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Informed intermediation of longevity exposures

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Outline

1. Motivation
2. Buyout market
3. ILS market
4. Dynamic setting
5. Conclusion

Motivation

The pensions buyout market

- took off in the UK in 2006 (Paternoster)
- GBP 30bn of business written so far
- buy-outs, buy-ins, longevity swaps

Important role of buyout firms

- aggregators of longevity exposures
- limited capacity of insurance market: DB schemes / annuity providers have longevity exposures roughly 30x larger than exposure to increase in mortality
- longevity space attractive to investors (ILS funds, endowments, etc.)

Questions

- explaining buyout prices (role of information and capital requirements)
- how can regulation affect buyouts / ILS market

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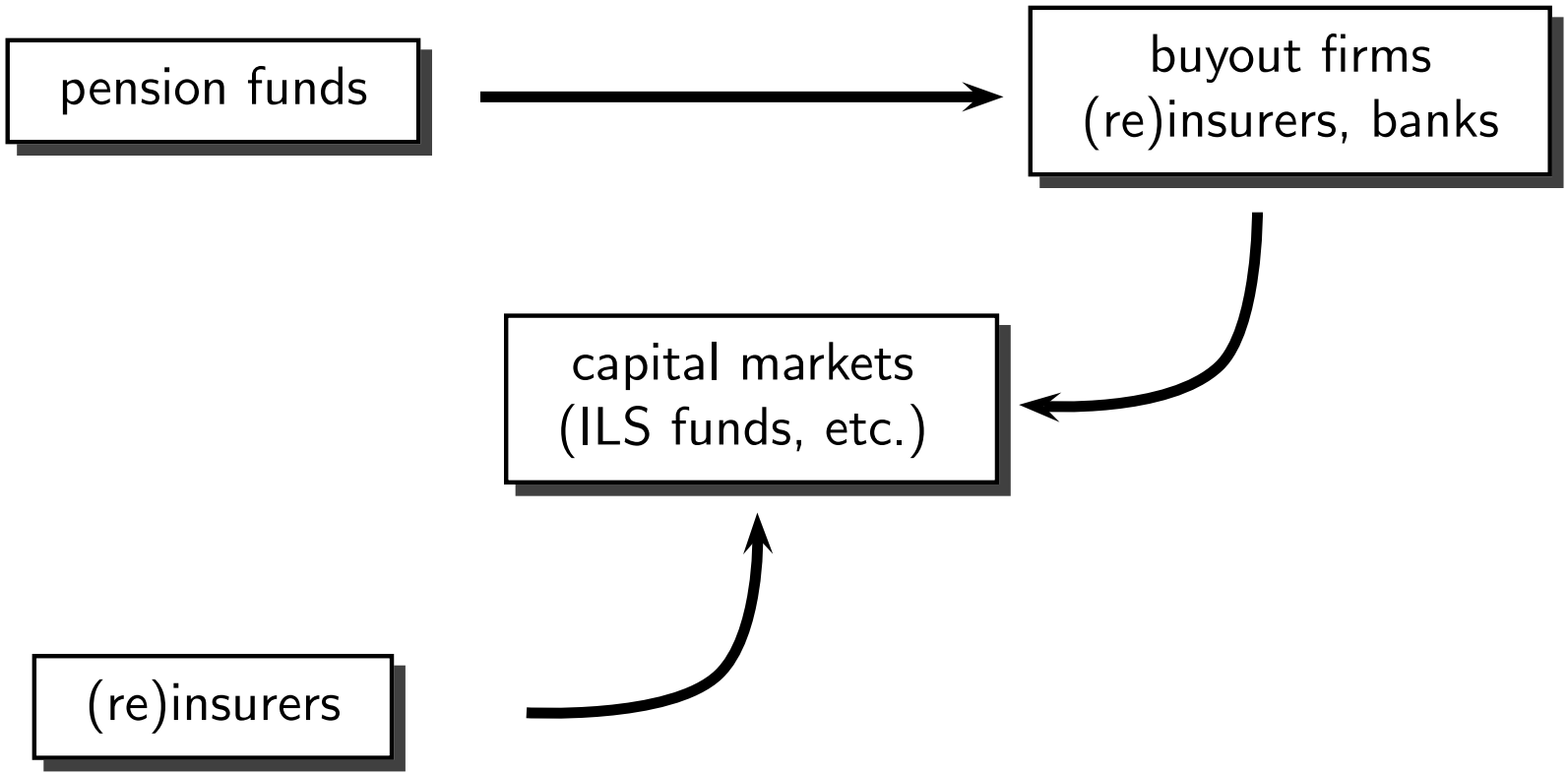
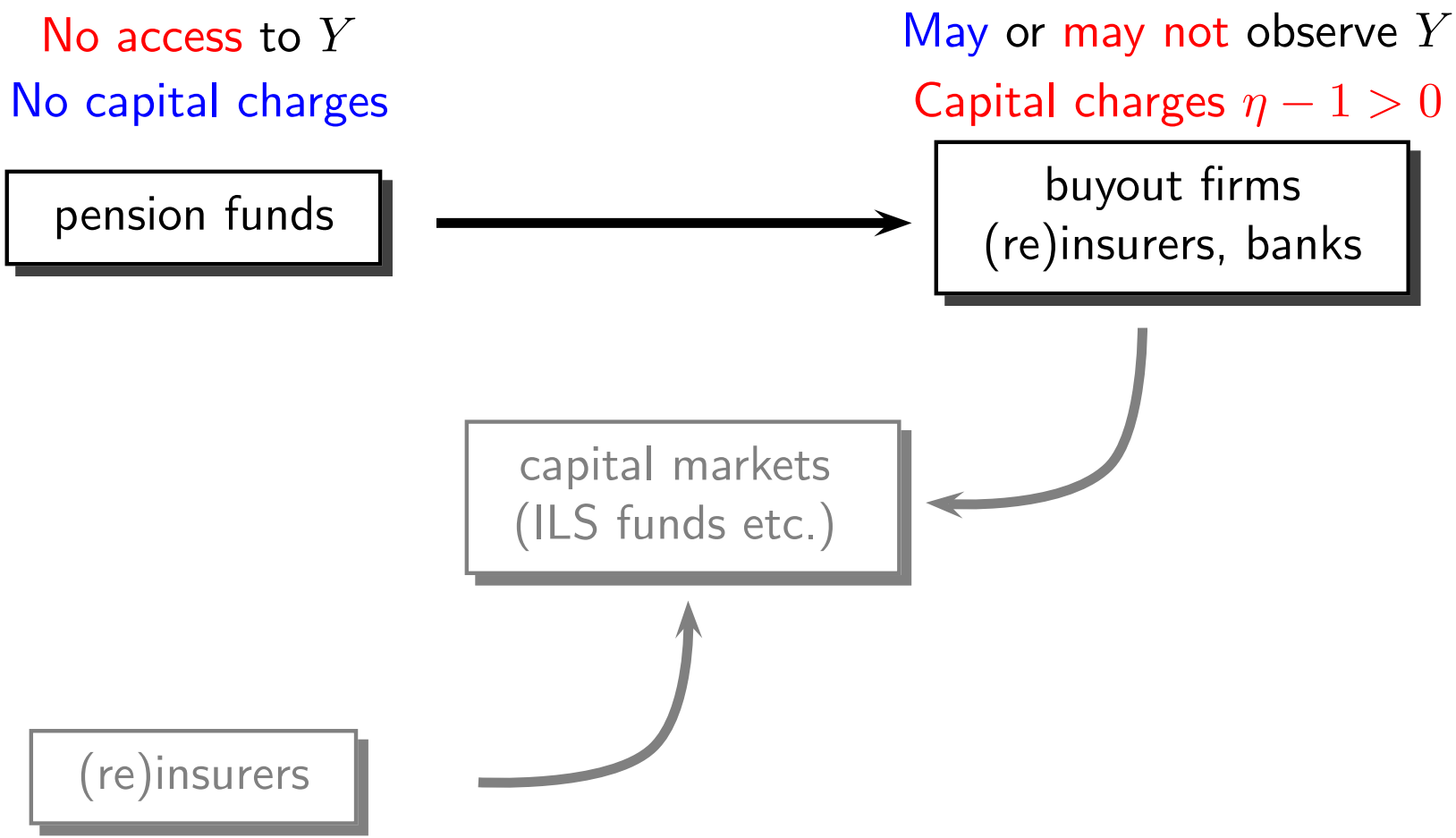
The pensions buyout market



Role of information & capital requirements



Equilibrium buyout prices

- Risk-neutral agents, zero interest rate.
- Exogenous supply of longevity exposure $S \geq 0$ from uninformed pension funds
  - $S = p(Y) + \varepsilon$, with $p(Y) := E[S|Y]$.
- Insurance regulatory framework: hold $\eta E[S]$ or $\eta p(y)$, with $\eta > 1$.

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- 'More informed' agents
  - capital $c \geq 0$, participate in a fraction β of transactions
  - if price π, they purchase S on $\{p(Y) \leq x^*\}$

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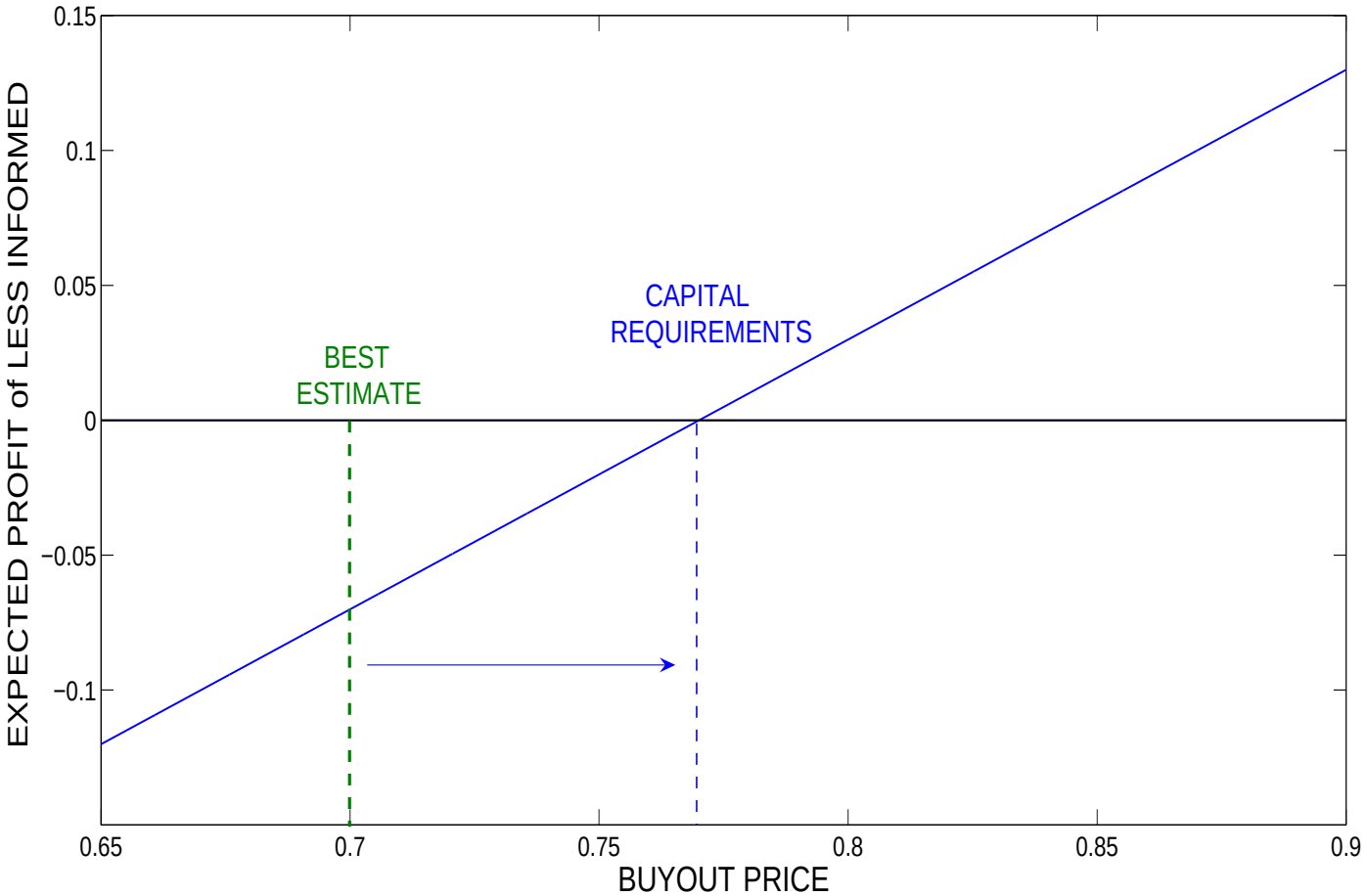
- 'Less informed' buyers (say uninformed) cannot offer less than

$$\pi^* := \min\left\{\pi \geq 0 \ : \ E\left[(\pi - \eta S)(1 - \beta 1_{\{p(Y) \leq x^*)\}})\right] \geq 0\right\} > \eta E[S]$$

Transferring a survival rate, $S = \frac{1}{m}\sum_{i=1}^{m} 1_{\tau^i > T}$



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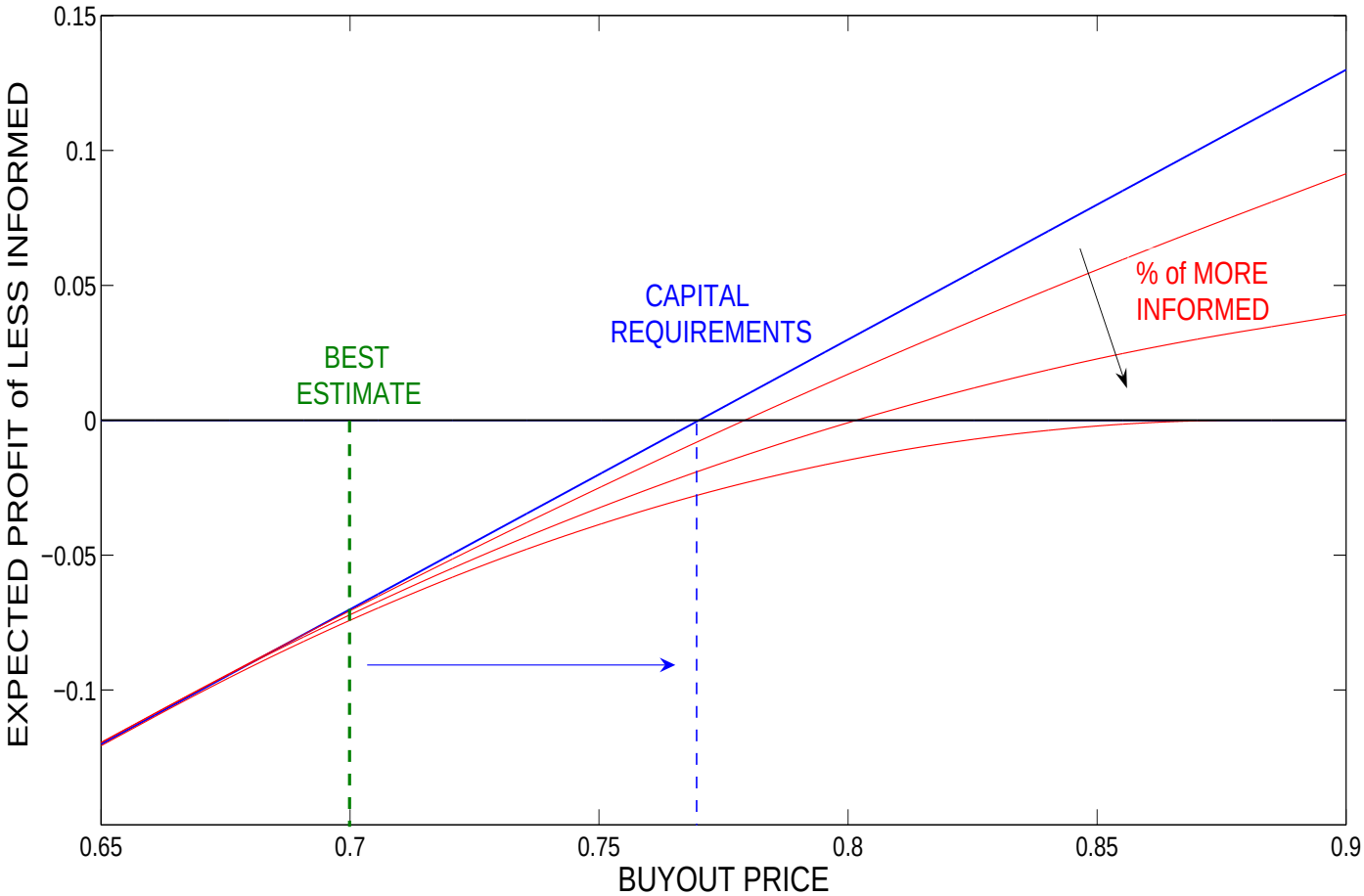

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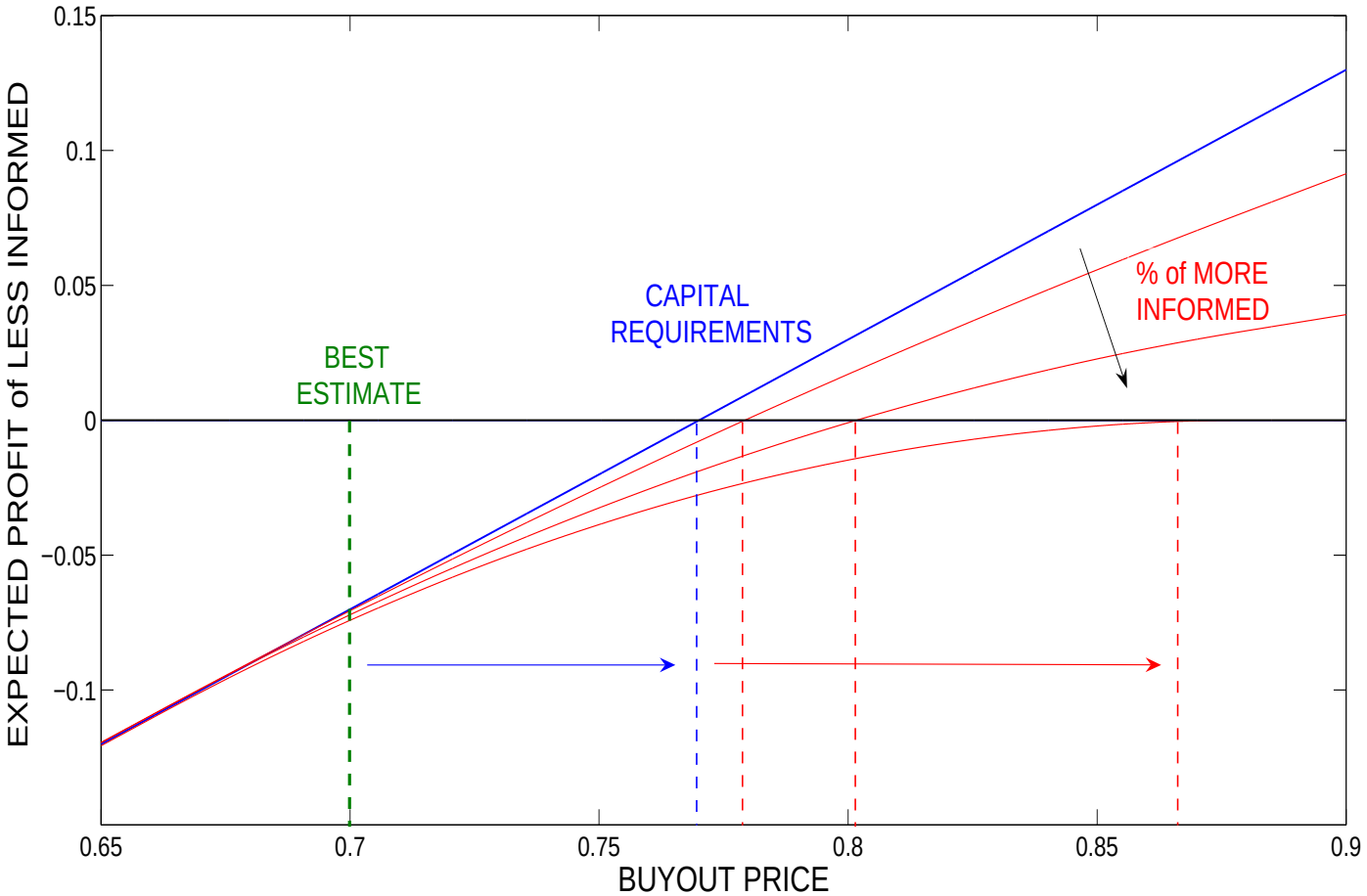

Pension funds perspective

How to mitigate adverse selection?

- transparency $\not\Rightarrow$ liquidity
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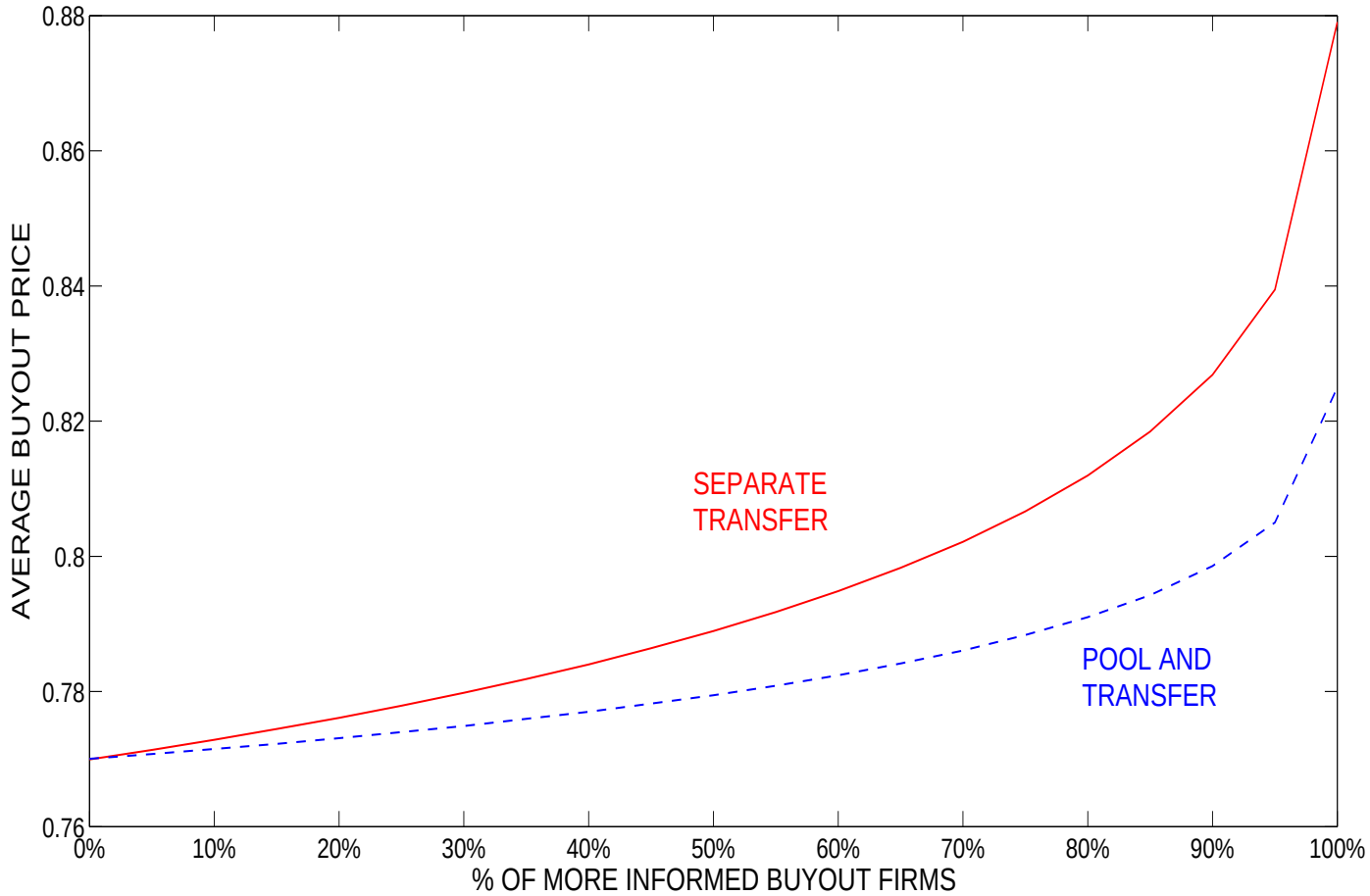
- transfer different age ranges / cohorts, longevity risk and other risks (bulk buyouts)
- capital charges still there: premium for 'insurance guarantee'

Partial vs. bulk buyouts



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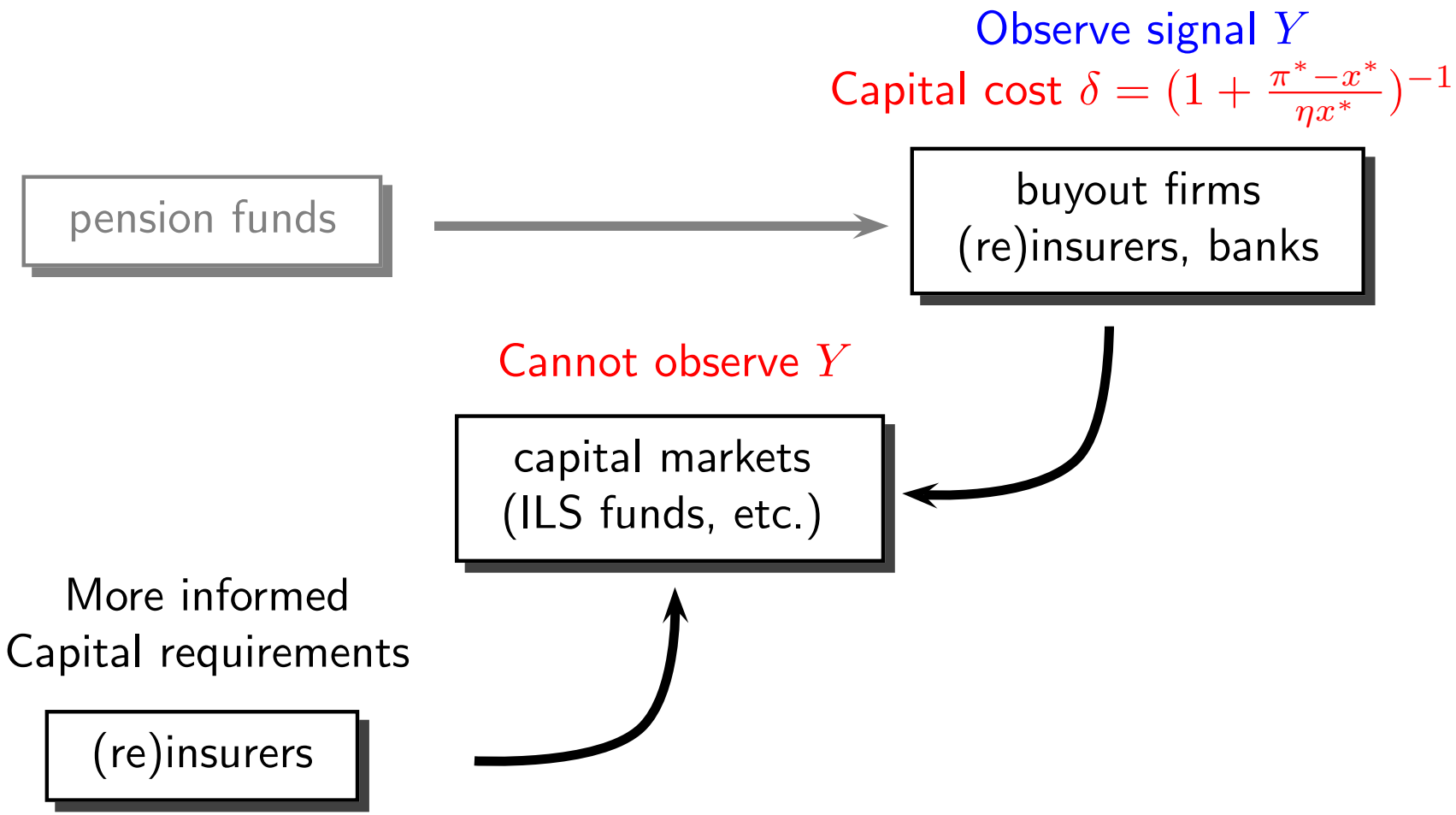
The ILS market



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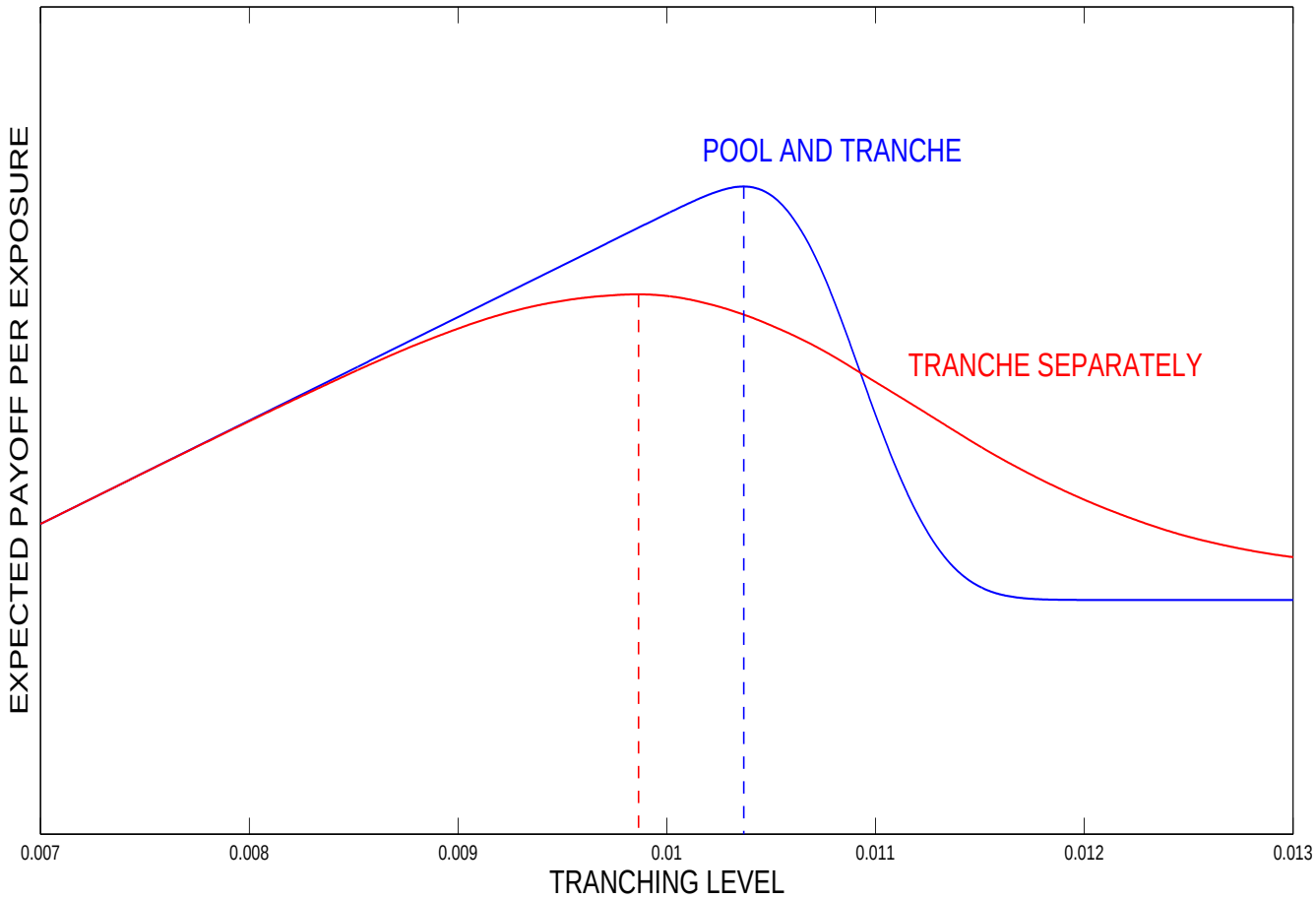
Write a contract on the exposure S (say survival rate)

- assume full collateralization: write $C = \phi(1 - S)$, with $\phi(\cdot)$ non decreasing
- optimal contract design

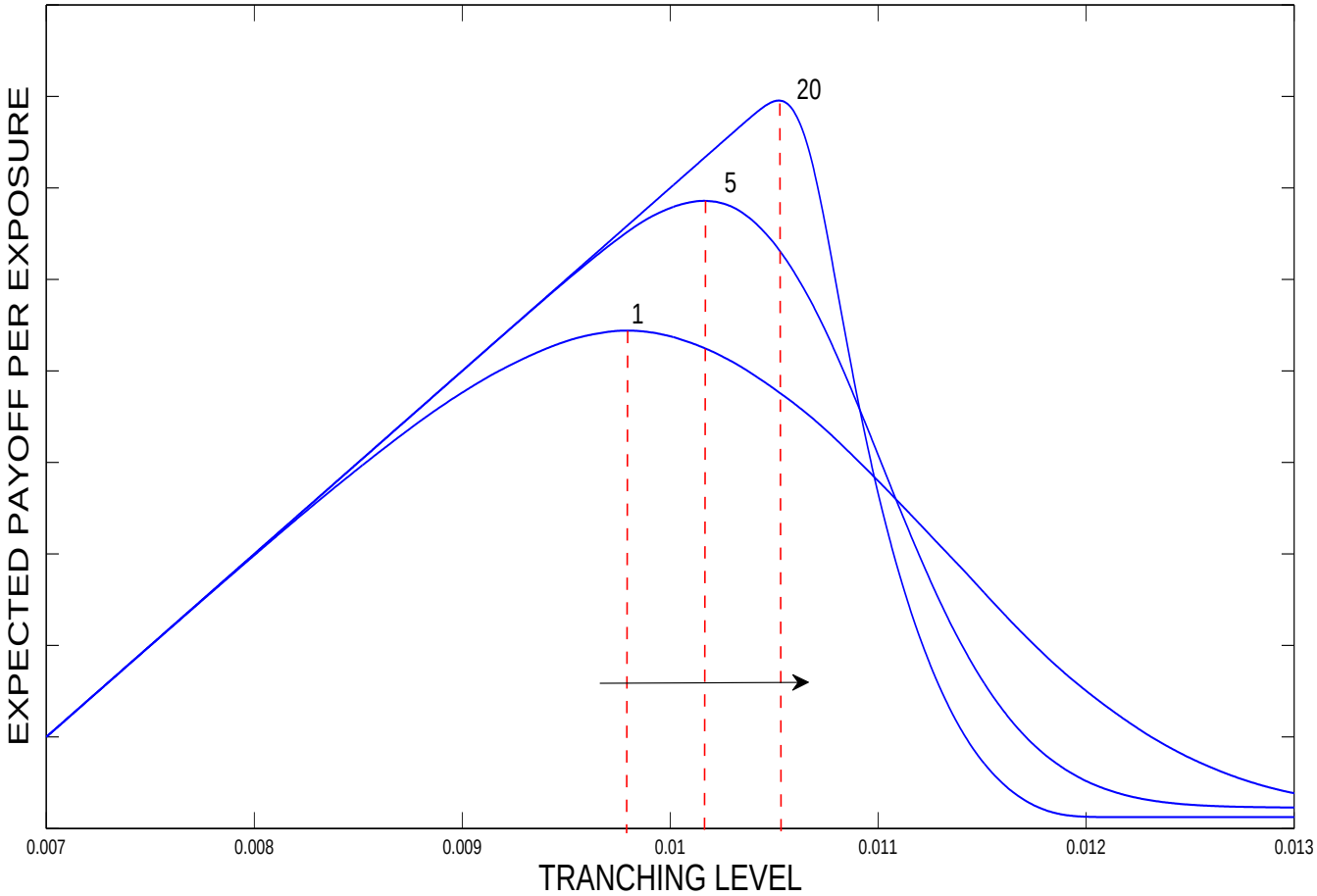
$$C^* = \min(q^*, 1 - S) = q^* - \max(0, S - p^*)$$

- higher $q^* = 1 - p^*$, higher longevity risk protection
- may be optimal doing it for a pool, not on individual basis!

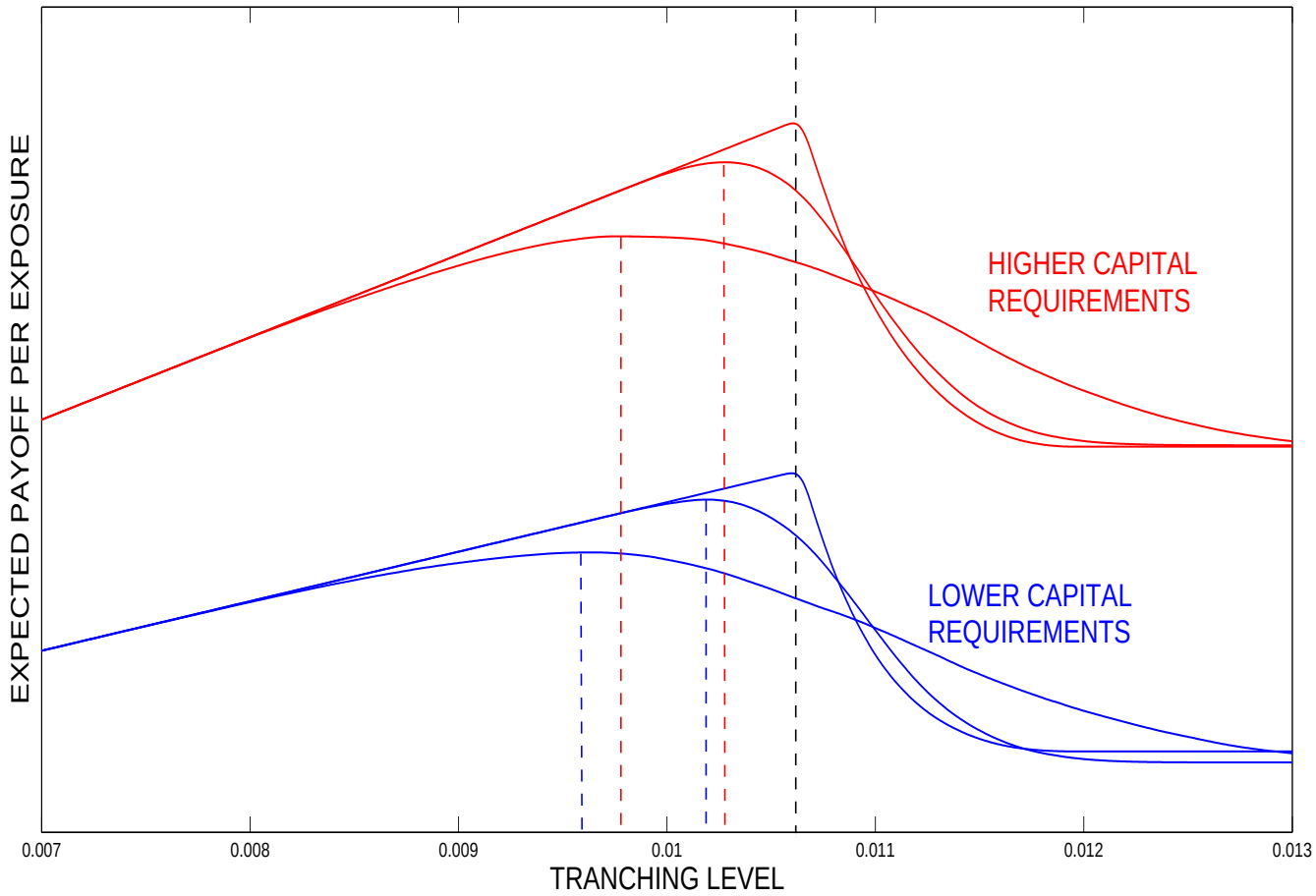
Pool and tranche



Pool size


EXPECTED PAYOFF PER EXPOSURE
TRANCHING LEVEL
20
5
1
0.007
0.008
0.009
0.01
0.011
0.012
0.013

Capital requirements



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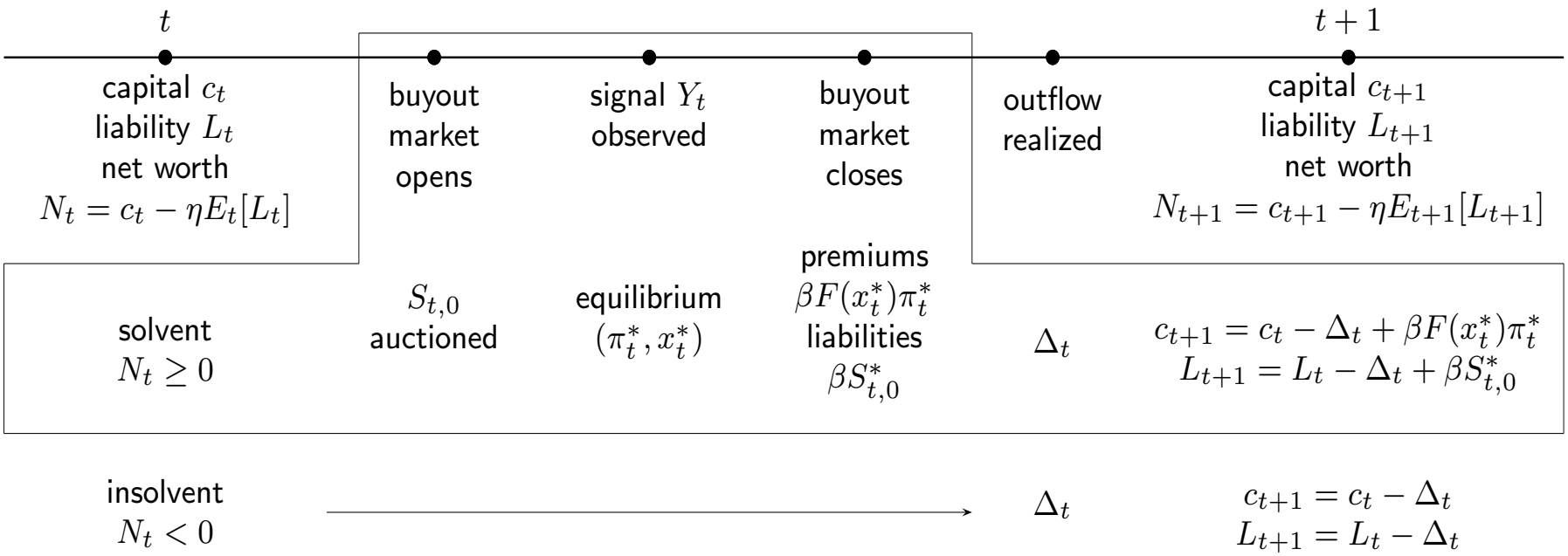
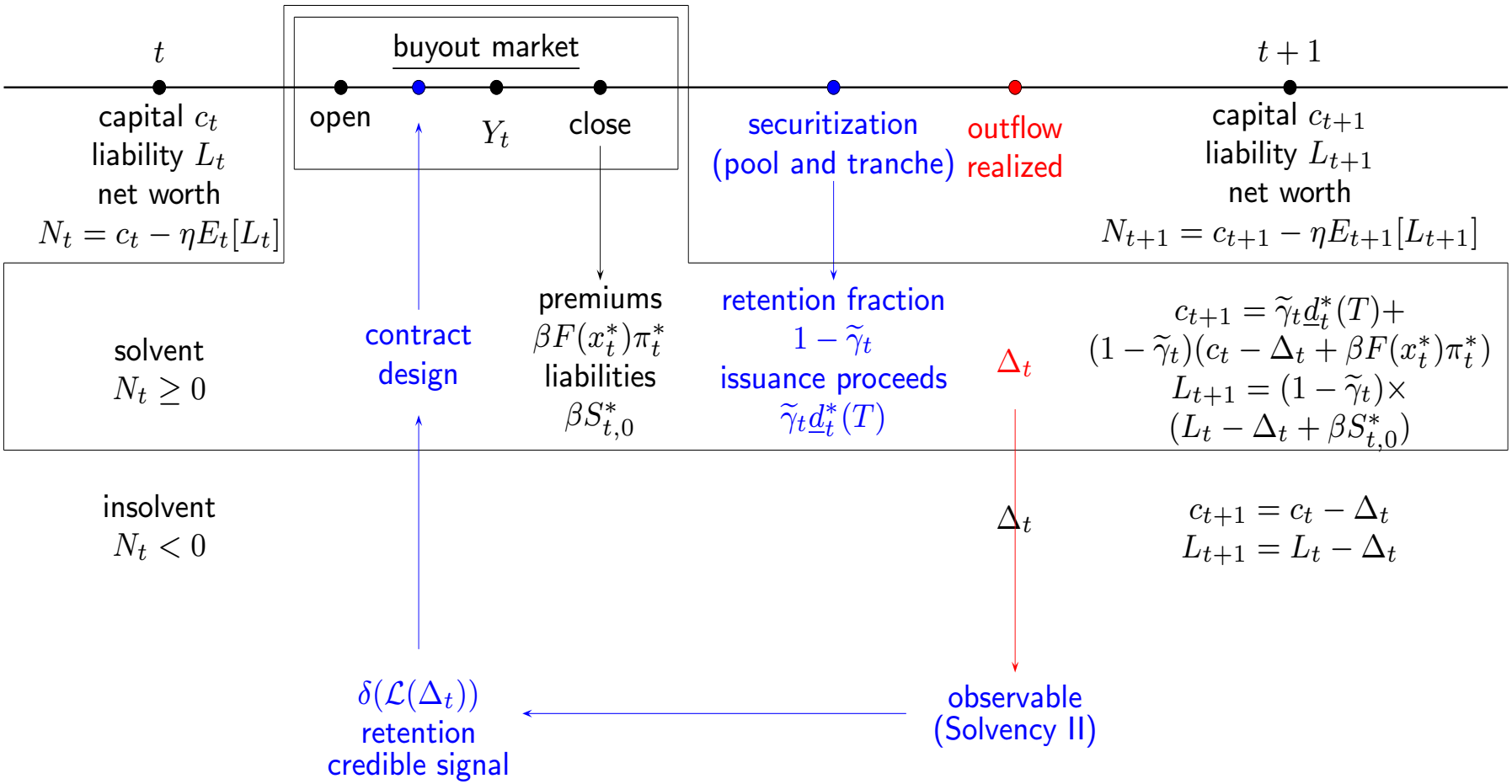
- Securitization channel
  - can improve market capacity and drive down buyout prices if role of information (and regulation) is properly understood.

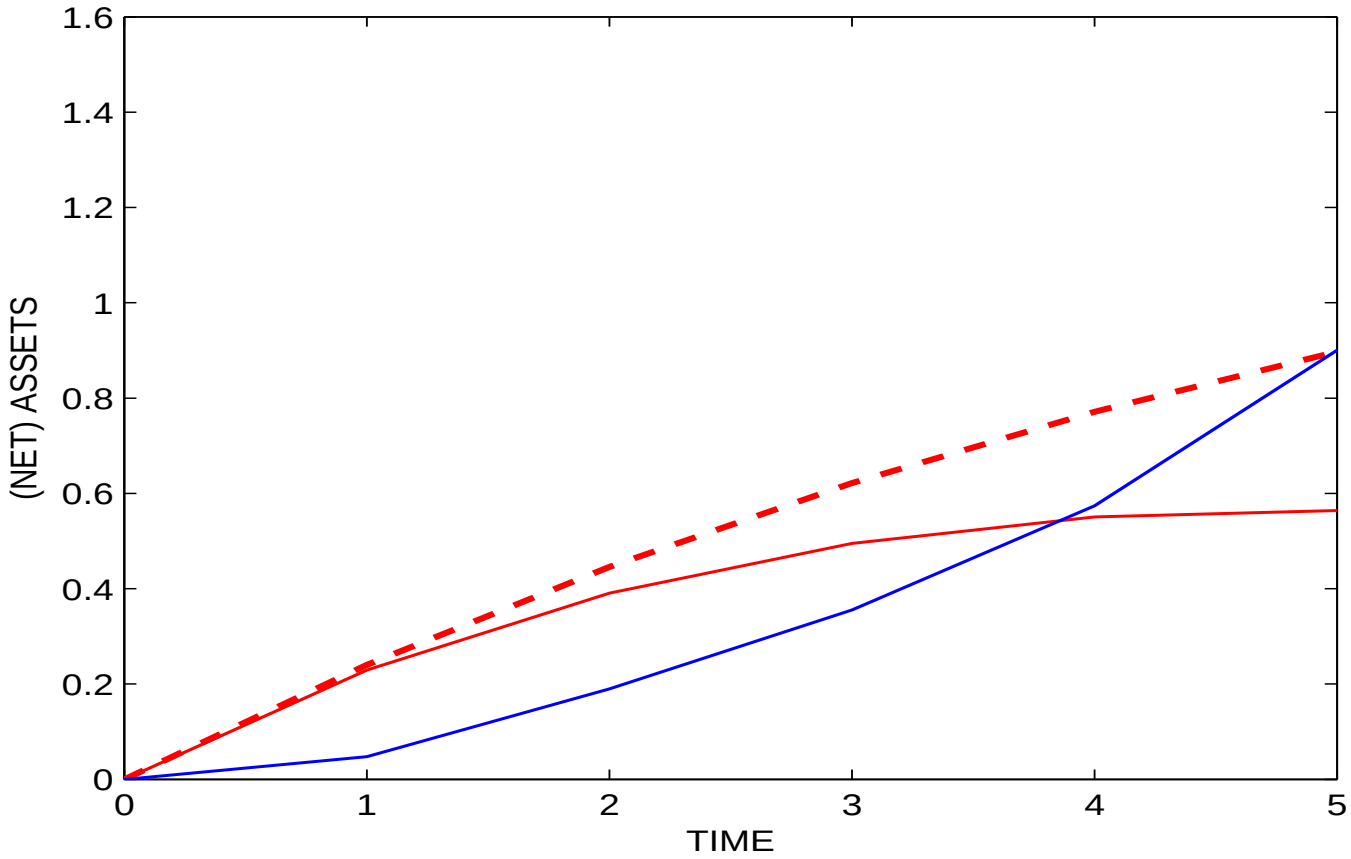
Timeline (buyouts)



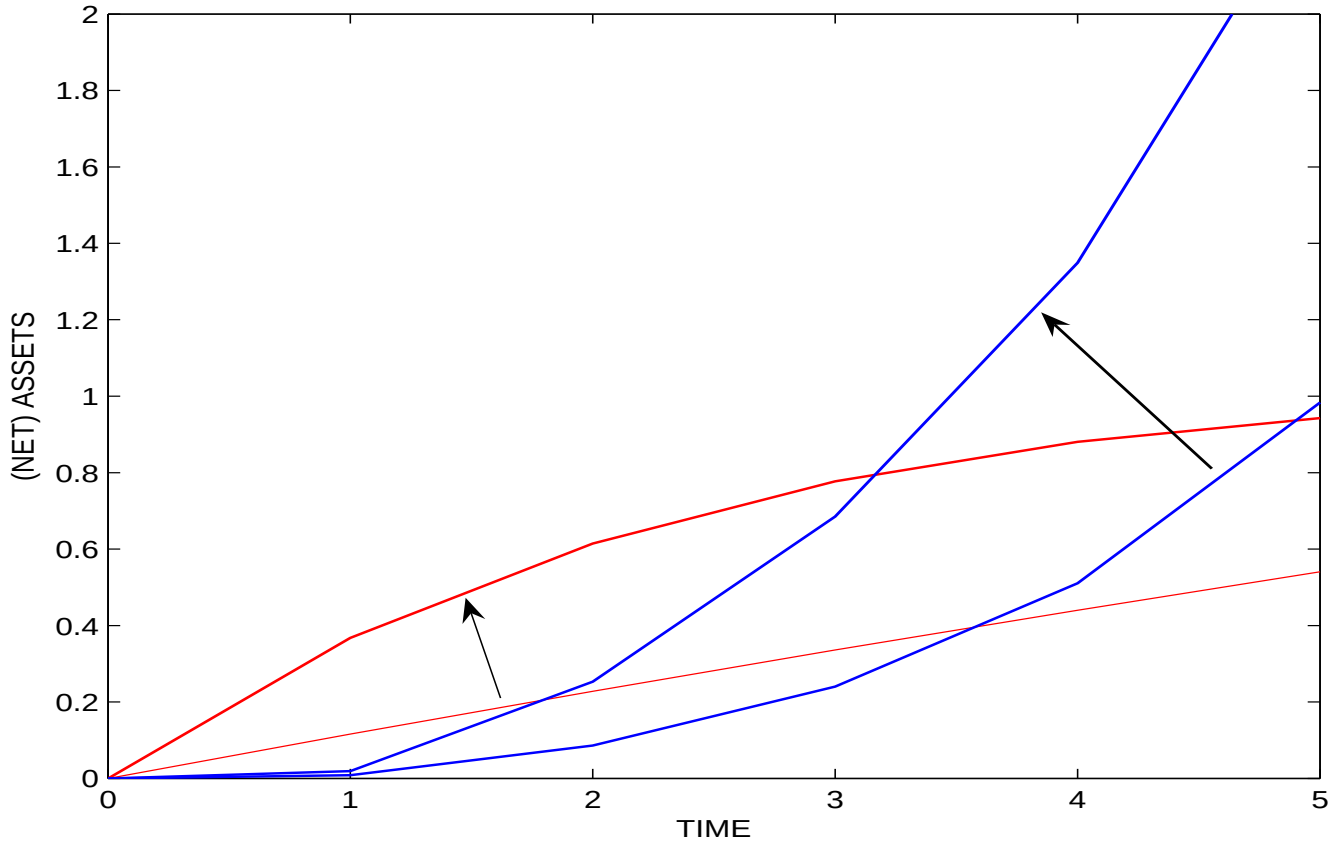
Timeline (buyouts & securitization)



Growth through securitization



Different levels of β



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The buyout market

- fundamental origination market (sheer size of DB schemes exposures)
- buyout firms as aggregators of longevity exposures (pooling)
- can bridge the gap between DB schemes and capital markets (intermediation)

Role of transparency & regulation

- lenient regulation on pension funds side reduces adverse selection in buyout mkt...
- ...but different capital requirements materialize in premium for 'insurance guarantee'
- aggregation can reduce adverse selection in the ILS market (pool and tranche), but transparency (e.g. Solvency II regulatory info) essential to deal with moral hazard

THANK YOU