

# **EMPOWER YOUR CORPORATE VISION**

MILANO | ITALY

## **The cost of the equity in PPP transactions (health): methodologies, applications, evidence**

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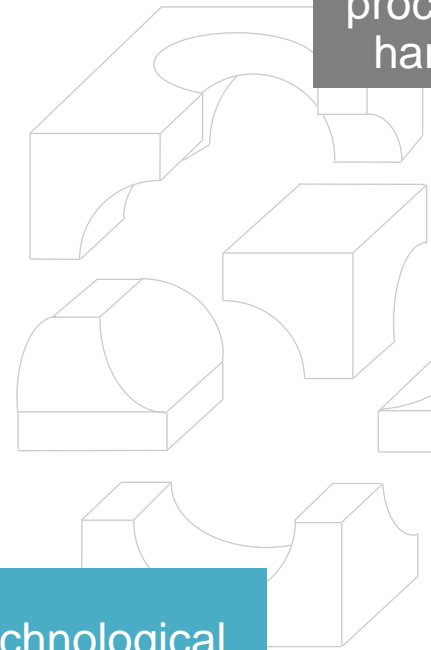
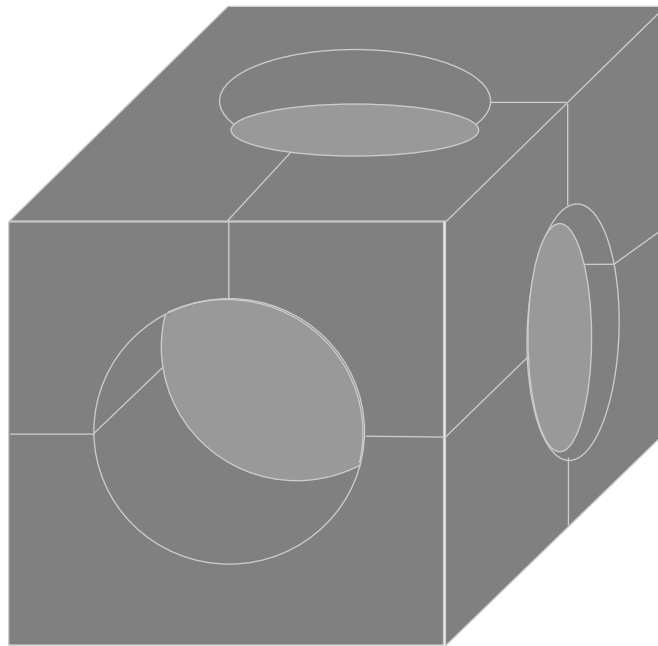
**OECD/G20**

Paris, 2<sup>nd</sup> Nov 2017

# PPP for healthcare investments at a glance

- **“Accommodation” model** was dominant across Europe, driven by macroeconomic reasons (off-balance sheet and matching fund)
  - DBFM/O model
  - There is a shift towards “lighter model”, without the inclusion of many non-core services (2nd wave in Italy, PFI2 in UK)
- In emerging markets, PPP for fully fledged hospital has been experimented
- **Technological PPPs** are emerging (MES type contracts) for the provision and management of medical equipment => the core of healthcare is technology and not cement
- However, PPP value for money and affordability is still under discussion
  - VfM was manipulated (risk assessment and fiscal neutrality) and contracts turned out to be unaffordable for many authorities
  - Rigid contracts when just based on the provision of hard facilities
  - **Over-estimation of the cost of the capital**

## PPP 2.0: a lighter and more focused approach



DBFM  
or traditional  
procurement for  
hard facilities

Innovative  
tenders for  
non-core soft  
services

Technological  
PPP (T3P)

# The “new” paradigm for more sustainable PPP

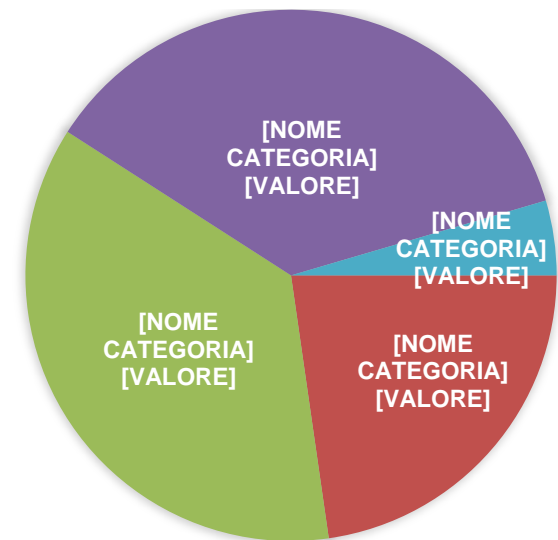
- A PPP must be partnership to reach **strategic goals** otherwise not possible (*public policy perspective*)
- It should not be a “procurement route” to inject private capitals, to be matched with scarce public funds, to merely build facilities
- In the EU framework (*legal perspective*) it is clear that a PPP must allocate risks (for which there may be rewards, as well as losses) to economic operators (EOs)
- If the risks associated to a PPP contract must generate rewards or losses, these risks determine what has been called in the Concession Directive (n. 23/2014 – considerandum n. 19) **Operating risk**. Therefore a PPP contract must be structured within the concession legal framework
- **Private operators should be partners of public healthcare authorities to reach more efficiency, more clinical innovation and effectiveness, that otherwise would not be possible. Therefore, metrics should change and we need to inject into the PPP domain “impact investing” principles: the business model must change to find a balance between social and financial returns**

**To make PPP more sustainable we need, *inter alia*, to understand how the equity can be correctly priced**

# The CAPM approach

- The CAPM determines that the return required on any given asset or project is a function of the return available on a risk-free investment (the risk-free rate) plus a premium for the amount of **systematic risk** in the investment being considered (the equity risk premium)
- The application of the CAPM to the PPP has some limitations, due to:
  - **Beta estimation**: no share prices; scarce historical data
  - **Portfolio diversification**: the CAPM assumes that the investor has a well-diversified portfolio, such that variation in the return on individual assets has a negligible impact on returns. This is not the case in PPP, where investors are sector/country focused

Degree of diversification  
of PPP investors



# The EMRP (an example)

Factors	Algeria	Turkey	Indonesia	Colombia	India
Base risk premium (US ERPM)	5.69%	5.69%	5.69%	5.69%	5.69%
Country sovereign rating (Moody's)	N/A	Ba1	Baa3	Baa2	Baa3
Country default spread	3.12%*	2.89%	2.54%	2.20%	2.54%
Relative volatility (equity/bond)	1.3	1.3	1.3	1.3	1.3
Country risk premium	4.06%	3.75%	3.31%	2.86%	3.31%
Total ERPM	9.75%	9.44%	9.00%	8.55%	9.00%

## Ke: an example in the healthcare sector

Factors	Algeria	Turkey	Indonesia	Colombia	India
10y Government bond yield	4.75%	10.22%	6.83%	6.21%	6.49%
Country default spread	3.12%	2.89%	2.54%	2.20%	2.54%
Risk free rate	1.63%	7.33%	4.29%	4.01%	3.95%
Asset beta	0.85	0.85	0.85	0.85	0.85
Tax rate	26.00%	20.00%	25.00%	25.00%	34.61%
Average project D/E	60.00%	60.00%	60.00%	60.00%	60.00%
Re-levered beta	1.23	1.26	1.23	1.23	1.18
Adjusted beta	1.15	1.17	1.16	1.16	1.12
EMRP	9.75%	9.44%	9.00%	8.55%	9.00%
Total cost of equity	12.85%	18.40%	14.68%	13.88%	14.05%
Total cost of equity with illiquidity premium (3%)	15.85%	21.40%	17.68%	16.88%	17.05%



# How to take into consideration the “non diversification”?

- As primary equity investors are generally not diversified, it is crucial to understand what risks are retained by the investor in each transaction and how these should be priced. This can be done with a **project risk matrix**.
- The Beta of the project is calculated by using the “comparable approach”, paying attention in the selection of the most appropriate comparable sectors.
- In some cases, for instance, where it is believed that the SPV’s retained **technical risks** are non-negligible, further steps may be taken, i.e.
  - they may be separately priced and added, through a “bottom-up” approach (added to the equity risk premium as separate factors) to the cost of equity capital,
  - they may be considered in the cash flows; e.g. if part of the archeological risk is retained by the SPV, this may (and should, in theory) be captured in the expected values of capex cash-flows.

## Cont.

- Investors may retain many **market-related risks**. Many of these are, however, purely systematic, and should be substantially captured in the Beta of the project, derived via the comparable approach.
- Among these risks, there are: *demand, inflation, currency, availability of funds, and failure of subcontractors*. Some of these are also mirrored in the country risk.
- Further, in the application of the CAPM methodology, also an illiquidity premium should be considered and eventually priced

Risks	Procuring authority	SPV	If allocated to the SPV
<i>Operation phase</i>			
Change in service tariff, defined by the regulator/authority	x		
Volatility of demand	x	x	Especially after the economic crisis, many projects are now availability-based. If the demand is retained by equity investors, it is capture through the Beta
Changes in tariff regulation	x		
Underperformance/Unavailability of the infrastructure, which may cause increase of life cycle costs or further investments		x	Transferred to subcontractors
Authority doesn't comply with payment obligations		x	Retained by the equity investors, it can be captured by Beta and EMRP, or, if the severity is high, considered through an adjustment of cash flows or through an additional factor by adjusting the CAPM formula (bottom-up approach)
<i>Funding</i>			
Availability of affordable funding		x	Retained by the equity investors, it can be captured by Beta, or, if the severity is high, considered through an adjustment of cash flows
Refinancing risk		x	Retained by the equity investors, it can be captured by Beta, or, if the severity is high, considered through an adjustment of cash flows

An excerpt of risk matrix for the estimation of the  $K_e$

# Steps to estimate the $K_e$

**Step 1:** Identify the risks via the risk matrix.

**Step 2:** Identify the allocation of risks to primary equity investors in the SPV.

**Step 3:** Identify those that are retained by equity investors after transfer to subcontractors or providers of insurance/hedging instruments.

**Step 4:** By following the matrix, identify those risks that can be captured in the Beta and those that can be captured in the EMRP.

**Step 5:** To calculate Beta, choose comparable industries in which equity providers are exposed to similar risks, and calculate the project Beta (slide 8)

**Step 6:** Calculate the EMRP (slide 8)

**Step 7:** Consider if there are any other retained risks that are not adequately captured in the Equity Risk Premium (Beta and EMRP), e.g. a liquidity premium, to be added to the EMRP.

**Step 8:** Consider if there are any other residual risks, including specific risks, that are not adequately captured in the Beta and EMRP, to be considered through a cash flow adjustment

**Step 9:** Calculate the risk free rate

**Step 10:** Apply the CAPM formula to derive the appropriate rate of return on primary equity.

# Applicability of the CAPM methodology

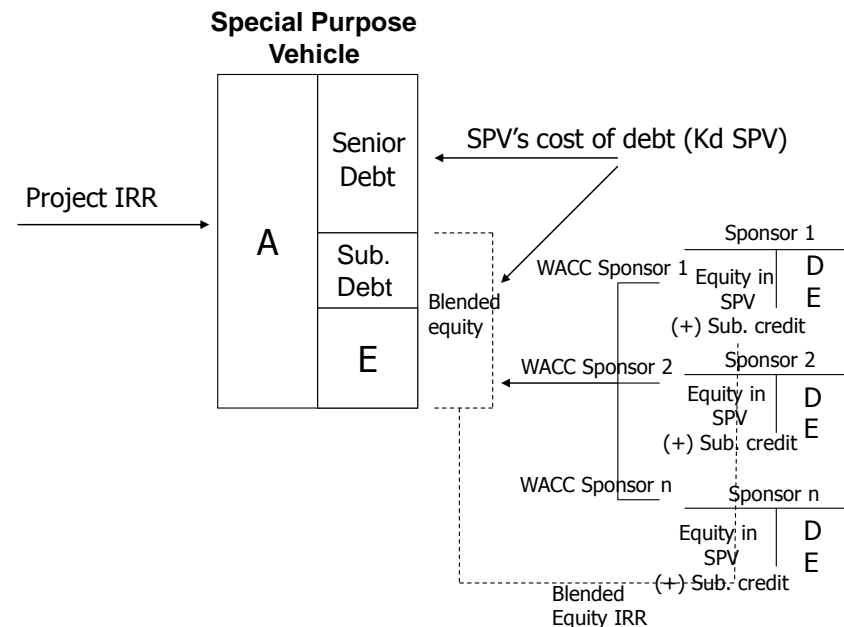
- As PPP transactions are quite standardized, especially when contracts are standards, this methodology can be useful for policy makers to **set a cap to the Ke (regulation issue)**
- However, the Equity Return sometimes may not express the real return of a project, when Capex and Opex contain excessive margins. This is the case in PPP transactions as markets are concentrated and competition limited due to the inherent complexity of such transactions
  - in the UK five sponsors contributed 45% of the total capital

## Is the $K_e$ priced correctly?

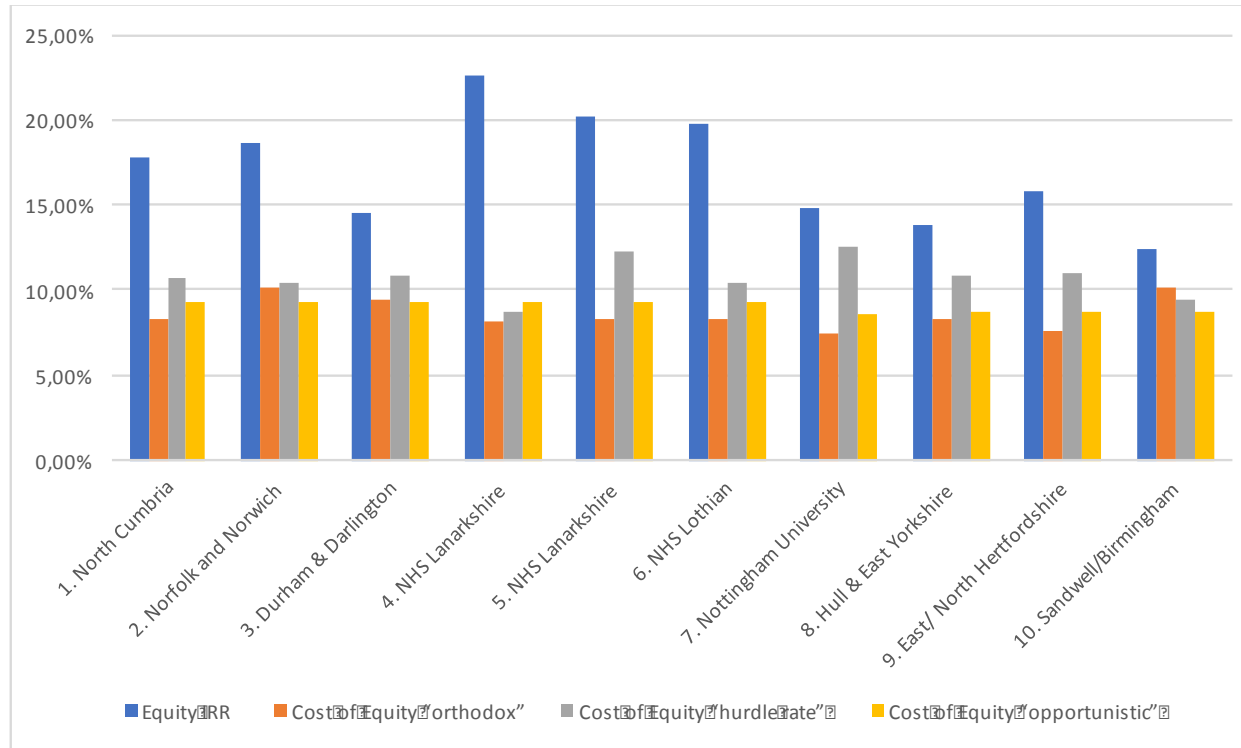
- To review past return we have used different methodologies:
  - **CAPM** (Vecchi, Hellowell 2012)
  - **Opportunistic approach:** discount rate used by investors to estimate the value of their PPP portfolios (Hellowell, Vecchi 2012)
  - **Hurdle rate:** very much used by equity investors (Vecchi, Hellowell, Gatti, 2013), as they don't perceive that PPP transactions contain a limited risks compared to traditional commercial transactions, due to the risks' transfer to subcontractors and the retention of regulatory risks by procuring authority

# The hurdle rate

- In a non-recourse project financing, the lowest acceptable blended equity IRR on sponsors' investment is the sponsors' WACC
- This methodology overestimate the  $K_e$  of a PPP transaction, as it considers the systematic risks faced by investors and not those of the SPV



# Results: 10 PPP projects in the UK



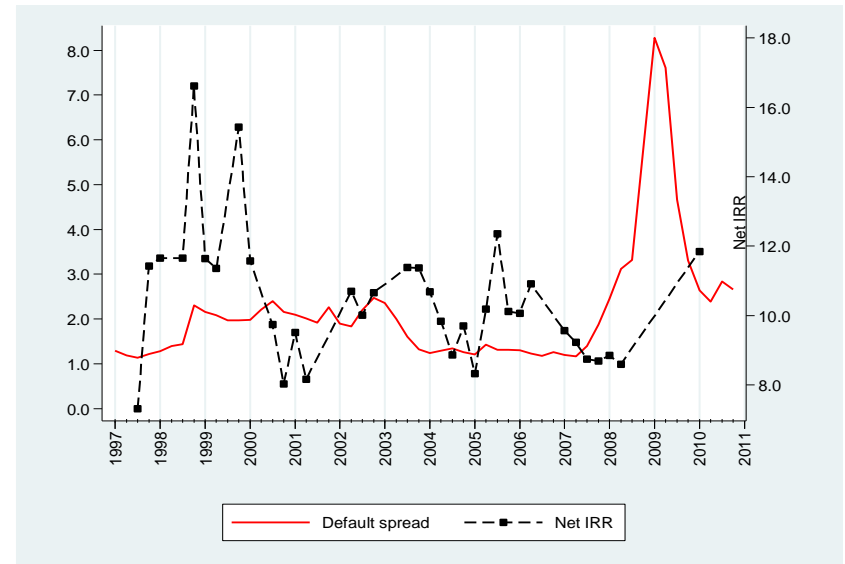
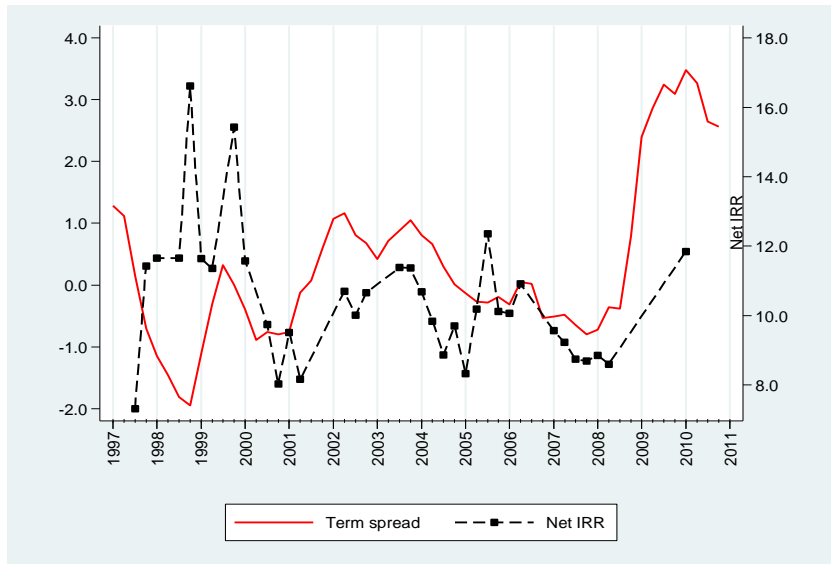
Average IRR	Average Ke (CAPM)	Average Ke (Opportunistic)	Average Ke (Hurdle rate)
17,04%	8,60%	10,73%	9,09%
Min Difference: 2,20%		Max Difference; 14,38%	



## Results: the UK healthcare PFI market

- Analysis run on 84 projects with a combined capital value of £12.3bn
- We analyse if there is any correlation between market, project, sponsor variables and the PFI net IRR (the difference between the equity IRR and the UK gilt rate)
- Our results indicate that
  - there has been a remarkable degree of stability in this excess return over the 14-year study period
  - project- and firm-level variables have no significant relationship with Net IRR
  - only general market conditions and lead sponsor size are found to be related to the Net IRR
- This suggests that **investors set a higher corporate hurdle rate when economic conditions are expected to deteriorate**, due to the increased level of systematic risk that the participating firms face. The resulting hurdle rate will normally be higher than is appropriate for specific PFI investments, which are subject to very limited systematic risk, if any.

# Net IRR correlated to Term spread and Default spread



# References

Hellowell M., Vecchi V. (2017), Estimating the cost of the capital for PPP contracts in emerging markets, World Bank

Colla P., Hellowell M., Vecchi V., Gatti S., (2015), Determinants of the price of equity in hospital private finance initiative projects, Health Policy

Vecchi V., Hellowell M., Gatti S., (2013), Does the private sector receive an excessive rate of return from investments in health care infrastructure? Evidence from the UK. Health Policy, 110 (2-3): 243 – 270

Hellowell M., Vecchi V. (2013), What return for risk? The price of equity capital in public-private partnerships, in Greve C. and Hodge G., Public Private partnership, Abingdon: Routledge

Vecchi, V and Hellowell, M (2012), 'Securing a better deal from investors in public infrastructure projects: insights from capital budgeting', Public Management Review, First Online August 2012

Hellowell, M., Vecchi, V. (2012b), An evaluation of the projected returns to investors on 10 PFI projects commissioned by the National Health Service, Financial Accountability & Management, Vol. 28, No. 1.