

Bonus Caps, Deferrals and Bankers' Risk Taking

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Model setup

- Future bonuses are like a series of call options on earnings
- Their present value is higher if earnings volatility is higher
- Hence, bonuses spur risk taking
- In "equilibrium":
 - A (risk-neutral) banker balances the cost from increasing risk with the marginal bonus value increase from increasing risk

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2

Research question

- What happens to bank risk if regulator imposes bonus restrictions?
 - Bonus cap (European Union)
 - Bonus deferral (both in US Dodd-Frank and EU legislation)

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3

A structural model for value of bonuses

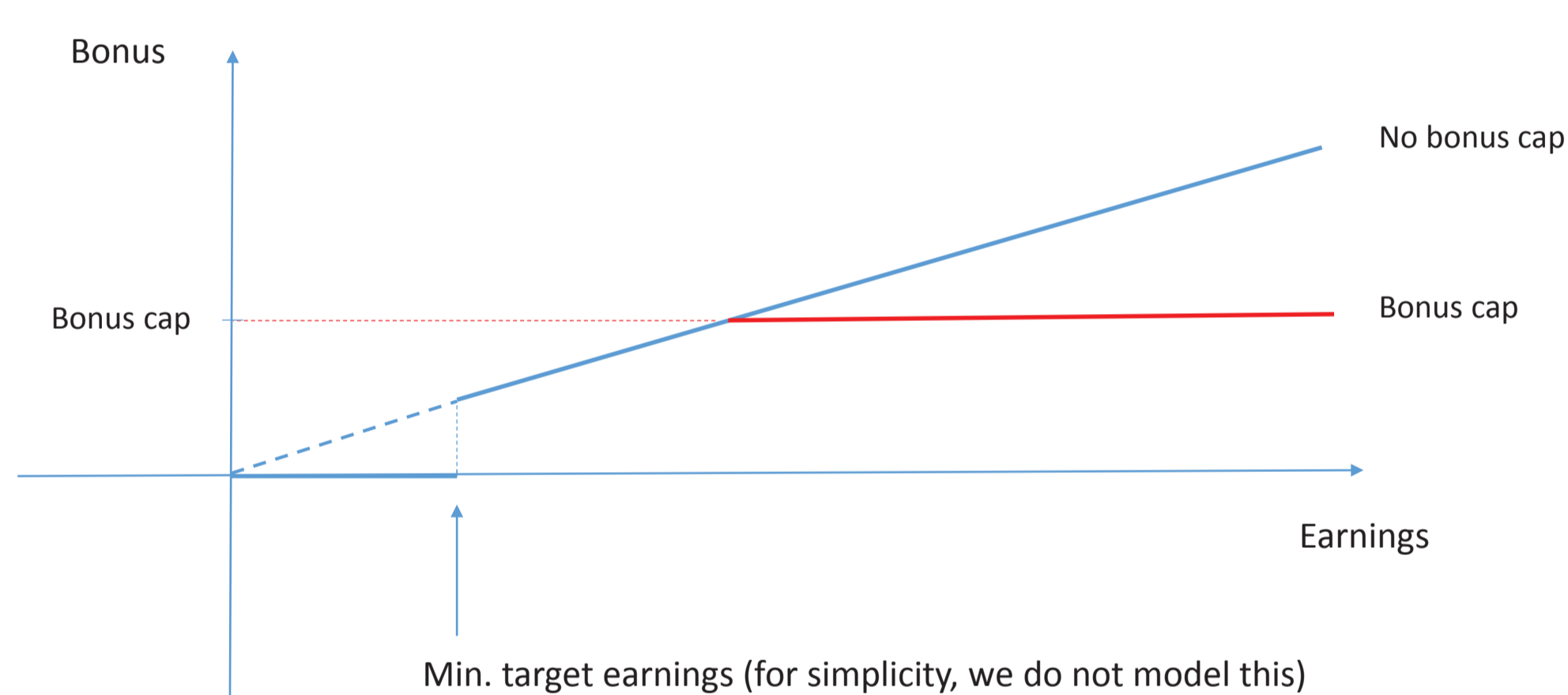
- Solve the present value of a banker's future bonus stream
 - Standard option pricing techniques
 - Assume the banker's tenure is max. 10 (/15) yrs., or less if close to retirement age.
 - In the benchmark case bonuses are paid annually
 - The bank cannot go bankrupt (we also relax this assumption)

$$\begin{aligned} \pi_n &= \sum_{t=1}^n E[\exp(-ri\Delta)\Pi(A(i\Delta), A((i-1)\Delta))] \\ &= \sum_{t=1}^n E[\exp(-ri\Delta)k \max[A(i\Delta) - A((i-1)\Delta), 0]]. \end{aligned}$$

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4

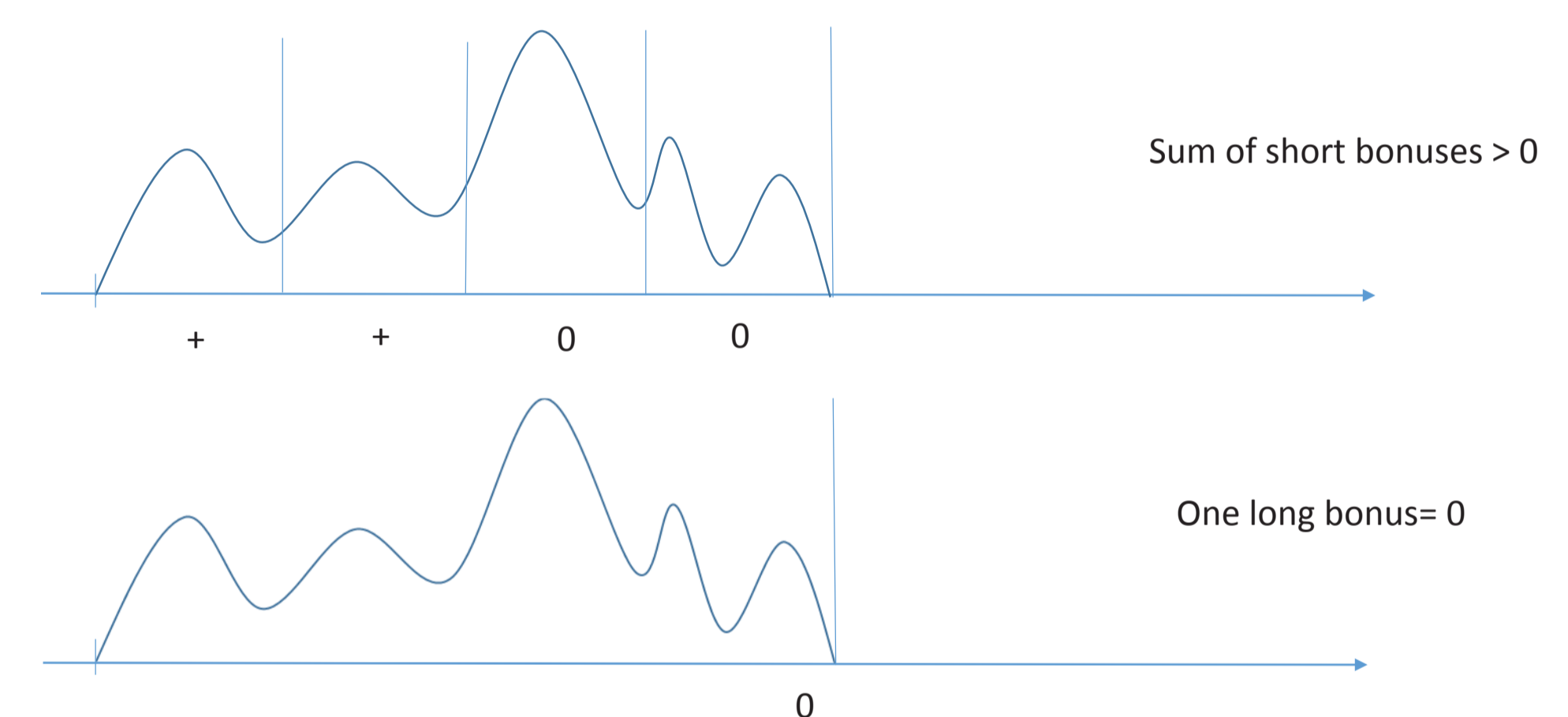
Bonus and bonus cap



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5

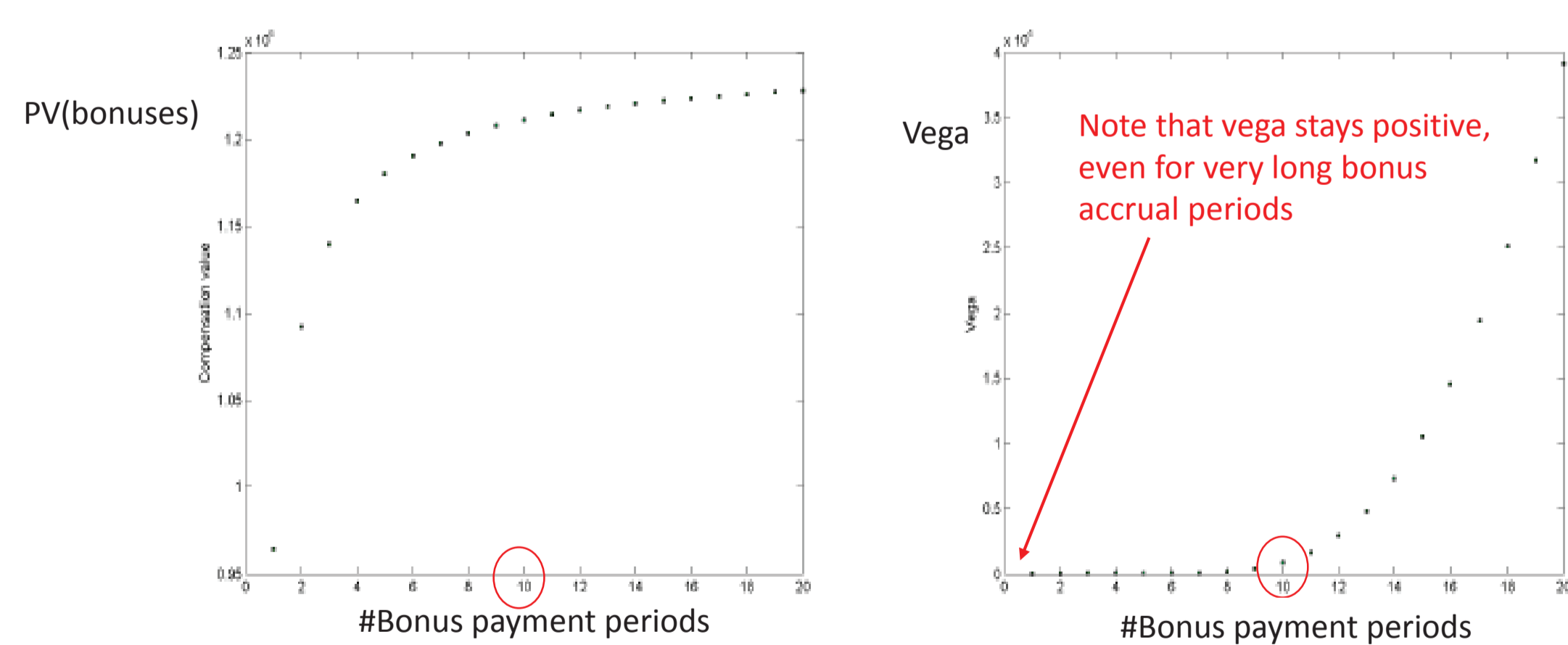
Result 1: Deferral reduces PV(bonuses)



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6

Result 2: Risk-taking incentive (vega of present value) increases if bonus accrual periods are shorter

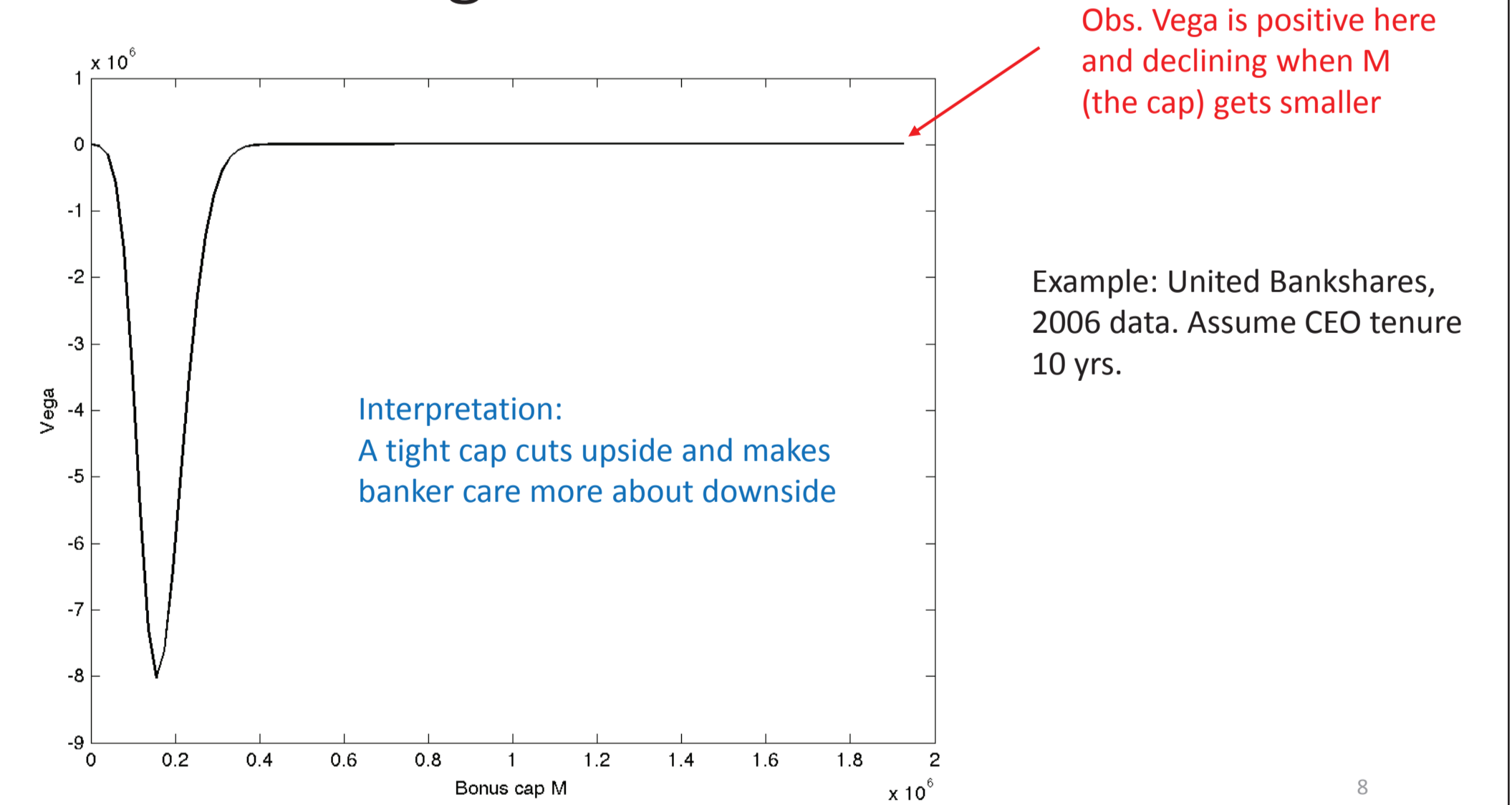


Example: United Bankshares, 2006 data. Assume CEO remaining tenure 10 yrs.

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7

Result 4: Bonus cap can turn vega negative



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8

Calibration and counter-factual analysis

- Data
 - 85 large US banks' balance sheet and CEO compensation (Compustat, Execucomp)
- Assumption: At the end of 2006, bank risk at level which CEO does not want to change ("optimal" level)
- Calibration: Find generic cost parameters which are consistent with this
- Quantitative effect on risk-taking of 1) bonus cap or 2) bonus deferral
 - Bonus cap (EU): 100% of fixed salary
 - Bonus deferral: lengthen bonus accrual period to 2 or 5 yrs
- CEO optimization problem under bonus restriction(s):
 - Max {"PV of bonuses (risk+Δrisk)" - "Cost(Δrisk)"} by choosing Δrisk

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9

Summary of main simulation results

- Bonus cap reduces risk by up to 20% for an average bank
 - assuming that cost of reducing risk is the same as increasing risk
- Bank-specific variation very large, from no effect (0%) to complete risk offloading (100%)
- Bonus deferral has no effect (unless banker is risk-averse)
- The "cap beats deferral" result is robust (w.r.t. adding option grants, internal caps, increasing fixed pay...)

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10