Evaluating the Cost of Government Credit Support: The OECD Context

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Introduction

- OECD governments allocate a large share of total capital and economic risk through their credit-related activities.
- Doing that efficiently and managing the risks entailed requires accurate information about cost and risk.
- OECD governments systematically understate the cost of credit support:
  - The costs and risks of financial guarantees go largely unaccounted for.
  - This is implicit in financial and budgetary accounting rules.
  - It manifests itself in a number of ways.
  - There are significant adverse consequences of understating costs, including masking systemic risk.
- The size and nature of the understated cost is illustrated here through several examples that include TVA, EBRD, and ESM.
Outstanding Government-Guaranteed Bonds and Debt of Government-Related Enterprises, OECD Countries (percent of GDP)

(Excludes contingent guarantees and national credit programs)

Source: IMF 2012 Fiscal Monitor
Three big questions

1. What is the right way for governments to think about their cost of capital?
   - Answer: The same way as large firms in the private sector

2. How do OECD governments think about their cost of capital in practice?
   - Answer: It’s a government’s own borrowing rate

3. How much does it matter that governments understate their cost of capital?
   - Answer: It matters a lot, both quantitatively, and for its likely allocative effects
What is the right way for governments to think about their cost of capital?

Answer: The same way as large firms do in the private sector
Robust principles from finance theory

- The cost of capital is **related** to the undiversifiable market risk (β) of the project financed.
- The cost of capital is **not related** to the proportion of debt and equity used to finance the project (Modigliani-Miller).
  - This is a first approximation—taxes, etc. also affect cost.

\[
E(r_A) = r - \beta (r_m - E(r_E)) = \frac{f}{D} E(r_A) + \frac{f}{V} E(r_D) - \frac{f}{V} E(r_E)
\]

- \(D = \text{Debt}\)
- \(E = \text{Equity}\)
- \(V = D + E\)
- \(E(R_A) = \text{expected return on firm assets}\)
- \(E(R_E) = \text{expected return on firm equity}\)
- \(E(R_D) = \text{expected return on firm debt}\)
- \(R_f = \text{risk-free rate}\)
- \(E(r_m) = \text{expected return on market portfolio}\)
- \(\beta_A = \text{beta of firm assets}\)
Robust principles from finance theory

A key relation as seen on a balance sheet:

\[
E(r_A) = D \cdot E(r_V) + E \cdot E(r_E)
\]

- **Assets**
  - Operating Assets
  - Financial Assets

- **Liabilities**
  - Debt
  - Equity

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating</td>
<td>Debt</td>
</tr>
<tr>
<td>Financial</td>
<td>Equity</td>
</tr>
</tbody>
</table>

- **Equations**
  - \(D\) = Debt
  - \(E\) = Equity
  - \(V = D + E\)
  - \(E(R_A)\) = expected return on firm assets
  - \(E(R_E)\) = expected return on firm equity
  - \(E(R_D)\) = expected return on firm debt
  - \(R_f\) = risk-free rate
  - \(E(\hat{r}_m)\) = expected return on market portfolio
  - \(\beta_A\) = beta of firm assets

- Firms make an **economic profit** when realized returns exceed the required return on assets
Robust principles from finance theory

- Financial guarantees are a type of “put option”
  - A put option gives the holder the right but not the obligation to sell a specified object at a preset price

- Put options concentrate market risk on the writer of the put
  - E.g., loan guarantees are equivalent to a highly levered position by the option writer in the stock of the firm
  - Therefore they have a high cost of capital

- Financial guarantees can be valued using an options-pricing approach
  - E.g., variations and extensions of Black-Scholes-Merton formula
Those robust principles also logically apply to government investments

- In particular, **the cost of capital for a risky government investment is higher than the interest rate it pays on its debt.**

- **Example:** The government makes a risky loan to finance an investment in new electrical generation.
  - Principal is $100 million
  - Interest rate charged is 3%
  - Government borrowing rate is 2%
  - Maturity is 1 year
Why a government’s cost of capital exceeds its borrowing rate

- Initial notional government balance sheet after loan is made:

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risky loan $100m</td>
<td>Government Debt $100m</td>
</tr>
</tbody>
</table>
Why a government’s cost of capital exceeds its borrowing rate

- Notional balance sheet at end of the year if the loan pays off in full:

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash $103m</td>
<td>Government Debt $102m</td>
</tr>
</tbody>
</table>

“Profit” of $1 million
Why a government’s cost of capital exceeds its borrowing rate

- Notional balance sheet at end of the year if the loan defaults and recovery is only $73m:

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash $73m</td>
<td>Government Debt $102m</td>
</tr>
<tr>
<td></td>
<td>Taxpayers -$29m</td>
</tr>
</tbody>
</table>

- Government borrowing costs are only low because of taxpayer backing.
- **Taxpayers and the public are *de facto* equity holders in government investments**—they absorb any gains or losses.
- Hence, the government’s cost of capital is logically a weighted average of the cost of debt and equity (as for a private sector firm).
  - It depends on the undiversifiable risk of the project, not how it is funded.
How do governments think about their cost of capital in practice?

Answer: It is the government’s own borrowing rate
How do governments think about their cost of capital in practice?

- Governments treat their cost of capital as their own borrowing rates
  - National governments, local governments, international government financial institutions, and government firms all tend to follow that practice
  - For contingent liabilities, capital is treated as essentially costless

- They define profits as accounting profits, not economic profits
  - Accounting profits are positive if expenses including interest costs are less than revenues
  - Economic profits are positive if expenses including the full cost of capital (i.e., the project WACC) are less than revenues
  - Often accounting profits are positive but economic profits are negative

- Consequently, subsidies arising from credit and investment programs often are unrecognized in budgetary accounts and financial statements
A few words on accounting

- Governments report cost information both in financial statements and in budgetary accounts.

- Under IPSAS guidelines, financial accounting is similar to that of the private sector.
  - In particular, government financial institutions are required to show a fair value balance sheet under IFRS.
  - But guarantees are off-balance-sheet.
  - And income statements do not show a fair return to equity as a cost.

- Budgetary accounting is much less standardized.
  - Credit is on cash basis for many countries, and on a naïve accrual basis for the U.S.
  - Some countries do not report guarantee costs in their budgets.
A few words on accounting

- Useful to ask: (1) How does the available information about the cost of government credit support compare to that for publicly-traded financial companies? (2) What is needed to make them similar?
  - Both have similar financial statements
  - Publicly-traded companies have observable stock price changes
  - Governments have observable budgetary costs

- The information revealed for public and private entities is similar only when budgetary costs are reported on a fair value basis
  - Budgetary costs on a fair value basis are in principle the same as the stock price change upon announcement of a new investment
    - Stock price changes by the NPV of the investment; fair value budgetary effect is the NPV of the investment
  - In practice, most governments budget on a cash basis and ignore the ex ante cost of financial guarantees
How much does it matter that governments understate their cost of capital?

Answer: It matters a lot, both quantitatively, and for its likely allocative effects.
Potential adverse consequences of understated capital costs

- Overinvestment and capital misallocation
  - Over-reliance on credit support (e.g., government loans and loan guarantees) relative to other types of assistance, such as grants or in-kind transfers, whose costs are measured more fully
    - Credit programs can appear to make money
    - Especially tempting during periods of fiscal consolidation

- Reduced government transparency
  - Unrecognized subsidies
  - Underreporting of the size of the public sector
  - Unrecognized aggregate financial risk in the world economy

- Encourages a buildup of financial risk by governments, increasing the likelihood of future funding shortfalls that could hinder governments’ capacity to respond to future adverse shocks
Quantitative examples illustrate:
- **Methods** used to infer government capital costs
- **Magnitudes** of government cost underestimates

The paper analyzes three examples:
- Capital costs for Tennessee Valley Authority (TVA)
- Capital costs and value of callable capital for European Bank for Reconstruction and Development (EBRD)
- Cost of callable capital for European Stability Mechanism (ESM)
Cost of Capital for the EBRD

- What is the EBRD?
  - A multilateral development bank
  - Owned by 64 member countries
  - Established in 1991 to provide financial support for projects to build sustainable and open market economies from central Europe to central Asia and elsewhere

- How is it structured?
  - The bank supports projects with loans, guarantees and equity. Also holds a portfolio of safe assets for liquidity
  - Assets of EUR 51 billion in 2012
  - Financed by debt, member equity, and callable capital
### Table 2: Assets of Selected Multilateral Banks in 2012 (EUR billions)

<table>
<thead>
<tr>
<th>Bank</th>
<th>Assets (EUR billions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>African Development Bank¹</td>
<td>25</td>
</tr>
<tr>
<td>Asian Development Bank²</td>
<td>95</td>
</tr>
<tr>
<td>European Bank for Reconstruction and Development</td>
<td>52</td>
</tr>
<tr>
<td>European Investment Bank</td>
<td>508</td>
</tr>
<tr>
<td>Inter-American Development Bank²</td>
<td>71</td>
</tr>
<tr>
<td>World Bank Group²</td>
<td></td>
</tr>
<tr>
<td>Intl Bank for Reconstruction &amp; Development</td>
<td>183</td>
</tr>
<tr>
<td>International Development Association</td>
<td>123</td>
</tr>
<tr>
<td>International Finance Corporation</td>
<td>58</td>
</tr>
</tbody>
</table>

¹ UA 1 = EUR 1.2
² USD 1 = EUR .77
### Cost of Capital for the EBRD

**Table 3:**

<table>
<thead>
<tr>
<th>EBRD Top Capital Contributors</th>
<th>Capital subscription (000 Euros)</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States of America</td>
<td>3,001,480</td>
</tr>
<tr>
<td>France</td>
<td>2,556,510</td>
</tr>
<tr>
<td>Germany</td>
<td>2,556,510</td>
</tr>
<tr>
<td>Italy</td>
<td>2,556,510</td>
</tr>
<tr>
<td>Japan</td>
<td>2,556,510</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>2,556,510</td>
</tr>
<tr>
<td>Russian Federation</td>
<td>1,200,580</td>
</tr>
<tr>
<td>Canada</td>
<td>1,020,490</td>
</tr>
<tr>
<td>Spain</td>
<td>1,020,490</td>
</tr>
<tr>
<td>European Investment Bank</td>
<td>900,440</td>
</tr>
<tr>
<td>European Union</td>
<td>900,440</td>
</tr>
</tbody>
</table>
Cost of Capital for the EBRD

- Debt issues have a AA+ rating and carry a low interest rate because of member backing (callable and paid-in capital)
- EBRD treats its cost of capital as its borrowing cost, and on a book value basis it appear profitable in most years
- The difference between its true cost of capital and its borrowing cost gives the unreported capital cost
- The true cost-of-capital can be approximated using the CAPM, and taking the $\beta$ to be that of international banks
  - My calculation: Annual cost = $r_A \times A$ (forward-looking)
  - EBRD calculation: Annual cost = $r_D \times D$ (historical)
# Cost of Capital for the EBRD

Table 4: Calculating the Weighted Average Cost of Capital for the EBRD

<table>
<thead>
<tr>
<th></th>
<th>2012</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assets (Fair value, EUR millions)</td>
<td>52,015</td>
<td>46,622</td>
</tr>
<tr>
<td>Total Debt (Fair value, EUR millions)</td>
<td>37,106</td>
<td>33,724</td>
</tr>
<tr>
<td>Borrowing cost (interest plus hedging)</td>
<td>0.89%</td>
<td>0.78%</td>
</tr>
<tr>
<td>Risk Free Rate (3-month t-bill)</td>
<td>0.03%</td>
<td>0.15%</td>
</tr>
<tr>
<td>Market risk premium</td>
<td>6.50%</td>
<td>6.50%</td>
</tr>
<tr>
<td>Asset Beta</td>
<td>.3</td>
<td>.3</td>
</tr>
<tr>
<td>Required Return on Assets</td>
<td>1.98%</td>
<td>2.1%</td>
</tr>
<tr>
<td>Unrecognized capital subsidy</td>
<td>699</td>
<td>716</td>
</tr>
</tbody>
</table>

All euro amounts are in millions
Multi-year cost of callable capital

- Callable capital allows the EBRD to access additional funds from members should its equity fall below a threshold
- Member countries are writers of the call options
- Governments usually recognize no cost of the call options until they are exercised
- Call options represent a significant cost to governments at the time they are agreed to
Callable capital can be valued using a generalized options-pricing approach following Lucas and McDonald (2006 and 2010)
  - Structural approach based on current assets, asset volatility, dynamic capital structure adjustment rules, call threshold

Cost of committed callable capital over 20 years for EBRD estimated to be **EUR 7.2 billion to member countries**
  - Estimated cost is most sensitive to asset volatility assumption
  - Annual probability of call estimated to be about 6 percent
    - May be high, sensitive to parameter assumptions
Pricing model for EBRD callable capital (risk-neutral version; actual has higher drifts)

- Risky assets follow a log-normal process:
  \[ A_{t+h} = A_t \exp \left( (r_f - 0.5 \sigma^2_{A,t}) h + \sigma_{A,t} \epsilon \sqrt{h} \right) \]

- Safe assets held for liquidity is deterministic:
  \[ B_{t+h} = B_t \exp \left[ r_f h \right] \]

- Periodic adjustment of assets towards target risky/liquid mix
  - Upward adjustments of the risky asset-to-equity ratio move 50% of the way to the target over the course of a year
  - Downward adjustments move 3% to the target

- Debt liabilities are also deterministic:
  \[ L_{t+h} = L_t \exp \left[ r_f h \right] \]
Pricing model for EBRD callable capital (risk-neutral version; actual has higher drifts)

- Equity is the difference between assets and liabilities:
  \[ E_t = A_t + B_t - L_t \]

- Capital is called when the ratio of liabilities-to-equity, \( L_t / E_t \), exceeds the trigger
  - Trigger based on statutory requirement that equity be at least 50 percent of (book) banking assets; implemented in terms of liabilities-to-equity.
  - Trigger is checked quarterly, reflecting that monitoring and the production of new information about asset values is fairly infrequent.
- Amount of capital called restores the target liability-to-equity ratio.
- The new capital is assumed to be initially invested entirely in risk-free liquid assets.
Pricing model for EBRD callable capital (risk-neutral version; actual has higher drifts)

- For each Monte Carlo run, variables are initialized to the data in 2012.
- Each month over a 20-year period, a standard normal random variable, scaled by $\sigma_A$, determines the evolution of risky assets.
- Safe assets, liabilities and equity evolve.
- Every quarter, $L_t/E_t$ is compared to the trigger value for a capital call.
- If tripped, equity is called in an amount that restores target ratio.
- Every quarter, the ratio $A_t/E_t$ is compared to its target value, and the mix of risky and risk-free assets are adjusted towards the target for that ratio.
- Along each path, the amount and timing of each capital call is recorded.
- Call payments are discounted to time 0 at risk-free rate.
- The reported fair value cost of the guarantee is the average cost over the 10,000 Monte Carlo runs.
- The physical call probabilities are based on the results of applying the same shocks to the evolution of actual risky assets and averaging over the Monte Carlo runs.
<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base Case Value</td>
<td></td>
</tr>
<tr>
<td>Number Monte Carlo runs</td>
<td>10,000</td>
</tr>
<tr>
<td>Time horizon</td>
<td>20 years</td>
</tr>
<tr>
<td>Risk-free rate, $r_f$ (annual)</td>
<td>.003</td>
</tr>
<tr>
<td>Return on liquid assets and liabilities, $r_B$ (annual)</td>
<td>.0078</td>
</tr>
<tr>
<td>Expected return on risky assets, $E(r_A)$ (annual)</td>
<td>.0198</td>
</tr>
<tr>
<td>Initial liquid assets, $B_0$ (EUR millions)</td>
<td>26,528</td>
</tr>
<tr>
<td>Initial risky assets, $A_o$ (EUR millions)</td>
<td>25,487</td>
</tr>
<tr>
<td>Initial liabilities, $L_o$ (EUR millions)</td>
<td>37,106</td>
</tr>
<tr>
<td>Volatility risky assets, $\sigma_A$</td>
<td>.075</td>
</tr>
<tr>
<td>Liability-to-equity target</td>
<td>2.24/1</td>
</tr>
<tr>
<td>Liability-to-equity trigger</td>
<td>2.91/1</td>
</tr>
<tr>
<td>Target risky asset-to-equity ratio for rebalancing asset mix</td>
<td>1/.65</td>
</tr>
<tr>
<td>Adjustment rate of $A_t/E_t$ to target when $A_t/E_t &gt;$</td>
<td>.03</td>
</tr>
<tr>
<td>Adjustment rate of $A_t/E_t$ to target when $A_t/E_t &lt;$</td>
<td>.5</td>
</tr>
</tbody>
</table>
Cost of Callable Capital for the EFSM/ESM

- The European Financial Stabilization Mechanism (EFSM) was created in May 2010 to respond to Eurozone crisis
- A rescue mechanism with the mandate of safeguarding financial stability by providing financial assistance to euro area Member States
  - European Stability Mechanism (ESM) is the permanent version
- Authority to issue bonds backed by member capital and callable capital
  - Bonds are rated AA+ because of the EUR 620 billion callable capital
- Governments recognize no cost of the call exposure until calls are made
- Callable capital again can be valued using a generalized options-pricing approach (this time including jumps) following L&M 2010
- Cost of committed callable capital over 20 years for EFSM/ESM estimated to be EUR 20 to 80 billion to member countries
Cost of Callable Capital for the EFSM/ESM

- Methodology (in brief)
  - “Risk-neutral” Monte Carlo valuation model
  - Risky assets evolve stochastically
    - A jump process indicates occurrence of infrequent crisis state
    - A 2nd jump process controls depreciations of existing assets; correlated with crisis
    - Asset volatility process can be time- and state varying; tricky to calibrate
  - Liabilities increase by the amount of new loans made in a crisis
  - Capital is called when the ratio of liabilities-to-equity exceeds a trigger threshold
    - The amount called is set to restore target liability-to-equity ratio
    - New capital is invested in safe liquid assets
  - Cost of callable capital is present value of model-predicted call amounts, averaged over 20,000 Monte Carlo runs over 20 years
Pricing model for EFSM/ESM callable capital (risk-neutral version; actual has higher drifts)

- Risky assets follows a log-normal process with two jumps:
  \[ A_{t+h} = (1 + I_{J,t} \omega_t) A_t \exp\left[ (r_f - p_j \omega_t - 0.5 \sigma_{A,t}^2) h + \sigma_{A,t} \epsilon \sqrt{h} \right] - A_t \alpha + I_{C,t} \Delta A_t \]

- New equity from capital calls is invested in liquid assets.
- The evolution between capital infusions of liquid assets is:
  \[ B_{t+h} = B_t \exp[r_D h] \]

- Debt liabilities increase in the amounts needed to fund new risky asset purchases in crises, net of amortization:
  \[ L_{t+h} = L_t \exp[r_D h] - A_t \alpha + I_{C,t} \Delta A_t \]
Pricing model for EFSM/ESM callable capital (risk-neutral version; actual has higher drifts)

- Equity is the difference between assets and liabilities:
  \[ E_t = A_t + B_t - L_t \]

- Capital is called when the ratio of liabilities-to-equity, \( L_t/E_t \), exceeds the trigger.
  - In base case capital is called when ratio exceeds target ratio by 20%
  - Target is taken to be initial ratio liabilities to equity.
  - Trigger checked quarterly
  - New capital is invested in liquid assets

- Monte Carlo simulations used to calculate PV of call under various parametric assumptions.
<table>
<thead>
<tr>
<th>Name</th>
<th>Base Case Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number Monte Carlo runs</td>
<td>20,000</td>
</tr>
<tr>
<td>Time horizon</td>
<td>20 years</td>
</tr>
<tr>
<td>Risk-free rate, $r_f$ (annual)</td>
<td>.003</td>
</tr>
<tr>
<td>Return on ESM debt and liquid assets, $r_B$ (annual)</td>
<td>.01</td>
</tr>
<tr>
<td>Fair value expected return on risky assets (annual)</td>
<td>.03</td>
</tr>
<tr>
<td>Initial liquid assets, $B_0$ (EUR millions)</td>
<td>80,000</td>
</tr>
<tr>
<td>Initial risky assets, $A_0$ (EUR millions)</td>
<td>39,461</td>
</tr>
<tr>
<td>Initial liabilities, $L_0$ (EUR millions)</td>
<td>39,461</td>
</tr>
<tr>
<td>Annual rate of asset repayment, $\alpha$</td>
<td>.027</td>
</tr>
<tr>
<td>Volatility risky assets, $\sigma_A$ non-jump component</td>
<td>.15</td>
</tr>
<tr>
<td>Probability crisis, $\Delta$</td>
<td>.06</td>
</tr>
<tr>
<td>Risky asset multiplier if crisis, $\Delta$</td>
<td>1.5x</td>
</tr>
<tr>
<td>Probability jump down in risky assets, $p_{\Delta}$ non-crisis, annual</td>
<td>10%</td>
</tr>
<tr>
<td>Probability jump down in risky assets, $p_j$, crisis, annual</td>
<td>25%</td>
</tr>
<tr>
<td>Jump size as percent of risky assets in crisis, $\omega$</td>
<td>-20%</td>
</tr>
<tr>
<td>Liability-to-equity target</td>
<td>39.461/80</td>
</tr>
<tr>
<td>Liability-to-equity trigger</td>
<td>1.2 x target</td>
</tr>
</tbody>
</table>
Table 4.6: Prospective Cost and Call Probability for EFSF/ESM Callable Capital
Sensitivity to Key Parameters

<table>
<thead>
<tr>
<th>(EUR billions)</th>
<th>Annual crisis probability</th>
<th>0</th>
<th>.03</th>
<th>.06</th>
<th>.09</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cost</td>
<td>0</td>
<td>19</td>
<td>38</td>
<td>59</td>
</tr>
<tr>
<td></td>
<td>Annual call probability</td>
<td>0.0%</td>
<td>1.5%</td>
<td>3.2%</td>
<td>5.0%</td>
</tr>
<tr>
<td>Risky asset multiplier in crisis</td>
<td>1.25x</td>
<td>1.5x</td>
<td>1.75x</td>
<td>2x</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cost</td>
<td>12</td>
<td>38</td>
<td>65</td>
<td>92</td>
</tr>
<tr>
<td></td>
<td>Annual call probability</td>
<td>0.9%</td>
<td>3.2%</td>
<td>4.6%</td>
<td>5.2%</td>
</tr>
<tr>
<td>Asset jump frequency, annual, no crisis</td>
<td>0</td>
<td>.05</td>
<td>.1</td>
<td>.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cost</td>
<td>38</td>
<td>38</td>
<td>39</td>
<td>39</td>
</tr>
<tr>
<td></td>
<td>Annual call probability</td>
<td>3.0%</td>
<td>3.1%</td>
<td>3.3%</td>
<td>3.4%</td>
</tr>
<tr>
<td>Risky asset volatility (non-jump component), annual</td>
<td>.05</td>
<td>.1</td>
<td>.15</td>
<td>.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cost</td>
<td>34</td>
<td>36</td>
<td>38</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>Annual call probability</td>
<td>2.8%</td>
<td>3.0%</td>
<td>3.2%</td>
<td>3.7%</td>
</tr>
<tr>
<td>Trigger liabilities-to-equity (relative to target ratio)</td>
<td>1.05x</td>
<td>1.1x</td>
<td>1.2x</td>
<td>1.3x</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cost</td>
<td>41</td>
<td>40</td>
<td>38</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>Annual call probability</td>
<td>5.3%</td>
<td>4.3%</td>
<td>3.2%</td>
<td>2.4%</td>
</tr>
</tbody>
</table>

Note: Each row varies only the listed parameter from its base case value.
Figure 1: Distribution EFSF/ESM cost
5,000 trials of 20 years
base case parameters, EUR millions
Conclusions and final thoughts

- OECD governments systematically understate their cost of capital by treating it as their borrowing rate (or as zero)
  - More accurate cost accounting would switch many activities from appearing profitable to appearing unprofitable
  - That switch of sign is especially salient to policymakers
  - Of course activities that are unprofitable may still be socially beneficial

- Cost and hence risk understatement is particularly severe for financial guarantees
  - Often not reported as having any cost unless a loss is realized

- Correcting that situation would require major changes in the budgetary accounting practices of OECD governments
  - For most it would require a move from cash to fair value accruals
  - Legislative proposal in U.S. would implement such changes
Conclusions and final thoughts

- More research is needed to
  - Inventory credit support in the OECD and the available information about cost (at national and subnational levels)
  - Inventory budgetary accounting practices for credit and other investments across the OECD
  - Develop and implement robust/practical methodologies for cost and risk estimation
  - Apply those methodologies to measure the costs and risks of large OECD area support programs
  - This is part of the research agenda being supported by the new MIT Center for Finance and Policy

- Thank you!