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**Discount Rate Analysis for
Lump Sum Retirement Options
(Conference Presentation)**

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Executive Summary

The Fiscal Year (FY) 2016 National Defense Authorization Act modified the military retirement system. The new system, called the Blended Retirement System (BRS) allows retiring personnel to convert a part of their retirement annuities to a lump sum, receivable at retirement. The Secretary of Defense must determine the discount rate to use in calculating the lump sums. The Director for Military Compensation, Office of the Assistant Secretary of Defense (Manpower and Reserve Affairs) asked the Institute for Defense Analyses to perform analytical tasks to help determine the discount rate. These tasks included:

- Reviewing the literature regarding the personal discount rates (PDRs) of military personnel. The two most relevant studies find mean real PDRs of roughly 5.7 percent in one case and 12.5 percent in the other. The lower mean rate is likely more relevant.
- Reviewing other sources of information on discount rates used for making similar calculations of lump sum payments in lieu of a stream of deferred payments. Lotteries use real discount rates of under 1 percent. Rates used in private pension conversions are below 2 percent. State government plans use rates as high as 6.5 percent.
- Estimating the proportion of Active Duty and Reserve personnel expected to opt for a lump sum distribution at retirement, as a function of the discount rate selected by the government. At government discount rates (GDRs) around 3 percent, the take rate could be between 30 and 60 percent, depending on the PDR distribution. Take rates fall rapidly as the GDR rises.
- Estimating the cost implications to the government of the choice of discount rate used to compute lump sum equivalents. Savings could be as high as \$1.05 billion relative to a BRS system not offering a lump sum option.
- Estimating the effect of the choice of discount rate on retention behavior of officer and enlisted personnel. We estimate the effect to be small, but there could be a non-negligible drop in retention beyond 20 years of service.
- Characterizing and quantifying the pros and cons of alternative methods for selecting discount rates to be used to compute lump sum equivalents.

This presentation concludes by discussing the relevance of the analysis to the retirement system in the Republic of Korea.

Discount Rate Analysis for Lump Sum Retirement Options

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May 2018

IDA In 2016, Congress changed the US military retirement system

Old system

No defined benefit (or other) plan before 20 years of service

50% of base pay at 20 years, rising to 75% at 30

No government contribution to private retirement accounts (Thrift Savings Plans, or TSPs)

New system (called Blended Retirement System, BRS)

Still no defined benefit plan before 20 years of service

40% of base pay at 20 years, rising to 60% at 30

Government contributes up to 6% of base pay to TSP

Additional "continuation pay" at \approx 12 years of service

Can convert half of retirement payments until age 67
to a lump sum

It says: The Secretary of Defense shall compute the present discounted value of the foregone retirement payments using a discount rate

Calculation of lump sum:

$$\text{Present discounted value} = \sum_{t=r}^{t=67} \text{Annuity amount} \div (1 + d)^{(t-r+1)}$$

d = discount rate r = age at retirement

What discount rate? The law says:

Discount by an appropriate percentage

Using average personal discount rates (PDRs)

Taking into account applicable and reputable studies of PDRs

In accordance with generally accepted actuarial principles and practices

Drives choice of whether or not to take lump sum

Not everyone has the same PDR; there is a distribution

People with high PDRs don't value future payments much and will accept smaller lump sums

If the government discount rate (GDR) is below an individual's PDR, the lump sum will be accepted

Tax treatment and other things can complicate this

Reviewed the literature on PDRs

Estimated take rates – fraction choosing lump sum

Estimated government costs or savings

Summarized markets that convert annuities to lump sums

Estimated retention effects

Provided context for Department of Defense's (DoD's) decision

The method for determining a lump sum should:

Be consistent with the law (could be interpreted to mean using average PDRs of military personnel)

Provide choice but not appear to advocate for a particular choice (projected take rate not close to zero or 100%)

Be the same for all or vary for acceptable reasons

Use rates that are not seen as unfairly high

At worst be cost neutral to Military Retirement Fund (MRF)

Not unduly affect retention

To a very close approximation:

Real discount rate = nominal discount rate – rate of inflation

Pensions are indexed to inflation. It is simplest to think of them as constant in real terms

In converting nominal to real rates, we assume 2% inflation

Lotteries: ~1%, reflects terms of instruments funding payments

Private defined benefit plans: <0% to 1.8%; depends on age

Linked to corporate bond rates

Mandated by U.S. tax code

Governmental defined benefit plans – rates based on expected return to retirement investments

State / local government employees: ~ 4.75% to 6.5%

Lump sum payment is like a very secure loan. You get money now in return for giving up a flow of funds in the future

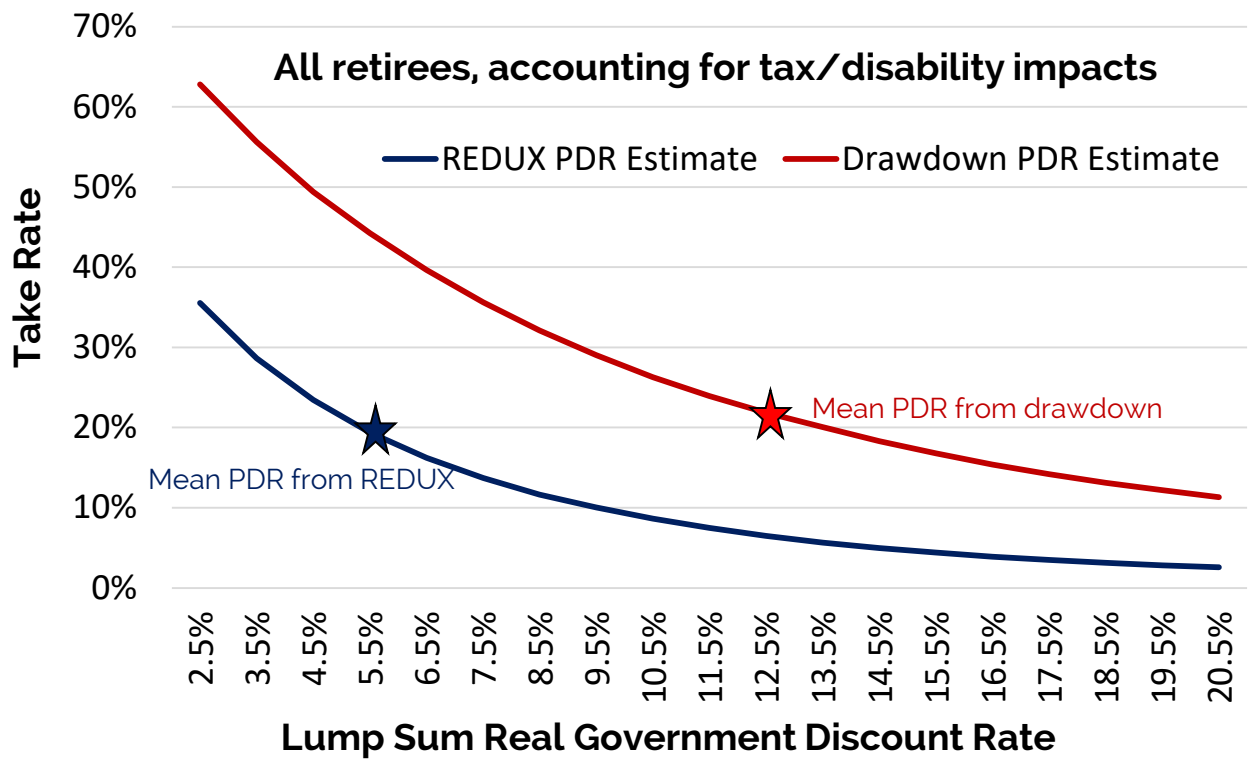
REDUX experience → mean ≈ 5.7%
 (more comparable scenario) – low PDRs

Similar age of personnel and retirement benefit context

Drawdown experience → mean ≈ 12.5% – high PDRs

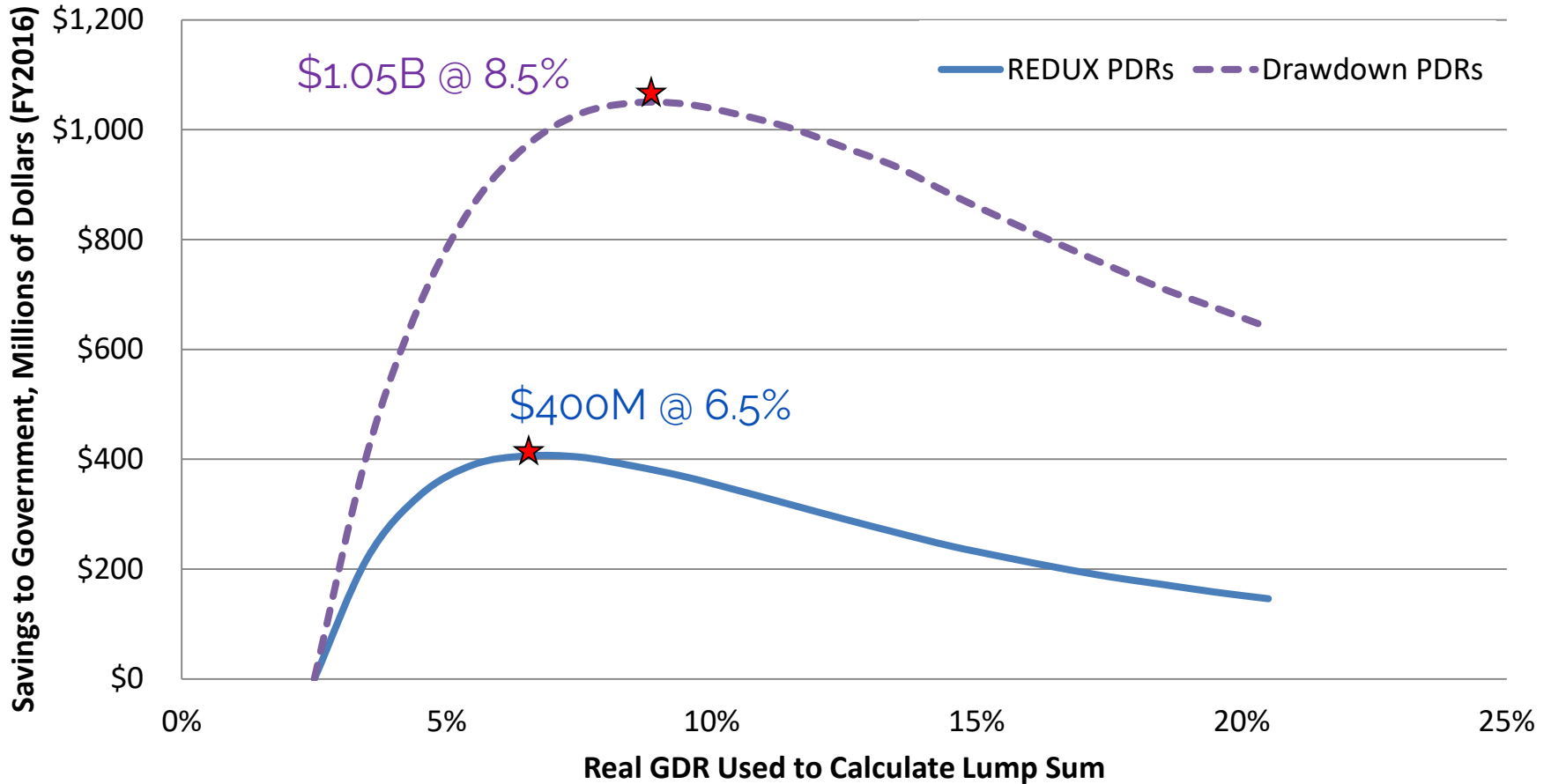
PDR distribution affects take rates

Tax effects (also veterans' benefit provisions) lower take rates substantially



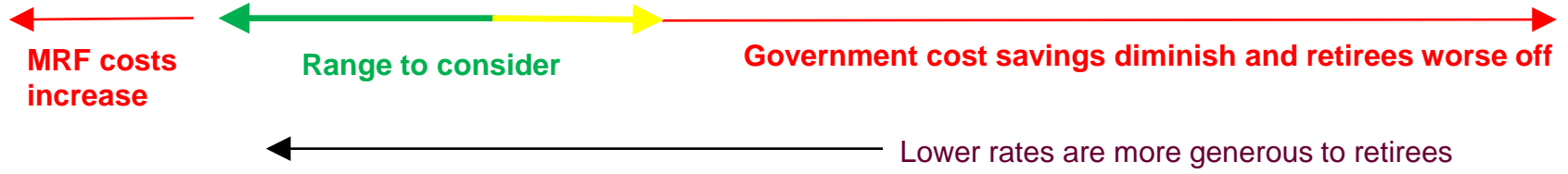
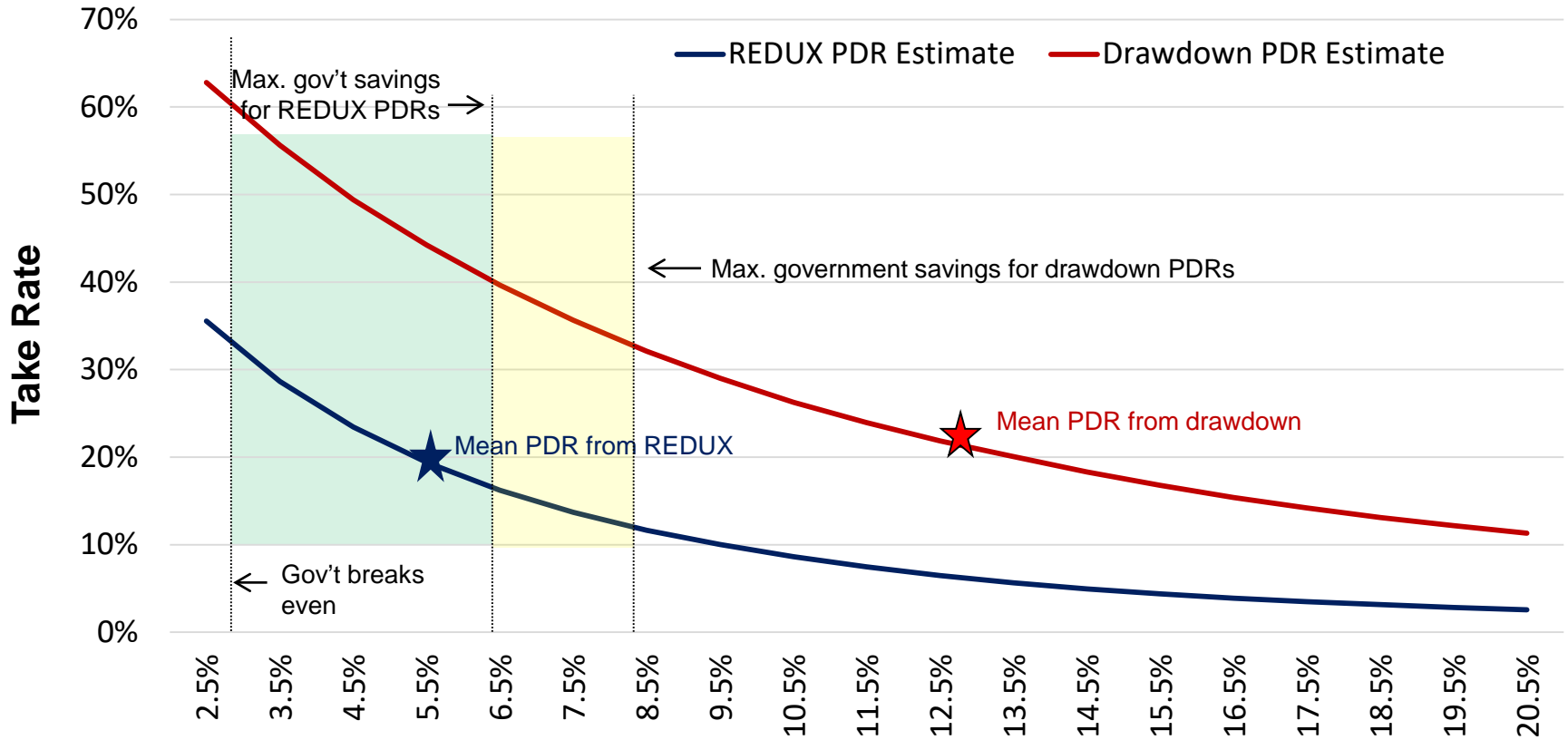
Government savings increase as GDR rises, up to a point

Savings to the Government Due to Availability of Lump Sum Option, for the FY 2015 Cohort of Retirees



A rate below ~2.7% would violate the principle that the MRF should not lose money.

All retirees, accounting for tax/disability impacts



Dynamic Retention Model evaluates stay/leave decision every year based on net present value of alternatives, considering PDR.

Model parameters were calibrated to closely match current retention behavior

The behavior of DoD Active Duty personnel under BRS is simulated with and without the lump-sum option for different scenarios about the PDR distribution and GDR choice

[REDUX-like PDR distribution](#)

[Drawdown-like distribution](#)

Simulations assume Continuation Pay of 2.5 times monthly base pay at 12 years of service

Table shows base (no lump sum) retention rates and the changes in retention rates at each 5-year increment for an entering cohort under BRS using two PDR scenarios

Shows retention impacts at 2.5%, 5%, and 7.5% GDRs

	GDR	REDUX-like PDRs			Drawdown-like PDRs			
		No LS (base rate)	2.5% (change)	5% (change)	7.5% (change)	2.5% (change)	5% (change)	7.5% (change)
Enlisted Personnel								
Years of Service	5	52.8	0.1	0.0	0.0	0.1	0.0	0.0
	10	21.6	0.3	0.1	0.0	0.2	0.1	0.0
	15	14.2	0.4	0.2	0.1	0.4	0.2	0.1
	20	12.0	0.5	0.2	0.1	0.6	0.3	0.1
	25	2.8	-0.2	-0.1	0.0	-0.5	-0.3	-0.2
	30	0.9	-0.1	0.0	0.0	-0.2	-0.1	-0.1
	Officers							
	5	82.2	0.1	0.0	0.0	0.1	0.0	0.0
	10	51.4	0.3	0.1	0.0	0.6	0.3	0.1
	15	39.0	0.3	0.1	0.0	0.9	0.5	0.1
	20	32.9	0.3	0.1	0.0	1.1	0.6	0.2
	25	12.1	-0.4	-0.2	-0.1	-1.8	-1.2	-0.6
30	3.7	-0.1	-0.1	0.0	-0.5	-0.3	-0.2	

Lump sum raises retention up to 20 years, then reduces it

Retention impacts are smaller in the REDUX-like PDR scenario

Concern over post-20-year retention with Drawdown PDRs

7.5% GDR yields smallest impact on retention for each scenario

Take into account IDA analysis and the observed average PDRs from REDUX and Drawdown studies

Comply with the guiding principles:

Be consistent with the law – *Average PDR demonstrated by military studies ranges from 5.7% to 12.2%*

Provide choice but not appear to advocate for a particular choice (projected take rate) – *Take rates at 7.5% GDR range from 14% to 34% (aware of tax and veterans' benefit implications); average is 24%*

Be the same for all or vary for acceptable reasons – *Link to long-term average of bond rates*

Rates not so high as to be perceived as unfair – *Multiple definitions of fair*

At worst, be cost neutral to Military Retirement Fund – *Above 2.7%, all meet this principle*

Not unduly affect retention – *A higher rate produces less uncertainty about retention*

Initial government discount rate – 6.99%

In many ways, Korean system is similar to US

Requirement to stay 19.5 years to qualify (get severance pay earlier)

Receive annuity starting immediately upon retirement

There is a lump sum option

Roughly 7 to 8 years of pension payments → a discount rate of $\approx 13\%$

About 10% choose lump sum, quite consistent with our US predictions

Perhaps consider modifications to the lump sum option

Evaluate it in the context of discount rate analysis

Is it fair to retirees? Discount rate is far above market

Could probably increase lump sum and save money for the
government

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