guarantee provide assurance against running out of money or outliving savings. Mercer will discuss these issues in a later memo covering annuity solutions.

The State provides the guarantee

The statute requires that the Program not "constitute a debt or obligation of the state" if such guarantees were to be offered as an investment option in the Program. This requirement appears to preclude the State providing a direct guarantee. Setting aside this restriction, Mercer developed a model to illustrate the potential costs of offering the guarantee. This illustration helps to explain why the cost of a guarantee from a third-party insurer is likely to be expensive. When the State is providing

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a direct guarantee, the State is essentially writing a put option to the participants. The State effectively commits that if the rate of return on the investment does not meet a minimum threshold of "x%", the State will fund the difference between the rate of return and the guaranteed percentage. If the rate of return exceeds the threshold, the participant does not require the State to fund the account. In this structure, the cost of the guarantee is determined by the time period over which the guarantee is made, the fluctuations in rates of return, and the accumulated assets for which the guarantee is made. To illustrate the point and understand the likelihood of the State paying out a guarantee, consider the following example:

- Assume participants have been contributing $1,000 per annum for the past 15 calendar years.

- Assume that at inception (15 years ago) there was one participant in each age group from age 47 through 61 (15 participants).

- Assume the contributions are invested in a return seeking fund aligned with the participant's age.

- Assume the guarantee is for principal + 1% return per annum every year. The accumulated balances with real rates of return will be compared with the principal +1% p.a. guarantee at age 62 to determine whether the State will pay.

- Table 1 shows how the State would have paid for the guarantee for the period of 2000 to 2014.

Using a backward looking approach and the assumptions listed, the State would have been likely to pay out guarantees in the first three years of the program and in 2008. Please see the bottom row of the table for the amounts paid.

TABLE 1: $1K CONTRIBUTIONS PER ANNUM FOR 15 YEARS WITH AGE GROUPINGS 47 TO 62

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
40% BC Agg / 60% MSCI ACWI return %	-4.3	-6.4	-7.7	21.8	11.2	7.8	14.4	10.2	-25.5	23.5	11.1	-0.8	11.9	12.7	5.3
Annual Contribution	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000
CPI %	3.4	1.6	2.4	1.9	3.3	3.4	2.6	4.1	0.1	2.7	1.5	3.0	1.7	1.5	0.8
Guaranteed Account Balance at Retirement (Contributions plus 1% annual real return)	$1,044	$2,097	$3,203	$4,325	$5,553	$6,843	$8,124	$9,591	$10,707	$12,146	$13,476	$15,054	$16,497	$17,937	$19,272
47	$957	$1,832	$2,612	$4,399	$6,001	$7,549	$9,784	$11,884	$9,599	$13,086	$15,649	$16,512	$19,592	$23,203	$25,482
48	$957	$1,832	$2,612	$4,399	$6,001	$7,549	$9,784	$11,884	$9,599	$13,086	$15,649	$16,512	$19,592	$23,203	
49	$957	$1,832	$2,612	$4,399	$6,001	$7,549	$9,784	$11,884	$9,599	$13,086	$15,649	$16,512	$19,592		
50	$957	$1,832	$2,612	$4,399	$6,001	$7,549	$9,784	$11,884	$9,599	$13,086	$15,649	$16,512			
51	$957	$1,832	$2,612	$4,399	$6,001	$7,549	$9,784	$11,884	$9,599	$13,086	$15,649				
52	$957	$1,832	$2,612	$4,399	$6,001	$7,549	$9,784	$11,884	$9,599	$13,086					
53	$957	$1,832	$2,612	$4,399	$6,001	$7,549	$9,784	$11,884	$9,599						
54	$957	$1,832	$2,612	$4,399	$6,001	$7,549	$9,784	$11,884							
55	$957	$1,832	$2,612	$4,399	$6,001	$7,549	$9,784								
56	$957	$1,832	$2,612	$4,399	$6,001	$7,549									
57	$957	$1,832	$2,612	$4,399	$6,001										
58	$957	$1,832	$2,612	$4,399											
59	$957	$1,832	$2,612												
60	$957	$1,832													
61	$957														
Guarantee Paid	$87	$265	$590	$-	$-	$-	$-	$-	$1,109	$-	$-	$-	$-	$-	$-

Participant Blance at retirement

The past 15 years have seen strong returns in bond markets and several years with high rates of return in equity markets, which means that the performance in the table most likely does not represent

an unbiased estimate of possible future experience. One could reasonably expect that guarantee payouts will likely be more frequent and larger going forward, than they would have been in the past 15 years.

A second consideration is that the program could have new entrants close to the age on which the guarantee will be due, e.g., aged 62. Using the same assumptions and historical data, if a person aged 61 enters in each of the past 15 years, the model shows a higher likelihood of the State paying guarantees. See table 2 below.

TABLE 2: NEW PARTICIPANT JOINS AT 61 IN EACH OF THE PAST 15 YEARS.

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
40% BC Agg / 60% MSCI ACWI return %	-4.3	-6.4	-7.7	21.8	11.2	7.8	14.4	10.2	-25.5	23.5	11.1	-0.8	11.9	12.7	5.3
Annual Contribution	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000
CPI %	3.4	1.6	2.4	1.9	3.3	3.4	2.6	4.1	0.1	2.7	1.5	3.0	1.7	1.5	0.8
Guaranteed Account Balance at Retirement (Contributions plus 1% annual real return)	$1,044	$1,026	$1,034	$1,029	$1,043	$1,044	$1,036	$1,051	$1,011	$1,037	$1,025	$1,040	$1,028	$1,025	$1,018
Retiree balance at 62	$ 957	$ 936	$ 923	$1,218	$1,112	$1,078	$1,144	$1,102	$ 745	$1,235	$1,111	$ 992	$1,119	$1,127	$1,053
Guarantee Paid	$ 87	$ 90	$ 112	$ -	$ -	$ -	$ -	$ -	$ 266	$ -	$ -	$ 48	$ -	$ -	$ -

While the option described above does not meet the statutory requirement for an annually pre-determined guarantee, it illustrates that guarantees determined less frequently than annually have a high likelihood of being paid out. One would expect an annually determined guarantee to pay out more frequently as illustrated by table 2 where a participant that is a year away from retirement would have received a guarantee payout five out of last 15 years as opposed to table 1 where the guaranteed amount was determined over a longer time period was paid out in four out of the last 15 years. If the State were to self-insure, the State would need to accumulate and maintain significant reserves to mitigate the risk of being unable to fund an actual loss. The State could provide a direct guarantee on accumulated assets and reinsure this risk off the State's balance sheet. Estimating the cost of such a reinsurance arrangement is not possible at this time, because such a contract would be unique and the overall terms are not known. One would expect that the terms of a reinsurance contract would incorporate the likelihood of paying guarantees and require a premium payment. Anecdotal feedback from insurers suggests that the arrangement would not be cost effective because these types of solutions can have unpredictable and large payouts and do not offer any natural hedging mechanisms with other insurance solutions.

Other issues
In addition to high cost and not achieving the policy objective of securing retirement income, guarantees also present administrative and practical challenges that either raise the overall administrative costs or put liability back to the State. Specifically, guarantees will be challenging to administer. The IRA provider will need to track annual balances and returns for each participant. IRA providers do not currently provide this service, and their recordkeeping systems are not likely to have this functionality.

Second, the State would want to manage future liabilities with hedges. Financial instruments are not available with sufficient liquidity at the maturities needed to provide the hedge; liquid high quality corporate bonds are not available for 30 and 40 year maturities. Equity put protection is not available at reasonable cost for time horizons beyond a few years. Consequently, the guarantee cannot be

hedged well, which increases the residual risk that the State would bear and raises the cost of any reinsurance. The lack of hedging instruments also means that there is no current pricing available on market instruments, so we cannot ascertain the costs associated with the State offering this type of guarantee.

Consequently, and in light of the additional analysis presented below, we suggest that a third-party insurance provider is a more likely solution for providing an annually pre-determined guarantee. The different approaches for providing a predetermined guarantee and the associated costs are described in the next sections.

A third-party insurance company provides the guarantee

A third-party insurance company can provide guarantees similar to the guarantee described above. The insurance company would also have a high likelihood of paying out against such a guarantee. Mercer obtained indicative pricing on an anonymous basis from two large insurers. To simply guarantee the principal accumulated at age 62, the insurers would charge an indicative fee of 100 basis points per annum or 1% in addition to administrative costs. If the legislature decides to offer a 1% guaranteed return, the fee would increase to 200 basis points or 2% of the asset value per annum. In short, given current market conditions including available interest rates on the marketable securities insurers would use to partially hedge their guarantees, providing a guarantee is so expensive that it cannot be done without a net reduction in the account balance. Moreover, this guarantee structure does not meet the statutory requirement because the guarantee is not determined on an annual basis. This structure is simply a guarantee of principal or 1% return at age 62.

The exhibits below highlight the net reduction in account balance by looking at income replacement ratios, assuming 6% of salary contribution into the Program for various age groups and no other retirement savings before joining the Program. Appendix 3 provides data for income replacement ratio assuming 3% of salary contribution into the Program. The calculations below include investment management and guarantee fees (where appropriate), but does not yet include administrative fees. An indicative administrative fee will be determined once the Program design is finalized.

TABLE 3: EXPECTED INCOME REPLACEMENT RATIO (INCLUDING SOCIAL SECURITY BENEFITS) AT 6% CONTRIBUTIONS, IF INVESTED IN A TARGET DATE FUND WITH NO GUARANTEES

6% contribution	Age 25	Age 40	Age 55
Low Income	104.0%	71.3%	58.4%
Mid Income	99.5%	62.5%	49.8%
High Income	94.4%	54.6%	36.3%

Please see appendix 2 for details on the assumptions.

TABLE 4: EXPECTED INCOME REPLACEMENT RATIO (INCLUDING SOCIAL SECURITY BENEFITS) AT 6% CONTRIBUTIONS, IF INVESTED IN A TARGET DATE FUND WITH PRINCIPAL AT AGE 62

6% contribution / Principal Guarantee	Age 25	Age 40	Age 55
Low Income	93.4%	68.5%	58.1%

Mid Income	88.8%	59.7%	49.5%
High Income	83.7%	51.8%	36.0%

Please see appendix 2 for details on the assumptions.

TABLE 5: EXPECTED INCOME REPLACEMENT RATIO (INCLUDING SOCIAL SECURITY BENEFITS) AT 6% CONTRIBUTIONS, IF INVESTED IN A TARGET DATE FUND WITH 1% RETURN GUARANTEES AT AGE 62

6% contribution / 1% Return Guarantee	Age 25	Age 40	Age 55
Low Income	86.0%	66.3%	57.8%
Mid Income	81.4%	57.5%	49.2%
High Income	76.3%	49.6%	35.7%

Please see appendix 2 for details on the assumptions.

TABLE 6: EXPECTED INCOME REPLACEMENT RATIO COMPARISON (DIFFERENCE BETWEEN INVESTING IN A TARGET DATE FUND WITH NO GUARANTEE VS. TARGET DATE FUND WITH A GUARANTEE OF PRINCIPAL)

6% contribution	Age 25	Age 40	Age 55
All income level	10.7%	2.8%	0.3%

Please see appendix 2 for details on the assumptions.

TABLE 7: INCOME REPLACEMENT RATIO COMPARISON (DIFFERENCE BETWEEN INVESTING IN A TARGET DATE FUND WITH NO GUARANTEE VS. TARGET DATE FUND WITH A 1% RETURN GUARANTEE)

6% contribution	Age 25	Age 40	Age 55
All income level	18.0%	5.0%	0.6%

Please see appendix 2 for details on the assumptions.

The income replacement ratio does not change significantly for participants that enter the Program at the age of 55, regardless of the assets in which they invest because their expected asset balances at retirement are fairly small compared to participants contributing at an earlier age. In all age groups, the participants have poorer outcomes from an income replacement ratio perspective compared to simply investing in an investment option without the guarantee. Moreover, the cost of insuring guarantees is not static. The State may procure insurance in a given year at one price; however, as market conditions change, the insurance might not be available or the cost may vary significantly. Communications around the guarantee costs and administration will vary over time assuming the cost of the guarantee will be passed to the participants.

Using a stable value fund as an option

The Program could theoretically achieve the general statutory objective using a stable value investment option, although using a stable value fund within an IRA program has major barriers. As with a direct guarantee, the State could directly guarantee the stable value fund's return or use a third-party insurer. The State guaranteeing the stable value return is not in-line with the statutory prohibition against the State taking on liability. Consequently, Mercer prepared this analysis assuming a third party provider would manage the stable value fund.

The guarantee cost for a stable value fund is significantly lower than a direct guarantee because the assets underpinning the stable value guarantee have a risk profile that matches the guarantee return. Generally, stable value funds invest in high quality fixed income assets with limited maturities. For

this reason, insurance providers are most likely to be open to providing a guarantee on a stable value fund versus guarantees on more risky and diverse funds.

Based on Mercer's Stable Value Fund survey as of March 31, 2015, the median fee including asset management fees of the underlying fixed income portfolio is about 47 basis points for accounts less than $25MM and 45 basis points for accounts greater than $25MM, which is significantly less than the cost of obtaining a direct guarantee on a riskier target date fund portfolio. While the cost is lower, the expected return on these more conservative portfolios will also be substantially lower than the expected return on a target date fund portfolio.

Other issues

While stable value options are fairly common in ERISA qualified retirement plans, stable value options are not offered within IRA structures due to securities regulations. Most IRAs require an SEC registered investment vehicle or offer a group annuity contract. Most stable value funds are managed in a commingled fund structure as opposed to a SEC registered mutual fund. If the IRA platform is structured as a group trust, the Program may be able to claim a municipal exemption to the SEC rules. This point should be discussed with legal counsel.

In addition, obtaining stable value insurance or wrap coverage around an option offered in an IRA program may be practically difficult as most providers will require an effective means to enforce "equity wash" provisions. "Equity wash" provisions in stable value insurance products restrict the flow of money from and to a stable value fund from a competing fund, such as a money market or short-term bond fund. These restrictions are in place because interest rates have different periods over which they adjust to base rate changes and individuals can move from stable value funds to investments that adjust more quickly or vice versa, creating valuation and liquidity issues for stable value funds.

To appropriately evaluate whether a stable value insurance wrap will work, the CRSB will need to consider the basis on which participants can withdraw money from the Program and whether withdrawals can be restricted. In qualified defined contribution plans participants can take their money from the plan at termination of employment. Under the proposed IRA structure participants may be able to roll their money at any time for any reason. One possible approach to resolving issues associated with cash flows is to take a class year approach where money is collected for a stated period of time, e.g. a calendar quarter, then held for a defined period, e.g. 2 and 3/4 years for a total of 3 years. The fund would essentially act as a 3 year Certificate of Deposit with no transfers in or out prior to the 3 year maturity date. At maturity the funds could be transferred, reinvested, or rolled over to another IRA provider. This approach could coexist with competing accounts.

Restricting money flows in and out of the Program, even if it is only the assets in the stable value fund, may not be desirable given the statutory goal of the Program being portable. Also, restricting the flow of money may make the Program less desirable for participants, especially for those participants that place high priority on being able to access their funds readily.

The stable value option must also be assessed within the broader program goals of maximizing savings and retirement income. Stable value options focus on guaranteeing a minimum rate of

return, not maximizing returns or income in retirement. Consequently, this option is not well aligned with the broader program policy objectives. The tables below, particularly table 12, illustrate this point.

TABLE 8: MERCER'S LONG-TERM FORWARD LOOKING RETURN AND RISK ASSUMPTIONS

	Return	Risk
Stable Value	1.5% (Short-term) to 3.7% (Long-term)	3.5%
Target Date Fund	5.8% (typical 2020 Fund) to 6.8% (typical 2060 Fund)	11.5% (typical 2020 Fund) to 16.8% (typical 2060 Fund)

TABLE 9: HISTORICAL RETURNS AND RISK (AS OF MARCH 31, 2015)

	Return (%pa)	Risk (%pa)
	Trailing 10-years	
Mercer Mutual Fund Target-Date 2020 Universe		
Lower Quartile	5.0	10.9
Median	5.6	11.9
Upper Quartile	5.9	13.0
*Mercer Mutual Fund Target-Date 2035 Universe**		
Lower Quartile	6.3	15.2
Median	6.6	15.6
Upper Quartile	7.1	16.0
Mercer US Stable Value Universe		
Lower Quartile	3.2	0.5
Median	3.5	0.6
Upper Quartile	3.7	0.7

Latest date target date fund universe with more than 10 years of track record

The guarantee's cost and return profile should be assessed with regard to how this option affects the expected income replacement ratio versus expectations associated with investing in an alternative approach, e.g. a target date fund. The tables below compare investment in a stable value fund to a target date fund.   The income replacement of a stable value fund is significantly lower than a target date fund, except when the time horizon for investment is short.

TABLE 10: EXPECTED INCOME REPLACEMENT RATIO (INCLUDING SOCIAL SECURITY BENEFITS) AT 6% CONTRIBUTIONS, IF INVESTED IN A TARGET DATE FUND WITH NO GUARANTEES)

6% contribution	Age 25	Age 40	Age 55
Low Income	104.0%	71.3%	58.4%
Mid Income	99.5%	62.5%	49.8%
High Income	94.4%	54.6%	36.3%

Please see appendix 2 for details on the assumptions.

TABLE 11: EXPECTED INCOME REPLACEMENT RATIO (INCLUDING SOCIAL SECURITY BENEFITS) AT 6% CONTRIBUTIONS, IF INVESTED IN A STABLE VALUE FUND

6% contribution	Age 25	Age 40	Age 55
Low Income	83.6%	65.9%	57.8%
Mid Income	79.0%	57.1%	49.2%
High Income	73.9%	49.2%	35.7%

Please see appendix 2 for details on the assumptions.

TABLE 12: INCOME REPLACEMENT RATIO COMPARISON (DIFFERENCE BETWEEN INVESTING IN TARGET DATE FUNDS VS. STABLE VALUE FUNDS)

6% contribution	Age 25	Age 40	Age 55
All income level	20.4%	5.4%	0.6%

Please see appendix 2 for details on the assumptions.

If the Board and the Legislature want to offer such a guaranteed investment option, assuming the insurers will provide such an option, Mercer recommends offering this option as an alternative as opposed to making the guaranteed investment option the default investment option. In addition, Mercer recommends not offering competing fund(s), such as a money market fund or a short-intermediate fixed income fund because duplicating exposure within the investment option line-up hinders participant investment decisions, particularly those that are less familiar with making investment decisions.[1]

As mentioned previously, stable value funds generally require participants moving assets from a stable value fund to a competing fund to first move the assets to an equity fund. Assuming a standard stable value fund can be offered, the Program should not offer a competing fund. Offering such an option(s) would require the IRA administrator or another managing body to oversee this activity to ensure the "equity wash" rule is being applied, which will add to administrative complexity.

Investing In a Conservative Portfolio
A fourth option for achieving the statutory mandate of offering a guarantee in the Program is to invest the portfolio in cash equivalents or short term bonds, such that the principal value of the portfolio, or even a small positive interest rate, is guaranteed. A return of 1% is not currently available on a broadly diversified high quality bond portfolio with a duration less than 1 year. So, a guarantee of 1% is not available currently under this scenario, but, the portfolio could provide principal protection. This approach may require imposing participant withdrawal limits to ensure that the State is not liable for making participants whole if the underlying bond holdings decline in value. This approach may not be feasible, as it is counter to the Program's goal of offering a portable retirement solution.

To ensure that the State is not liable, the Board may want to consider having an insurance company guarantee the rate of return. Purchasing a guarantee from an insurer would increase the cost of offering this investment option, making it less attractive. Mercer is in the process of getting indicative

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[1] Source: Choice Overload and Simplicity Seeking, Sheena S. Iyengar, Columbia University, Graduate School of Business; and Emir Kamenica, University of Chicago, Graduate School of Business; February 2007.

pricing for this type of guarantee, as well as the requisite requirements for offering the option in the Program. One requirement may be restricting participant withdrawals. As already discussed, withdrawal restrictions are counter to the Program's goal of being a portable IRA solution.

Mercer does not view either option as attractive relative to the State's other goals for the program, nor as practical under current market conditions. The income replacement ratio obtainable via investment over an entire career in cash and short term bonds is poor and worse than the comparisons shown above for stable value and particularly poor relative to investing assets in an age appropriate target date fund, as shown below. Also, administrative, investment, and insurance costs associated with the program might be higher than the yields currently available on cash and short term bonds, such that in practice even a principal guarantee could not be provided. Finally, a guarantee near zero is unlikely to be attractive to participants, relative to competing alternatives in the market.

TABLE 13: AVERAGE YIELDS OF 1-YEAR MATURITY INVESTMENT GRADE BONDS (AS OF JULY 27, 2015)

Credit Rating	Average Yield
AAA	0.50%
AA	0.65%
A	0.80%
BBB	1.15%

Source: Barclays

TABLE 14: EXPECTED INCOME REPLACEMENT RATIO (INCLUDING SOCIAL SECURITY BENEFITS) AT 6% CONTRIBUTIONS, IF INVESTED IN A TARGET DATE FUND WITH NO GUARANTEES)

6% contribution	Age 25	Age 40	Age 55
Low Income	104.0%	71.3%	58.4%
Mid Income	99.5%	62.5%	49.8%
High Income	94.4%	54.6%	36.3%

Please see appendix 2 for details on the assumptions.

TABLE 15: EXPECTED INCOME REPLACEMENT RATIO (INCLUDING SOCIAL SECURITY BENEFITS) AT 6% CONTRIBUTIONS, IF INVESTED IN A CONSERVATIVE PORTFOLIO

6% contribution	Age 25	Age 40	Age 55
Low Income	73.6%	62.1%	57.5%
Mid Income	69.1%	53.3%	48.6%
High Income	64.0%	45.4%	35.0%

Please see appendix 2 for details on the assumptions.

TABLE 16: INCOME REPLACEMENT RATIO COMPARISON (DIFFERENCE BETWEEN INVESTING IN TARGET DATE FUNDS VS. A CONSERVATIVE PORTFOLIO)

6% contribution	Age 25	Age 40	Age 55
All income level	30.4%	9.2%	1.1%

Please see appendix 2 for details on the assumptions.

Conclusion

Of the guaranteed solutions discussed in this memo, the stable value fund or a conservative portfolio guaranteed by an insurer are the only options that meet the statutory requirements. These options could provide a guaranteed rate of return that is set at least annually. Both options may require withdrawal restrictions, which affects the portability requirements.

Next steps

If the Subcommittee and the CRSB are interested in considering offering a stable value fund or a conservative portfolio as an investment option in the Program, Mercer will inquire with insurance providers the feasibility of offering such a solution within an IRA structure, as well as the requisite requirements for offering such an option. In a separate memo, Mercer will analyze investment instruments offering guaranteed retirement income within an annuity structure that can be offered through a target date fund structure, which aligns to the CRSB's mandate to make recommendations around improving retirement income and readiness.

Appendix 1
Background on Stable Value Funds

The underlying assets of stable value funds are primarily invested in fixed income securities of varying quality, yield, duration, and maturity. The insurance guarantee allows for preservation of principal and provides a guaranteed rate of return. The wrap contracts smooth the market volatility of the underlying bond portfolio by amortizing gains and losses over the duration of the portfolio. This smoothing is done through the guaranteed return rate reset mechanism and insulates against day-to-day volatility.
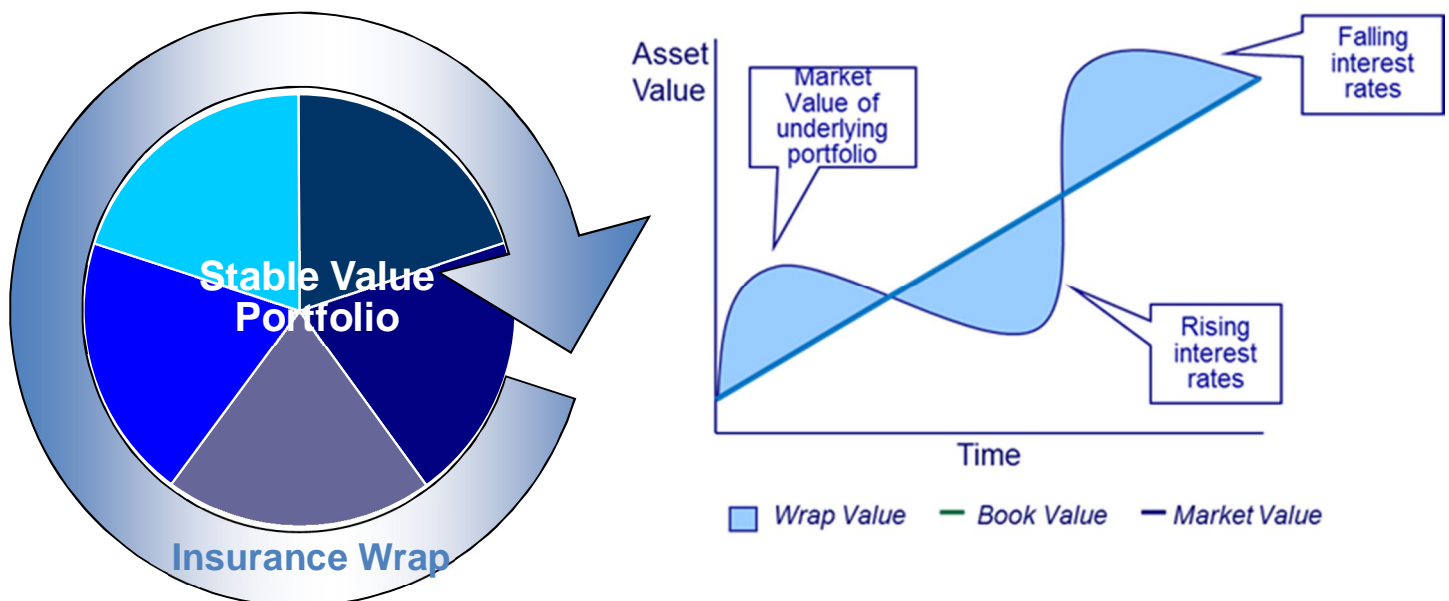
Fundamentals of stable value funds:
- Invests in short/intermediate duration fixed income securities
- Book value accounting (value = contributions + guaranteed return)
- Expectations:
  - Constant net asset value (NAV) of $1
  - Returns similar to intermediate term bond fund over the long-term
  - Volatility similar to money market fund
  - Book value liquidity (participants can liquidate based on book value even when the underlying portfolio has a lower market value)

A stable value fund keeps its NAV constant through "wrap" contracts:
- The fund enters into "wrap" contracts with insurance companies
- The wrap contract maintains a book value asset or fund balance for the underlying assets and reports the yield credited on that book balance

- Any market value gains or losses are amortized over a multi-year period, using the time to maturity or duration of the asset being wrapped, with the crediting rate being adjusted by this amortized gain or loss
- This amortization process maintains the yield and principal stability that plan participants desire
- Market/Book ratio
  - The assets are worth their market value but the portfolio is accounted for using book values
  - Desired ratio is 100% but the ratio will fluctuate over time given market movements and cash flows
- Contracts do not have fixed maturity dates. Usually contracts payout in a lump sum payment that is the lessor of the market value and the book value. If book value is less than market value contract will payout in a series of book value payments. Payout period is equal to duration of underlying investments.

Pros	Cons
- Generally provides higher return over time relative to money market funds, especially in low interest rate environments - Provides participant liquidity at book value - Provides access to an investment product that is not readily available outside of retirement plans - Captures maturity premium (longer dated securities) - Credit premium – may invest in higher-yielding investment grade securities	- Complex portfolio and product structure relative to money market funds - Will generally lag market in rapidly rising interest rate environments - Risk with underlying fixed income strategy (more risk with opportunistic mandates), losses can negatively impact fund crediting rate - Insurance/wrap provider risk - Liquidity constraints on Plan Sponsor directed withdrawals - Limitations on adding "competing options"

Types of stable value funds

There are four different structures of stable value funds in the market that could be considered for inclusion in the Program: a commingled fund, an open maturity general account product, an open maturity insurance company separate account, or an open maturity synthetic contract. Each of these products provide trade-offs with respect to guarantees provided, liquidity and credit risk, contractual provisions, discontinuance provisions, and administration. (Further details are provided in the table below.) The availability of these options is also dependent upon the plan structure (attaining a municipal exemption to the SEC rules regarding an IRA requiring an SEC registered vehicle).

In our view, the best approach for the Program is likely to be an insurance company separate account that has a quarterly crediting rate and a 0% minimum guarantee. The separate account structure provides a credit enhancement relative to a general account product and provides transparency in underlying investments, crediting rate determination and fees relative to a general account. The separate account structure is at the expense of rate relative to the general account in terms of both crediting rate and minimum guarantee.

	Traditional GIC (General)	Traditional GIC (Separate)	Synthetic GIC (Separate)	Synthetic GIC (Commingled Stable Value Fund)
Principal Guarantee	YES	YES	YES	YES
Book Value Accounting	YES	YES	YES	YES
Benefit Responsiveness	YES	YES	YES	YES
Ownership of Underlying Assets	INSURANCE CO	INSURANCE CO	PLAN	COMMINGLED FUND
Exposure to issuer credit	YES	LIMITED	MINIMAL	MINIMAL
Plan control over investment strategy/guidelines	NO	NO	YES	NO
Upside participation in asset performance	NO	YES	YES	YES
Downside participation in asset performance	NO	YES	YES	YES
Fee Transparency	NO	YES	YES	YES
Rate Crediting Method	Typically, forward rate set quarterly	Typically, forward rate set quarterly	Typically, forward rate set quarterly	UNITIZED
Subject to Actions of Other Plan sponsors and participants	YES	YES	NO	YES
Subject to Claims of Company Creditors	YES	NO	NO	NO

Appendix 2: Assumptions used to calculate income replacement ratios

9 test participants:

Median Wage		Career Level		
		Age 25	Age 40	Age 55
Income Level	Low	20,000	26,000	30,750
	Mid	24,000	45,000	55,000
	High	31,000	75,000	99,000

Inflation:	2.2%
Retirement age:	66
Salary increase:	2.2% with inflation
Wage base increase rate:	2.2% (consistent with inflation)
Social Security COLA:	2.2% (consistent with inflation)
Conversion factor for converting account balance to annuity	4
Last age to show on chart:	90
Treatment of surplus income:	Accumulate with interest and spend when needed
IRA limit for 2015:	$5,500 ($6,500 if over age 50)
IRA limit increase:	2.2% (consistent with inflation)
Post retirement marginal income tax rate:	10% or 15%

Rate of return for Target Date Funds (With no guarantees)

Age	20-29	30-39	40-49	50-59	60+	Post-Retire
Underlying inflation	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%
Nominal Return	6.7%	6.7%	6.4%	5.9%	5.7%	4.6%
Real rate of return	4.5%	4.5%	4.4%	3.8%	3.5%	2.3%

Rate of return for Target Date Funds (With guarantee of principal and 1% Fee)

Age	20-29	30-39	40-49	50-59	60+	Post-Retire
Underlying inflation	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%
Nominal Return	5.7%	5.7%	5.4%	4.9%	4.7%	3.6%
Real rate of return	3.4%	3.4%	3.1%	2.7%	2.4%	1.3%

Rate of return for Target Date Funds (With 1% return guarantee and 2% Fee)

Age	20-29	30-39	40-49	50-59	60+	Post-Retire
Underlying inflation	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%
Nominal Return	4.7%	4.7%	4.4%	3.9%	3.7%	2.6%
Real rate of return	2.4%	2.4%	2.2%	1.7%	1.4%	0.3%

Stable Value Fund Return Assumptions	All Age Group
Underlying inflation	2.2%
Nominal Return	3.7%
Real rate of return	1.5%

Conservative Portfolio	All Age Group
Underlying inflation	2.10%
Nominal Return	1.35%
Real rate of return	-0.75%

Appendix 3: Income replacement ratio assuming 3% default contribution into the Program

TABLE 17: EXPECTED INCOME REPLACEMENT RATIO (INCLUDING SOCIAL SECURITY BENEFITS) AT 3% CONTRIBUTIONS, IF INVESTED IN A TARGET DATE FUND WITH NO GUARANTEES

3% contribution	Age 25	Age 40	Age 55
Low Income	80.4%	61.0%	55.2%
Mid Income	75.8%	52.2%	46.6%
High Income	70.7%	44.3%	33.2%

Please see appendix 2 for details on the assumptions.

TABLE 18: EXPECTED INCOME REPLACEMENT RATIO (INCLUDING SOCIAL SECURITY BENEFITS) AT 3% CONTRIBUTIONS, IF INVESTED IN A TARGET DATE FUND WITH PRINCIPAL GUARANTEES AT AGE 62

3% contribution / Principal Guarantee	Age 25	Age 40	Age 55
Low Income	75.0%	59.6%	55.1%
Mid Income	70.5%	50.8%	46.5%
High Income	65.4%	42.9%	33.0%

Please see appendix 2 for details on the assumptions.

TABLE 19: EXPECTED INCOME REPLACEMENT RATIO (INCLUDING SOCIAL SECURITY BENEFITS) AT 3% CONTRIBUTIONS, IF INVESTED IN A TARGET DATE FUND WITH 1% RETURN GUARANTEES AT AGE 62

3% contribution / 1% Return Guarantee	Age 25	Age 40	Age 55
Low Income	71.3%	58.5%	54.9%
Mid Income	66.8%	49.7%	46.3%
High Income	61.7%	41.8%	32.9%

Please see appendix 2 for details on the assumptions.

TABLE 20: EXPECTED INCOME REPLACEMENT RATIO (INCLUDING SOCIAL SECURITY BENEFITS) AT 3% CONTRIBUTIONS, IF INVESTED IN A STABLE VALUE FUND

3% contribution	Age 25	Age 40	Age 55
Low Income	70.1%	58.3%	54.9%
Mid Income	65.6%	49.5%	46.3%
High Income	60.5%	41.6%	32.8%

Please see appendix 2 for details on the assumptions.

TABLE 21: EXPECTED INCOME REPLACEMENT RATIO COMPARISON (DIFFERENCE BETWEEN INVESTING IN A TARGET DATE FUND WITH NO GUARANTEE VS. TARGET DATE FUND WITH A GUARANTEE OF PRINCIPAL)

3% contribution	Age 25	Age 40	Age 55
All income level	5.3%	1.4%	0.2%

Please see appendix 2 for details on the assumptions.

TABLE 22: INCOME REPLACEMENT RATIO COMPARISON (DIFFERENCE BETWEEN INVESTING IN A TARGET DATE FUND WITH NO GUARANTEE VS. TARGET DATE FUND WITH A 1% RETURN GUARANTEE)

3% contribution	Age 25	Age 40	Age 55
All income level	9.0%	2.5%	0.3%

Please see appendix 2 for details on the assumptions.

TABLE 23: INCOME REPLACEMENT RATIO COMPARISON (DIFFERENCE BETWEEN INVESTING IN TARGET DATE FUNDS VS. STABLE VALUE FUNDS)

3% contribution	Age 25	Age 40	Age 55
All income level	10.2%	2.7%	0.3%

Important notices