PPP Risk Allocation

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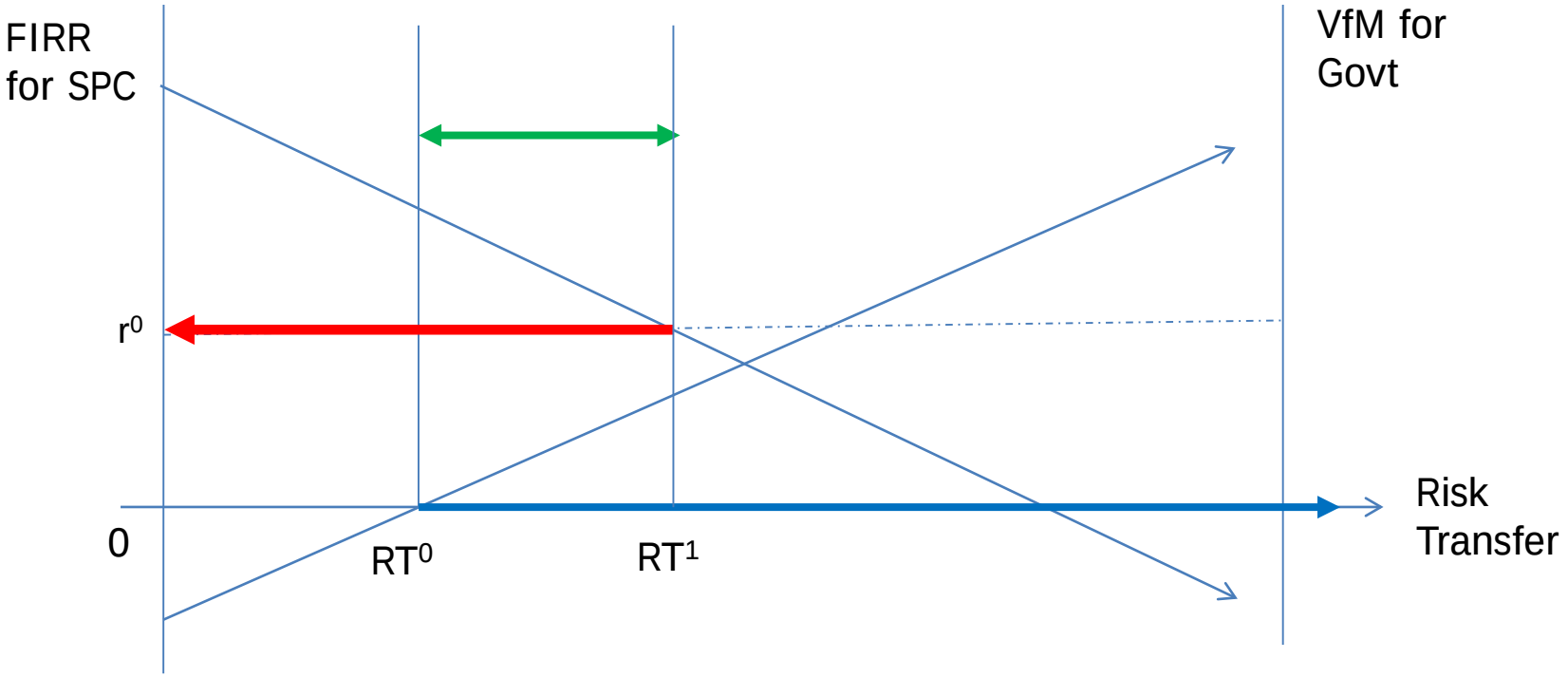
Overview

Why risk allocation is important?

- The potential benefits of PPP
  - Fiscal space
  - Efficiency gains
    - LCC costing by integrating DBFOM into a single contract
    - Minimizing overall cost through risk allocation
    - Resource allocation through market mechanism
  - Quality service by performance orientation
  - Public sector reform
- Appropriate risk allocation/transfer is the key to materializing PPP benefits
- It also contribute to bankability of a PPP project

Financial Viability and VfM



- The green arrow area ($RT^0 < RT < RT^1$) meets both public and private interests on PPP
  - $RT < RT^1$ → IRR > r^0 ,where r^0 = minimum FIRR of SPC; and
  - $RT < RT^0$ → VfM > 0

Risk management in PPP

- PPP and risk allocation
  - PPP is a CONTRACT that allocates responsibilities, rights and risks between public and private parties
- Risk management in PPP
  - Identifying risks (assessing & mitigating risks)
    - Risk = likelihood • impact
      = probability • financial cost of the event
  - Mitigating risks
    - Public entity provide reference information (geo-technical, traffic forecast, and ESIA) to allow private entity to evaluate risks and decide to manage risks.
  - Allocating risks

→ Translating into contract

Identifying risks/ PPP risk categories (1)

- Site
  - Acquiring land and related permits
  - Public (India, Korea) or private sector
- Design, construction and commissioning
  - Time and cost overrun, and asset quality
  - Private
- Operation
  - Interruption of service, and O&M cost
- Demand and other commercial risk
  - Less demand or revenue than expectation
  - Public and private
- Regulatory or political
  - Failure to renew approval appropriately

Source: WB(2017: 142)

Identifying risks/ PPP risk categories (2)

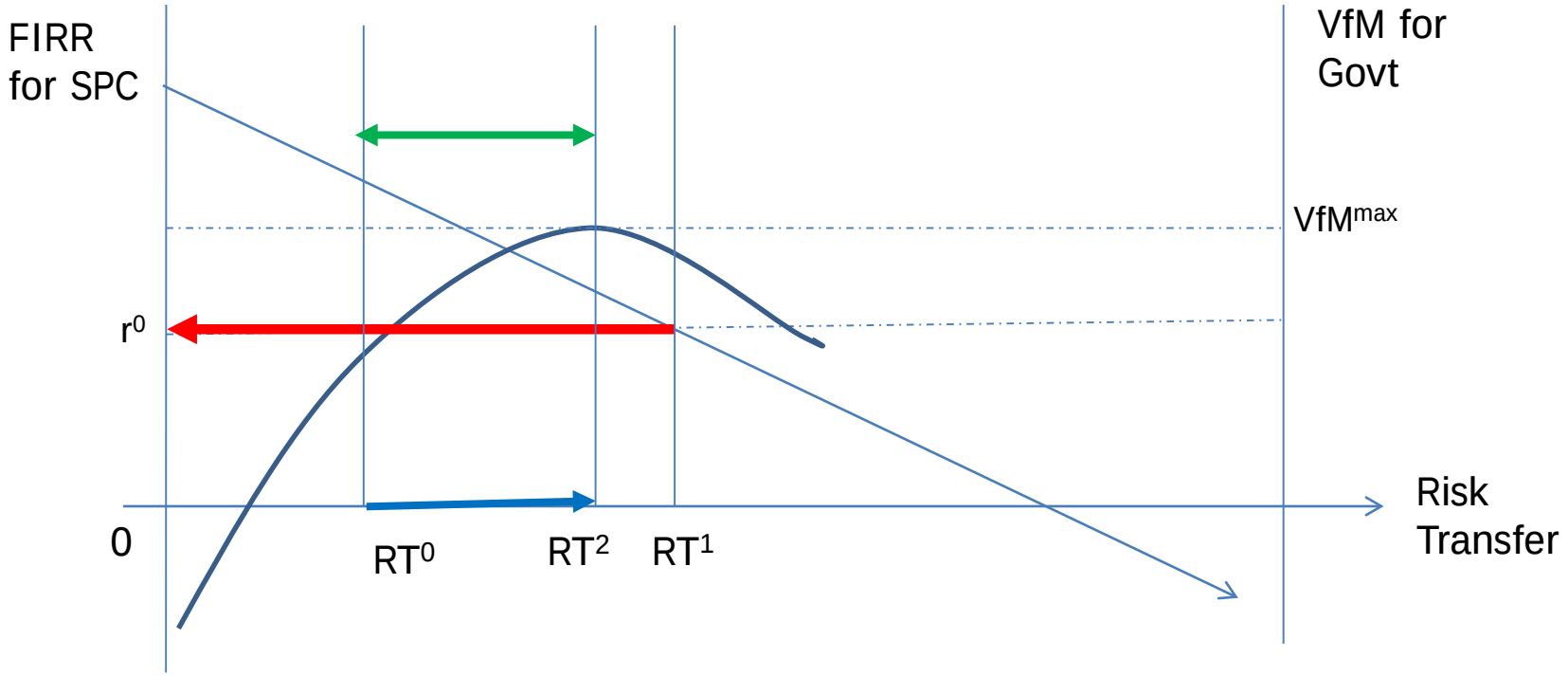
- Change in legal or regulatory framework
  - Change in general law or regulation
- Default
  - Financially or technically unimplementable
- Economic or financial
  - Changes in interest rate or FX rates
- Force Majeure
  - Natural disaster or civil disturbance
- Asset ownership
  - Technology obsolescence or asset value depreciation

Source: WB(2017: 142)

Principe of risk allocation

- Each risk should be allocated to whoever can manage it best
  - Best able to control the likelihood of the risk occurring
    - Eg, the private party can control construction risk of cost overrun and time overrun
  - Best able to control the impact the risk on the project outcomes
    - Eg, the private party control the damage of earthquake by incorporating earthquake-resistant design factors
  - Best able to absorb the risk at lower cost
    - Eg, if the government can spread the damage to taxpayers, they have lower risk-bearing than SPC whose ultimate risk-bearers are their shareholders
  - Irwin(2007: 56-62), Government guarantees: allocating and valuing risk in privately financed infrastructure projects
- The more total risk transferred to the private party, the higher the return (higher risk premium) the equity investors will require and the harder it will be to raise debt finance (less bankable)
- The risk allocation is a key value driver of PPPs
  - Optimum risk allocation lowers the overall project cost, and improve VfM

Financial Viability and VfM



- The green arrow area ($RT^0 < RT < RT^2$) is a set of appropriate risk allocations
  - The VfM may reach at its maximum where $RT = RT^2 < RT^1$

Risk allocation matrix

- GIH(2016), *Allocating Risks in PPP contracts*.
  - Presents a series of 12 sample risk matrices in different infrastructure sectors:
  - Transport, energy, and water and sanitation, etc.
  - The sample matrix provide a detailed and comprehensive list of project risks, along with a discussion of risk allocation, mitigation measures and government support arrangements.
- Other examples of risk matrix
  - HK(2008), An introductory guide to PPPs, Hong Kong, China: Efficiency Unit
  - South Africa's PPP Manual (2004) includes standard risk matrix
  - Government of Rio de Janeiro's PPP manual

Risk allocation measures in Korea

The Phases of the PPP Framework in Korea

	Period	Characteristics
Phase I	1968–1994	▪ PPP projects based on individual laws (Road Act, Port Act, etc)
Phase II	1994–1998	▪ 'The Act on Promotion of Private Capital Investment in Social Overhead Capital'
Phase III	1999–2004	▪ 'The Act on Private Participation in Social Overhead Capital' • Establishing **PIMAC**, Improving the Korea **Infrastructure Credit Guarantee Fund** (ICGF) system, granting buyout rights • Positive government support for vitalizing private investment(including **MRG** program) • Encouraging **unsolicited proposals**
Phase IV	2005–Now	▪ Revision of 'the Act on Private Participation in Infrastructure' • Introduction of **BTL** scheme as a new method • Strengthened fiscal disciplines including introduction of **VfM test**

Risk allocation in Korea (1)

- Site
  - Competent Authority (CA) is responsible for providing SPC with the project site
  - CA pays for land acquisition and other compensation for fishery permits or business rights
- Design and construction
  - Time and cost overrun, and asset quality
  - SPC takes the responsibility of design and construction (cost and time overrun)
  - Financing is the responsibility of SPC while CA provides construction subsidy in most BTO projects (25%+ on average)
  - Getting construction-related permits from related public organizations is responsibility of SPC
  - Clearing EIA and transport impact assessment process is the responsibility of CA
- Operation
  - O&M is the responsibility of SPC.
  - O&M cost increase can be shared with CA when it occurred because of the change in law or government policies

Risk allocation in Korea (2)

- Change in legal or regulatory framework
  - The cost increase due to changes in general law or regulations are to be shared by CA through increase in government subsidy, or by users through increase in user-fees
- Early termination
  - Both CA and SPC can request early termination if the a fault stipulated in the contract happens
    - The fault of SPC: bankruptcy, serious mistakes in construction, serious violation of laws
    - The fault of CA: confiscation of the asset, delay in land acquisition and compensation, and undue delays in administration process
  - Early termination payment is paid as stipulated (usually covers senior debts)
  - All the belongings as well as main asset is transferred to CA
  - The SPV has a buy-back option in certain conditions:
    - Increase in construction costs by more than 50% due to natural disaster or war
    - Construction delay by more than 6 months because of neglect of the CA
- Economic or financial
  - In the wake of AFC, there was a clause that CA shares FX risk through re-negotiation of the contract
  - Sharing refinancing gains and step-in rights by the government

Risk allocation in Korea (3)

- Force Majeure
  - Political- and non-political force majeure
  - Non-political force-majeure
    - Natural disaster
    - Nation-wide or industry-wide strikes
    - Non-bankability because of drastic change in economic situation
    - Substantial changes in PPP Act, Act Enforcement Decrees that has substantial adverse impacts on SPC
  - Political force-majeure or its equivalent
    - Breaking of a war or a incident
    - Site contamination due to nuclear wastes, chemicals and radioactivity
    - Riots or terror
    - Control of FX and remittance
  - Government pays the increased cost due to force majeure
    - For non-political FM, 80% of the increased costs
    - For political FM, 90% of the increase costs

How the risk allocation affects the VfM of PPP: An empirical ex post VfM test

Demand risk sharing: MRG (1999~2009)

- Minimum Revenue Guarantee (MRG): A certain level of forecasted annual revenues is guaranteed by government. And when the actual operating revenue falls short of it, the government pays the deficit.

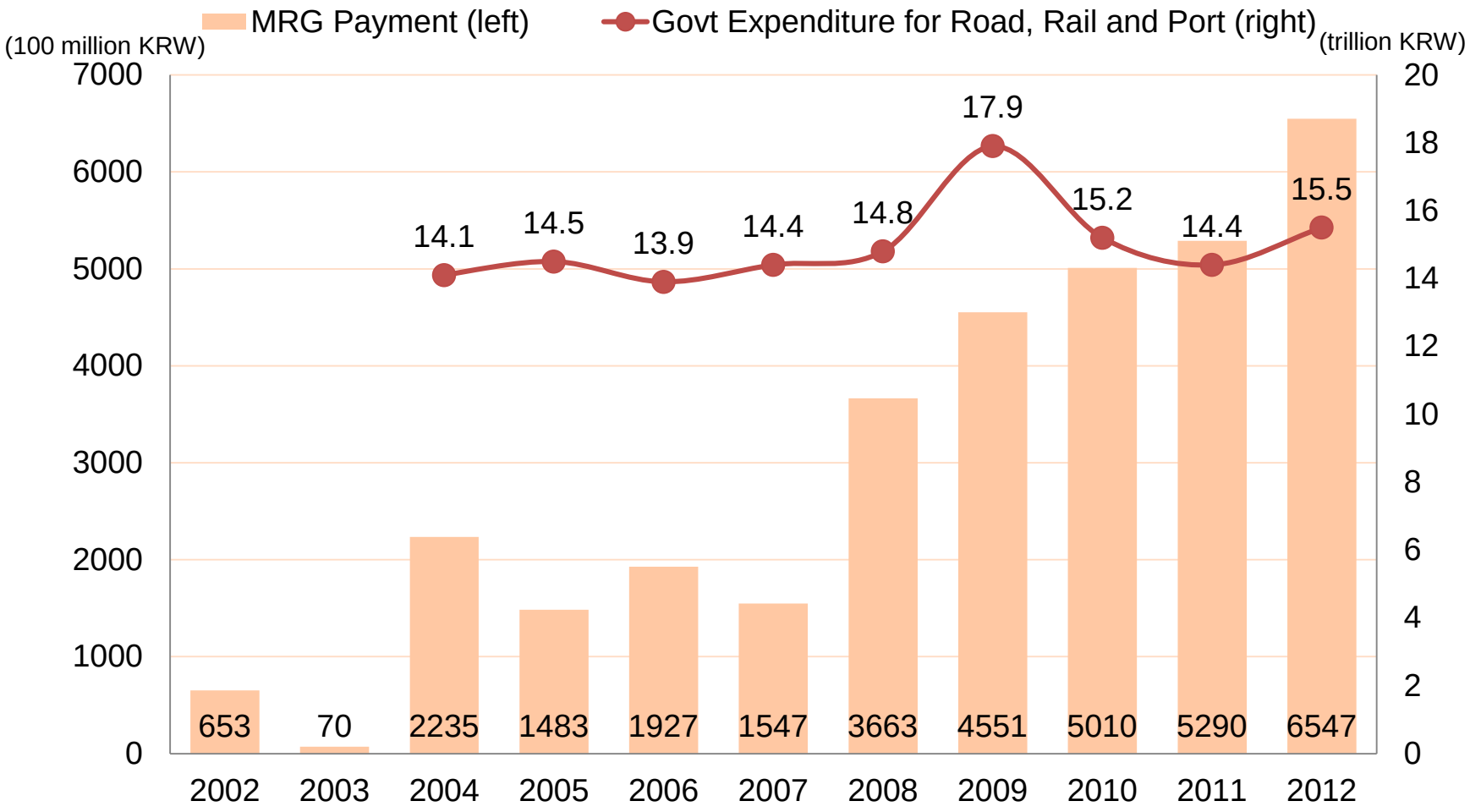
	Jan 1999		May 2003	January 2006		Oct.2009
	Solicited	Unsolicited		Solicited*	Unsolicited	
Period	Whole operating period		15 Years	10 Years	Abolished	Abolished
Guarantee Level (Max)	90%	80%	First 5 Years 90% Next 5 Years 80% Last 5 Years 70%	First 5 Years 75% Next 5 Years 65%		
Condition	None		No MRG applied if Actual Revenue < 50% of Forecasted Revenue	Same as Left		

- Criticisms against MRG
  - ✓ Government took most of the risks, but still provided high returns on investment to SPC.
  - ✓ MRG scheme provided SPC with incentives to overestimate future demand.

MGR payment

- Under the MRG (Minimum Revenue Guarantee) clause, the government take substantial project demand risk by guaranteeing minimum level of forecasted revenue.
- Among the operating 633 PPP projects as of end of 2012, 78 projects include MRG provision in the concession agreement, 39 of which generate MRG payments.
- Total MRG payments from 2002 to 2012 equaled about 3.3 trillion KRW (approximately 3 billion USD).
- Meanwhile, the average government investment for road, rail and port sectors from 2004 to 2012 is about 15 trillion KRW
  - ✓ Such unexpected MRG payment comprised around 2.4% of the total planned investment amount, incurring significant fiscal burden to the government.

MRG Payment (2)



Source: "National Fiscal Management Plan 2012~2016 for SOC Sector," SOC Sector Task Force, Open Debate Session, June 2012.
PPP Comprehensive Evaluation 2013, KDI, January 2015.

ex post VfM for Road PPP Projects

- Hyeon PARK, et al. (2018), "Do Public Private Partnership Projects Deliver Value for Money? An ex post Value for Money (VfM) Test on Three Road Projects in Korea," International Journal of Urban Sciences

- All three projects would have been analyzed to deliver VfM
  - If VfM tests had been conducted at the time of the concession agreement

- Only Project C (singed in 2005) is analyzed to deliver VfM if the test were to be conducted with latest information (Dec 2012).

Appendix: Concept of VfM

Function	PSC	PFI
Design	1	X
Build	2	X
Finance	3	△ (subsidy)
O&M	4	X
Risk	5	▽(retained risk)
Tariff	**6**	**X**
Govt burden	**(1+2+3+4+5) -(6)**	**△ + ▽**

VFM Assessment

- Present value of government payments for PSC and PFI options are estimated in present value and VfM(%) is calculated

$$VfM\,(\%) = \frac{GP(PSC) - GP(PFI)}{GP(PSC)}$$

  - GP(PSC): Present value of government payment for PSC option
  - GP(PFI): Present value of government payment for PFI option

- GP(PSC) = Capital costs + operating costs – Revenue
  - Capital costs may include financial costs such as bond interest

- GP(PFI) = Construction subsidy + Compensation costs + Additional government support
  - GP(PFI) is the government subsidy requested by the private party in the project proposal

- VfM is a financial analysis from the government point of view

Results of ex post VfM Assessment

Unit Billion Won

	Project A		Project B		Project C	
	PSC	PFI	PSC	PFI	PSC	PFI
Sum of GP	164.3	1,492.1	149.1	1,429.6	441.4	423.0
PV of GP	578.4	682.4	438.3	526.4	404.5	246.1
VfM (%)	-18.0		-20.1		39.2	

As of Dec 2012

Results of pretended ex ante VfM assessment

Unit Billion Won

	Project A		Project B		Project C	
	PSC	PFI	PSC	PFI	PSC	PFI
Sum of GP	205.4	1,921.7	247.3	2,098.7	364.6	359.6
PV of GP	695.9	689.8	615.3	578.2	394.8	226.1
VfM (%)	0.88		6.03		42.7	

As of contract time

Results of VfM Assessment

- Projects A and B signed in 1997 and 2000 respectively could not achieve VfM if the VfM test is conducted now (with latest information available). The worsened VfM is attributable to:
  - The discount rate has been dropped from 9.5% to 6.0%
    - The discounted value of MRG of PFI gets bigger with lower discount rate.
  - The interest rate of government bond has also dropped
    - The lower interest rates put less burden of government project.

year	1997	1998	1999	2000	2001	2002	2003	2004
Govt bond i.r.	12.17%	13.18%	8.60%	8.66%	6.20%	6.30%	4.76%	4.33%
year	2005	2006	2007	2008	2009	2010	2011	2012
Govt bond i.r.	4.53%	4.96%	5.28%	5.36%	4.64%	4.30%	3.89%	3.24%

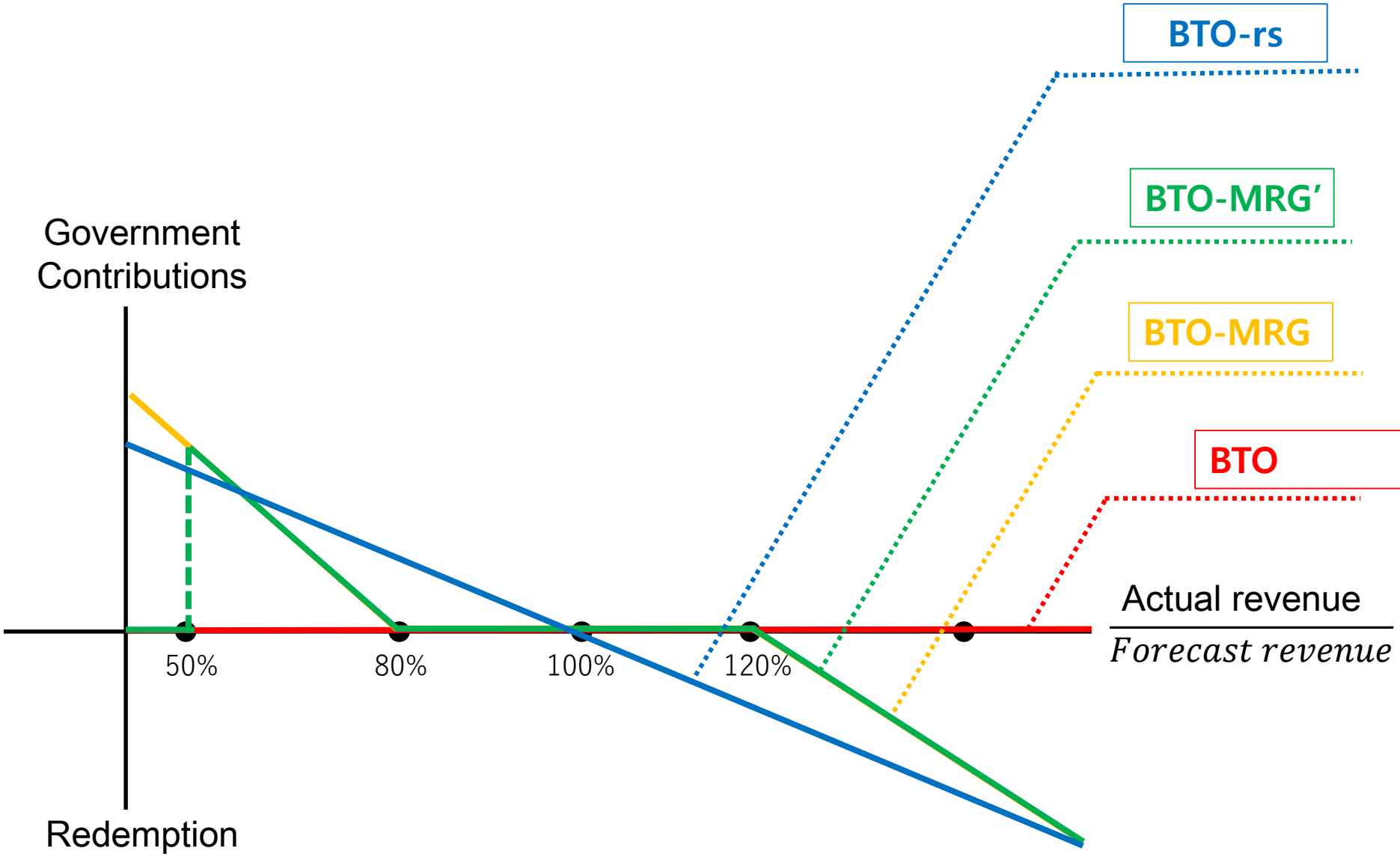
Recent demand risk-sharing scheme in Korea

with In-Seok Park, Senior Research Fellow, University of Seoul

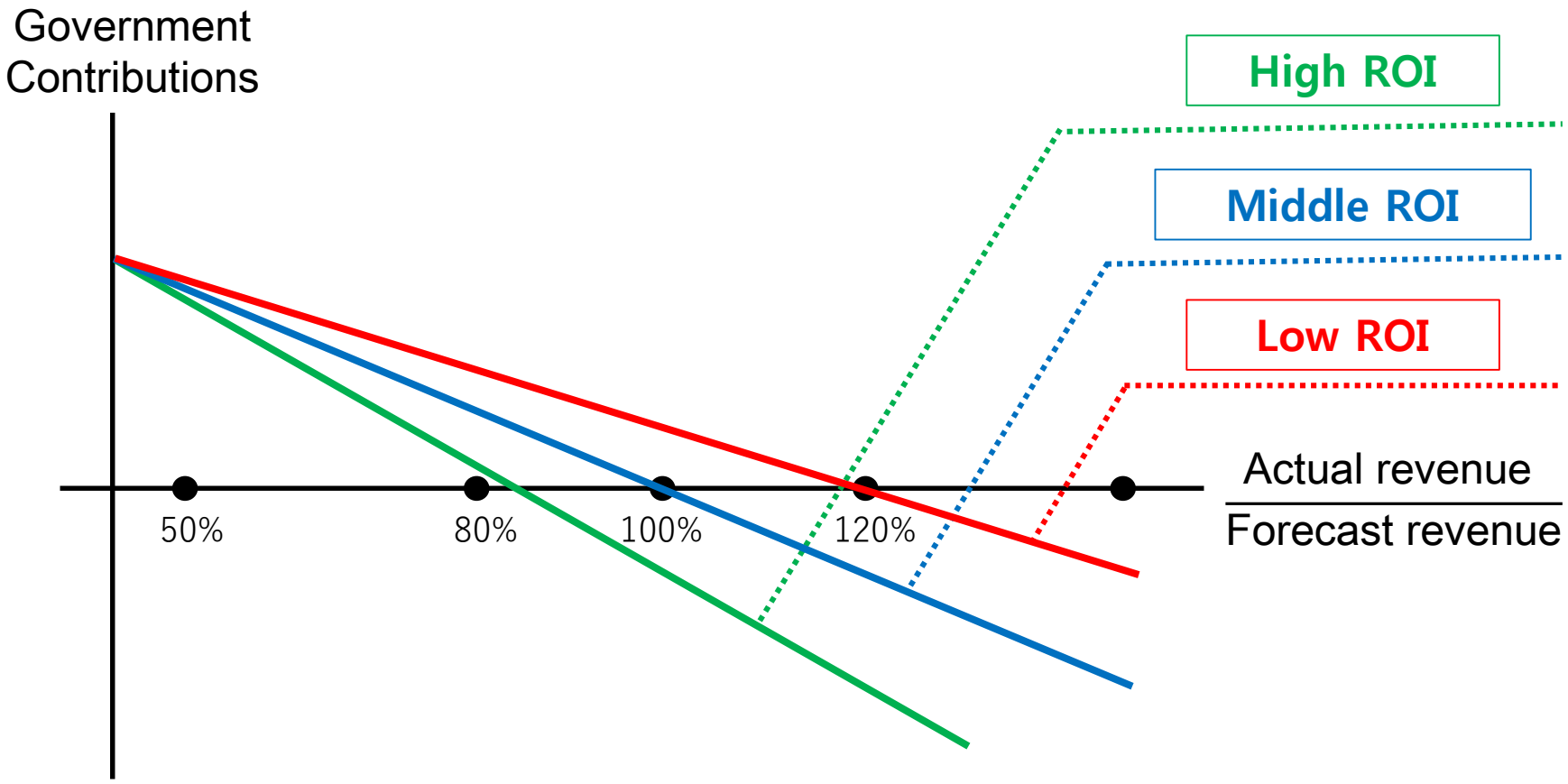
New risk sharing scheme in Korea

- After the Global Crisis in 2008, there were only a few BTO project signed because of the cancellation of the MRG policy in 2009.
- To promote PPP projects, government re-introduce a new risk-sharing scheme
  - BTO-rs: CA shares the demand risk
  - BTO-a: CA covers the loss of SPV if the revenue does not cover minimum operating costs

Government contributions by various risk sharing



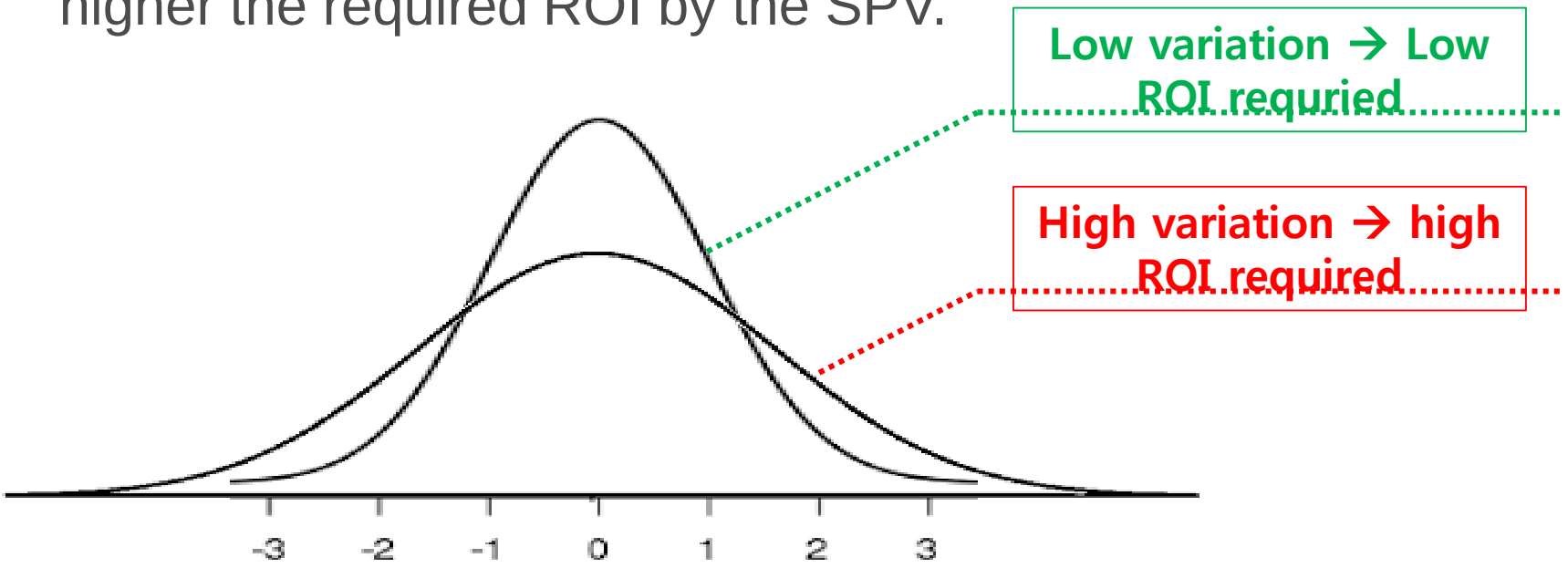
Government contributions of BTO-rs by financial profile



- Depending on the ROI of a project, there may be positive (for low ROI project) or negative contribution, or redemption, (for high ROI) even when the actual revenue is same as the forecast

Assesment of traffic volume forecasting risk in the road proejects

- If a rational PPP investor, it should consider the time value as well as traffic forecast risk
- The greater the variation in expected return (higher risk), the higher the required ROI by the SPV.



Assesment of traffic volume forecasting risk in the road proejects

- Traffic volume risk premium is the difference between the expected return(μ) and risk-free return(r) of a project
- and can be expressed as a product of predict risk market prices(λ) and uncertainty of forecast(σ)

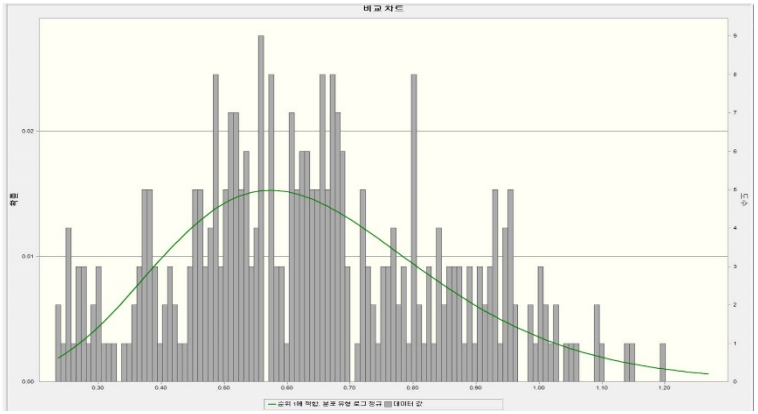
$$\mu - r = \lambda\sigma \leftrightarrow \frac{\mu - r}{\sigma} = \lambda \text{ ---------- (Equation 1)}$$

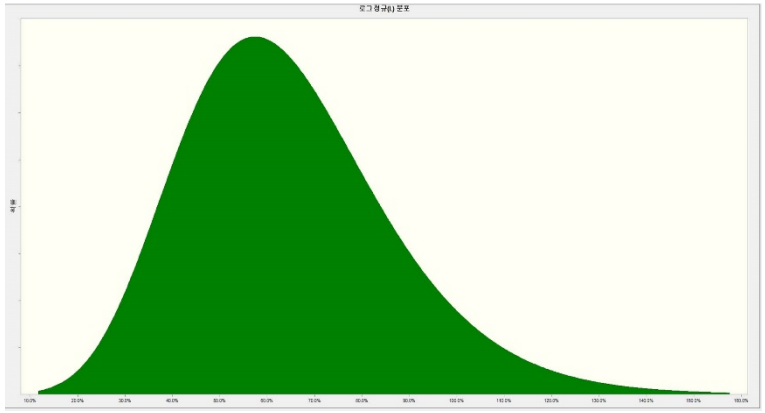
- ❖ In this analysis, μ was assumed to be 3.69%, and the return on the BTL project without demand risk was assumed to be 2.08% as a demand risk-free retrun(r)

Assesment of traffic volume forecasting risk in the road proejects

$$\mu - r = \lambda\sigma \leftrightarrow \frac{\mu - r}{\sigma} = \lambda \text{ ---------- (Equation 1)}$$

- To calculate the σ, Monte Carlo simulation was conducted using historical road projects traffic predictability data
  - The data used in this analysis consists of panel data with a total 326 samples from 2004 to 2016 for 37 road projects





Assesment of traffic volume forecasting risk in the road proejects

$$\mu - r = \lambda\sigma \leftrightarrow \frac{\mu - r}{\sigma} = \lambda \text{ ---------- (Equation 1)}$$

- Calculated price of demand risk(λ) was derived at 0.84, meaning an increase of 1σ variation in revenue, or traffic volume in road project, is reflected as a 0.84% increase in risk premium.

❖ The Monte Carlo simulation showed that σ was valued at 1.91%

μ (ROI of BTO)	r (ROI of BTL)	σ	λ
3.69%	2.08%	1.91%	0.84

Closing

Recent global trend of risk sharing

- In the aftermath of the Global Crisis in 2008, the financial tend to price high the cost of risk, widening gap between private financing and public financing.
- To reduce the gap,
  - Government shares demand risk: demand of a infrastructure is influenced by planning factors, and price which are decision by the government in many countries
  - Government provide guarantee products, or provide loans
- On the other hand, there is a tendency that government strengthen monitoring and oversight of the SPC at the operation phase as well as construction phase
  - Streamlining PPP governance by phase of implementation
  - Government participate in SPC as shareholders
- The combined results is the shift of PPP project profile
  - From high-risk and high-return, to low-risk and low-return

Balance b/w market promotion and fiscal discipline

- Both bankability and VfM are important
- Risk allocation is the key to the balance to them
- Structuring a PPP in a "Medium-risk, medium-return" profile seems to be a realistic approach