Toulouse School of Economics

FUND MANAGERS' CONTRACTS AND SHORT-TERMISM

Catherine CASAMATTA and Sébastien POUGET
Toulouse School of Economics (IAE and IDEI)

IDEI Conference of the Chair FDIR, may 28-29, 2009

Motivation

- Short-term compensation is often blamed to induce short-termism

Motivation

- Short-term compensation is often blamed to induce short-termism
- Practitioners complain about the difficulty to implement LT strategies

"The big difficulty is that a lot of the reputational issues and environmental issues play out over a very long period of time [...] and if the market isn't looking at it you can sit there for a very long time on your high horse saying 'this company is a disaster, it shouldn't be trusted' and you can lose your investors an awful lot of money…". (SRI fund manager in Guyatt (2006)).

Motivation

- Short-term compensation is often blamed to induce short-termism
- Practitioners complain about the difficulty to implement LT strategies

> "The big difficulty is that a lot of the reputational issues and environmental issues play out over a very long period of time [...] and if the market isn't looking at it you can sit there for a very long time on your high horse saying 'this company is a disaster, it shouldn't be trusted' and you can lose your investors an awful lot of money…". (SRI fund manager in Guyatt (2006)).

- Academic view: Why isn't the market looking at it? Prices should be efficient
- Why should long-term investors care about short-term performance?

Research questions

- What is the link between short-term compensation and short-termism in the context of SRI?
- What is the structure of delegation mandates between long-term investors and fund managers?
- What are the consequences for market efficiency & short-termism?

What we do

- Consider an asset that pays off in the long term
- Model an investor who delegates asset management to a risk averse fund manager
- Actively managing a portfolio is costly and subject to moral hazard
  - Effort to gather relevant information on LT payoff
  - Difficult to say whether a manager is actively searching for information or actively doing nothing
- Study how moral hazard affects LT information acquisition
- Study the design of fund management mandates using asset prices

If you need to leave in 5 min…

- Moral hazard induces short-termism:
  - With moral hazard and risk aversion, investors need efficient short-term prices to incentivize their managers
  - Efficient short-term prices arise if and only if informed trading occurs
  - This cannot happen if prices are too efficient ex ante
- Ambiguity of information precision: Higher precision increases trading profits… but can increase incentive cost
  - Can deter LT information acquisition
  - Can increase fund managers' wages

Related Literature

Toulouse School of Economics

- Prices may not incorporate LT information because:
  - Dow and Gorton (1994): ST traders are not sure that future prices will reveal information
  - Froot, Scharfstein, and Stein (1992): ST traders herd on the same (potentially useless) information
  - Shleifer and Vishny (1990): arbitrage in the long-run is more costly than in the short-run
  - Holden and Subrahmanyam (1996): risk averse investors do not like to hold positions for a long time when prices are volatile
  - Vives (1995): the rate of information arrival matters when traders have ST horizons
- Delegation contracts of fund managers
  - Guembel (2005): short-term mandates to better assess managers' quality
  - Gorton, He, and Huang (2009): moral hazard and mandate structure

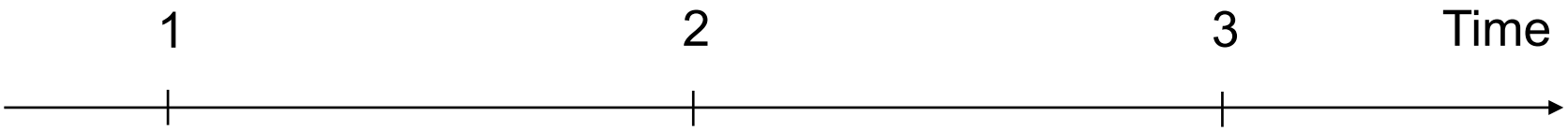
What is different here

- No exogenous short horizon
  - Agents care about the short-term price for incentive reasons only
- Agents can contract with a risk neutral long-term principal
  - Not considered in the previous literature
  - Could relax limited horizon problem or risk aversion
- We study the dynamics of fund managers' compensation

Outline

- A Model
- Benchmark: No Moral Hazard
- Delegation in the Long-Run
- Conclusion

The setting



Investor 1

Manager 1

Effort and signal trading

Market price

P_1

Investor 2

Manager 2

Effort and signal trading

Market price

P_2

v is realized:
1 or 0 with
ex ante prob. 1/2

The fund management industry

Toulouse School of Economics

- Includes investors and managers
- One initial investor is born at each date 1 and 2
- Investors:
  - cannot invest directly (time- or skill- constrained)
  - risk-neutral
- Decide whether to delegate investment to a fund manager

Fund managers

- Fund managers:
  - risk-averse
  - no cash

Fund managers

- Fund managers:
  - risk-averse
  - no cash
- Manager 1 utility function: $U\left(R_1^1\right)+U\left(R_2^1\right)+U\left(R_3^1\right)$
- Manager 2 utility function: $U\left(R_2^2\right)+U\left(R_3^2\right)$
- Utility of a transfer $R \geq 0$: $U(R)=R1_{\{R \leq k\}}+\left\{\gamma(R-k)+k\right\}1_{\{R>k\}}$
- Risk aversion: $\gamma<1$

Managers' information

- Fund managers receive independent private signals s_t (*H* or *L*) regarding *v*
- Binary effort decision: effort (*e*) or no effort (*ne*)
- Effort *e* gives an informative signal at cost c:

$$\Pr_e\left(s_t = H/v = 1\right) = \Pr_e\left(s_t = L/v = 0\right) = \varphi_t > \frac{1}{2}$$

- For simplicity, we assume that $\varphi_1 = \varphi$ and $\varphi_2 = 1$

The financial market

- Hedgers:
  - At each date *t*, a continuum is born with probability ½
  - Income 1 or 0 at date 3, perfectly negatively correlated with *v*
  - Infinitely risk averse
  - Hedgers demand $q_t^h = 1$ unit of risky asset (if they are born)
- Market makers:
  - Risk neutral
  - Compete à la Bertrand to trade the risky asset

Trading process

- Manager (if hired) and hedgers (if born) submit market orders
- If they trade, managers mimic hedgers' behavior ($q_t^m = 1$)
- Market makers observe the buy order flow $q_t = q_t^m + q_t^h$ and the sell order flow
- Market makers set prices equal to the expectation of *v* conditional on:
  - Equilibrium hiring decisions of investors
  - Equilibrium trading strategies of managers

Prices

- If managers only buy when receiving a high signal, prices reveal information only if the order flow is 2 or 0

  - At date 1:

$$P_1(q_1 = 2) = \varphi$$
$$P_1(q_1 = 1) = \frac{1}{2}$$
$$P_1(q_1 = 0) = 1 - \varphi$$

  - At date 2:

$$P_2(q_2 = 2) = 1$$
$$P_2(q_2 = 1) = P_1$$
$$P_2(q_2 = 0) = 0$$

Outline

Toulouse School of Economics

- A Model
- Benchmark: No Moral Hazard
- Delegation in the Long-Run
- Conclusion

Investor *t*'s profit

- Investor *t*'s expected trading profit is:

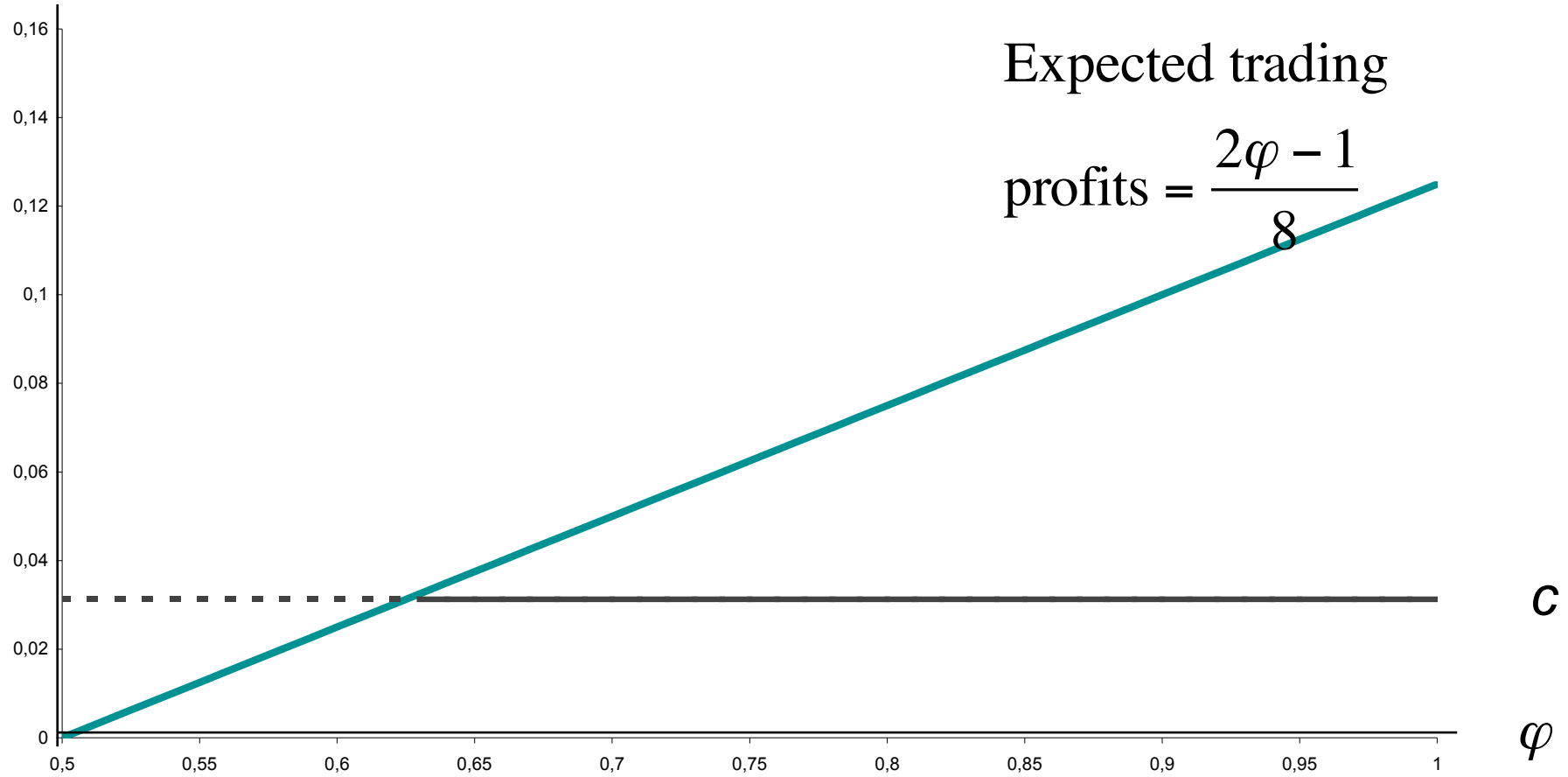
$$\underbrace{\Pr_e\left(s_t = H\right)}_{\text{Manager buys}} \times \underbrace{\Pr_e\left(P_t = P_{t-1} \middle| s_t = H\right)}_{\text{Not spotted by MM}} \times \underbrace{\left[\Pr_e\left(v = 1 \middle| s_t = H\right) - P_{t-1}\right]}_{\text{Expected profit}}$$

$$= P_{t-1}\frac{1}{2}\left[\varphi_t - P_{t-1}\right]$$

- Manager's expected wage is *c* (assuming that $k > c/3$)

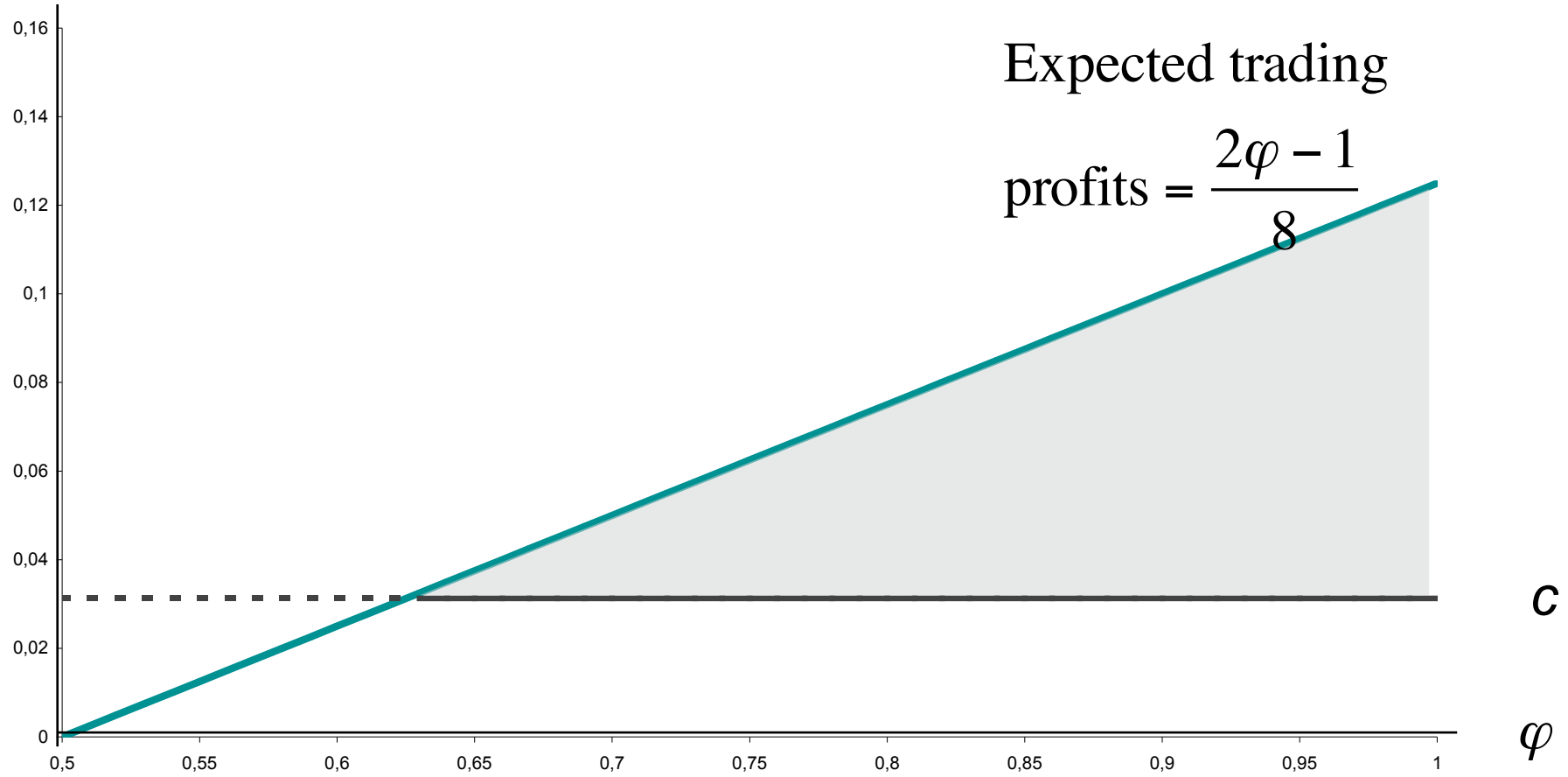
Benchmark: no moral hazard

Investor 1's decision



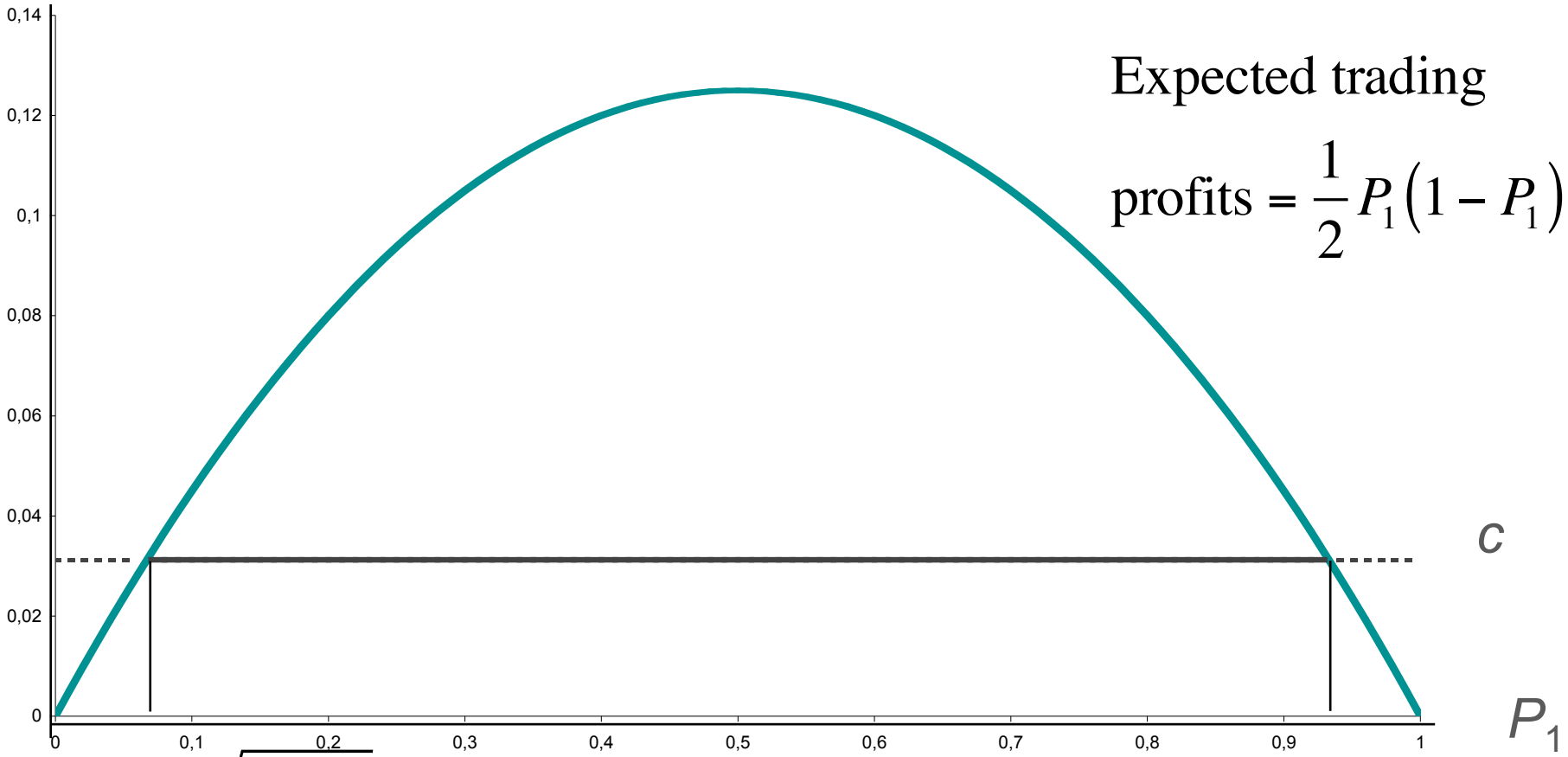
Benchmark: no moral hazard

Investor 1's decision



Benchmark: no moral hazard

Investor 2's decision



Benchmark results

- Investor 1's profit always increases with information precision φ and does not depend on investor 2's decision
- Investor 2's decision does depend on investor 1's decision through market efficiency (in line with Grossman and Stiglitz, 1980): lower expected profit when φ is higher

Outline

- A Model
- Benchmark: No Moral Hazard
- Delegation in the Long-Run
- Conclusion

Moral hazard in the long run

- Effort of manager 1 is not observed
- When designing the contract at date 1, investor 1 anticipates the equilibrium behavior of all agents (at dates 1 and 2) and the level of price P_2
- Contract: $R^1_1(q_m)$, $R^1_2(q_m, P_1, P_2)$, $R^1_3(q_m, P_1, P_2, v)$

Incentive compatibility constraints

- Incentive to buy after observing a high signal: IC_H^1
  - After a high signal, buying should translate into a higher expected utility than doing nothing
- Incentive to do nothing after observing a low signal: IC_L^1
- Incentive to exert effort: IC_e^1
  - Exerting effort and trading appropriately should translate into a higher expected utility than exerting no effort

Price efficiency

- In order to design a contract, investor 1 has to anticipate the level of efficiency of P_2 (that depends on P_1)
  - If investor 2 proposes a contract to her manager (when P_1 is between $\overline{\beta}$ and $\underline{\beta}$), price P_2 reveals v with probability ½
  - otherwise, investor 2 does not propose a contract to her manager and $P_2=P_1$ (P_2 does not convey information)
- The fact that investor 2 proposes or not a contract to her manager affects the expected wage given to manager 1

Investor 1's objective

- Investor 1 proposes the contract that maximizes her expected profit:

$$\underbrace{\frac{2\varphi - 1}{8}}_{\text{Expected trading profit}} - \underbrace{\left(E_e\left[R_1^1\left(q_1^m\right)\right] + E_e\left[R_2^1\left(q_1^m, P_1, P_2\right)\right] + E_e\left[R_3^1\left(q_1^m, P_1, P_2, v\right)\right]\right)}_{\text{Expected compensation of the manager}}$$

Contract at date 1

- The optimal contract offered by investor 1 is such that:

$$\underset{P_1,P_2}{\mathrm{E}}\left\{U\left[R_2^1\left(q_1^m=1,P_1,P_2=1\right)\right]+U\left[R_3^1\left(q_1^m=1,P_1,P_2,v=1\right)\right]\right\}=\frac{\varphi c}{2\varphi-1}$$

$$\underset{P_1,P_2}{\mathrm{E}}\left\{U\left[R_2^1\left(q_1^m=0,P_1,P_2=0\right)\right]+U\left[R_3^1\left(q_1^m=0,P_1,P_2,v=0\right)\right]\right\}=\frac{\varphi c}{2\varphi-1}$$

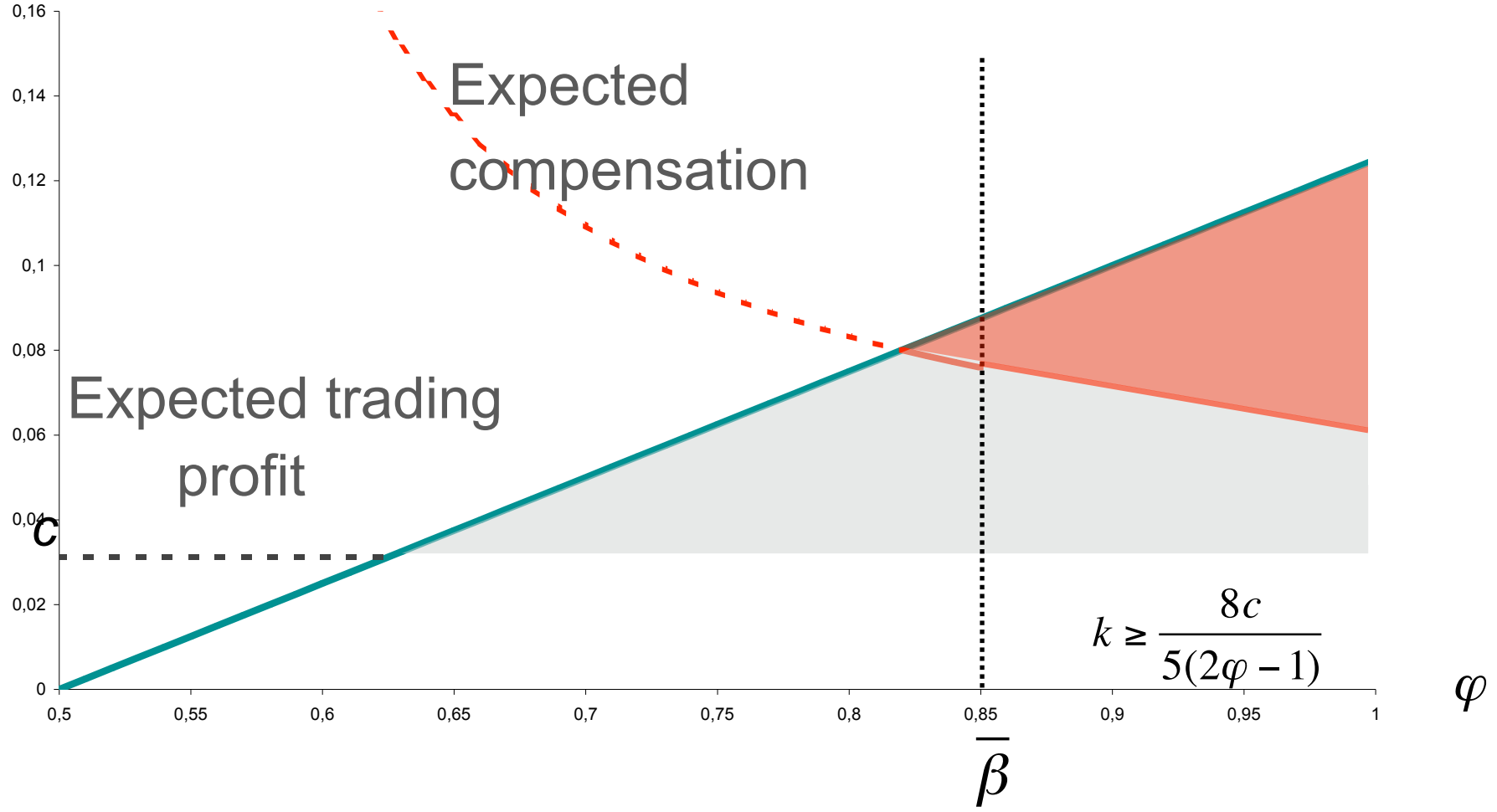
- Manager 1 earns a rent equal to $\dfrac{c}{2\varphi-1}$

- The optimal contract compensates the fund manager when the ST and/or the LT portfolio performance is positive

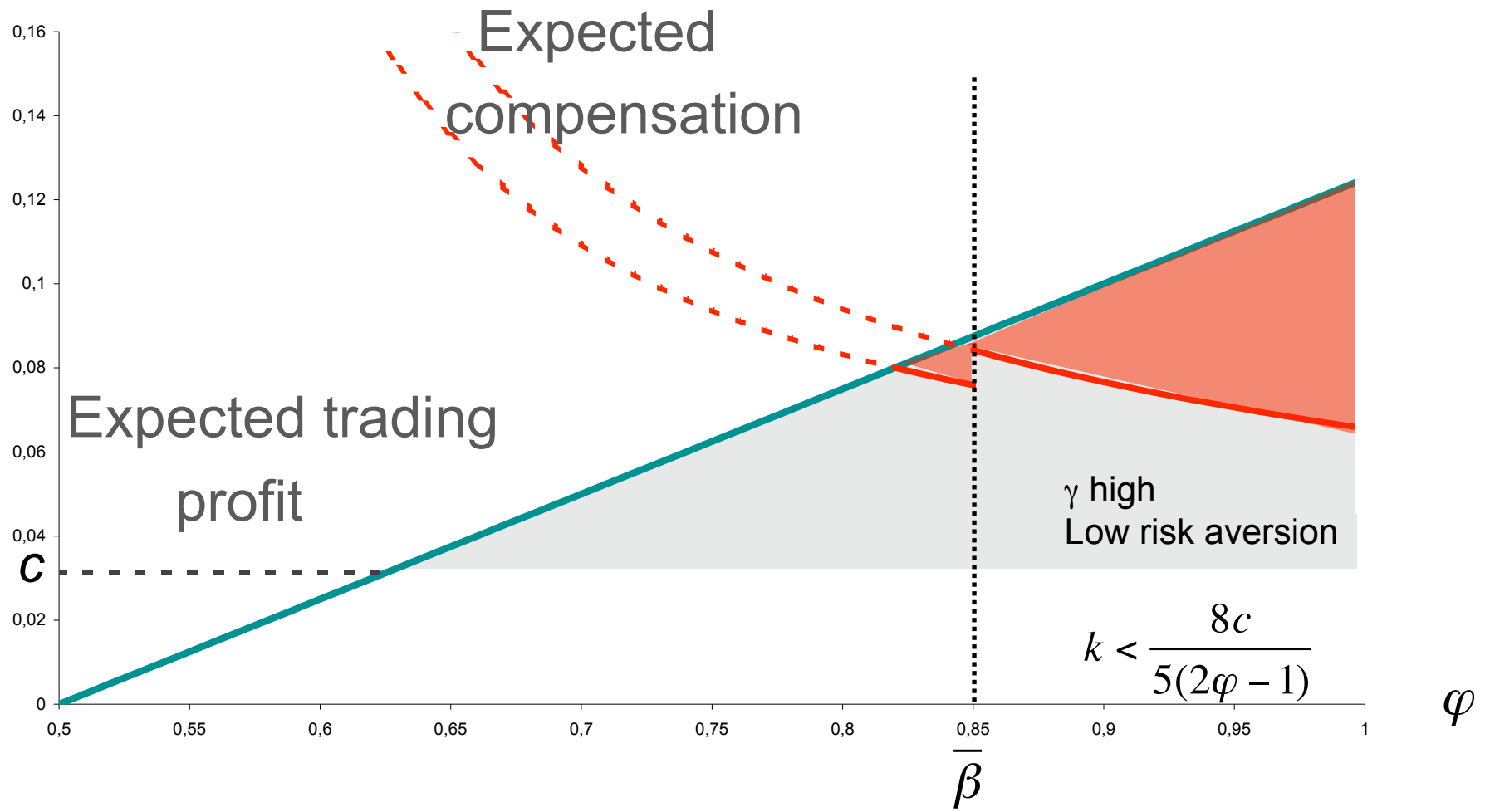
LT and ST compensation

- When risk aversion is high (*k* low), it is necessary to reward the manager both in the LT and in the ST
- Intuition:
  - A large bonus needs to be paid to incentivize the fund manager
  - Because of risk aversion, paying the entire bonus at one period is costly
  - Smoothing the bonus between t=3 and t=2 mitigates the impact of risk aversion
- Implication: ST compensation can be necessary to induce LT information acquisition

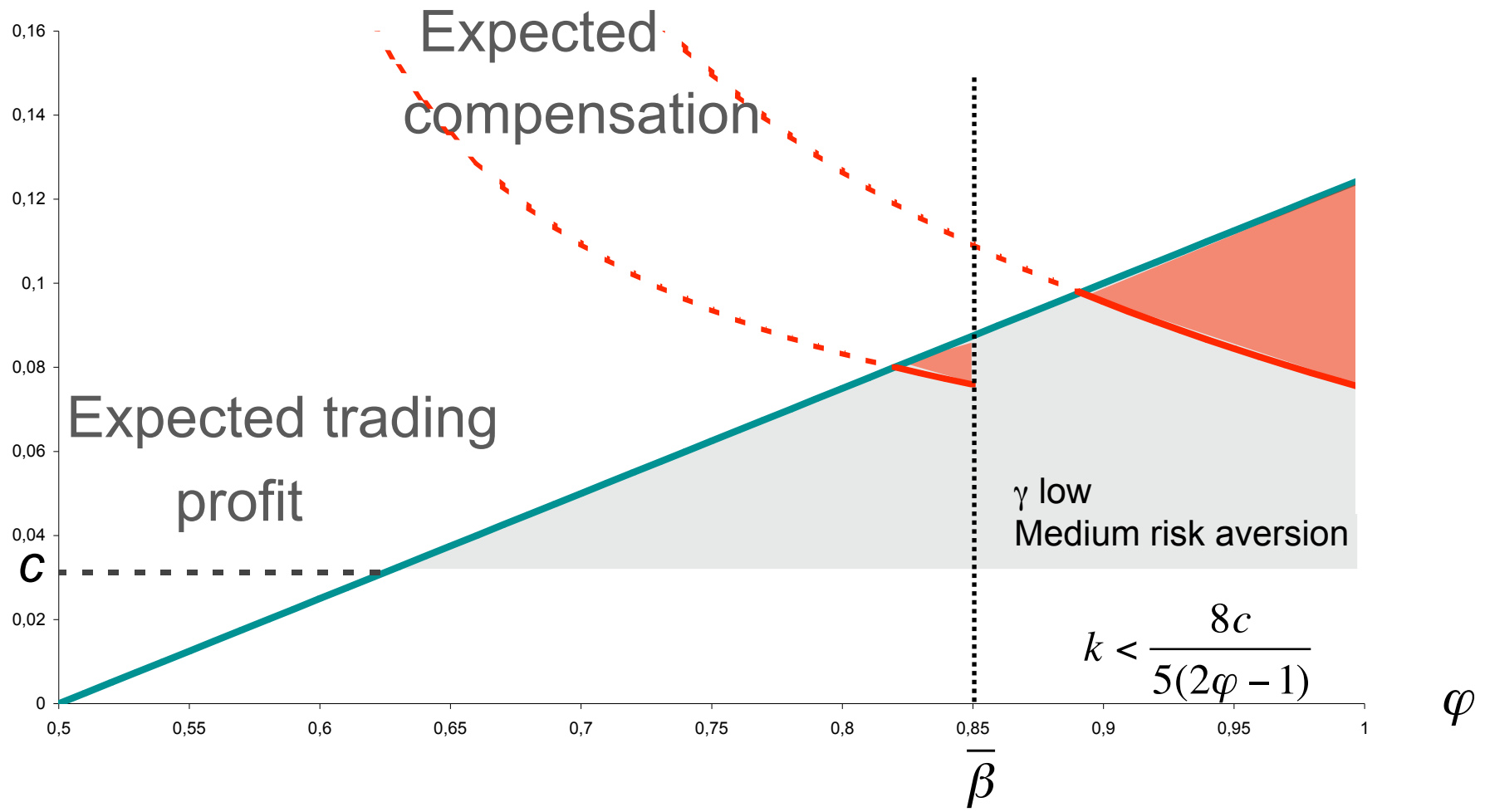
Risk aversion and short-termism



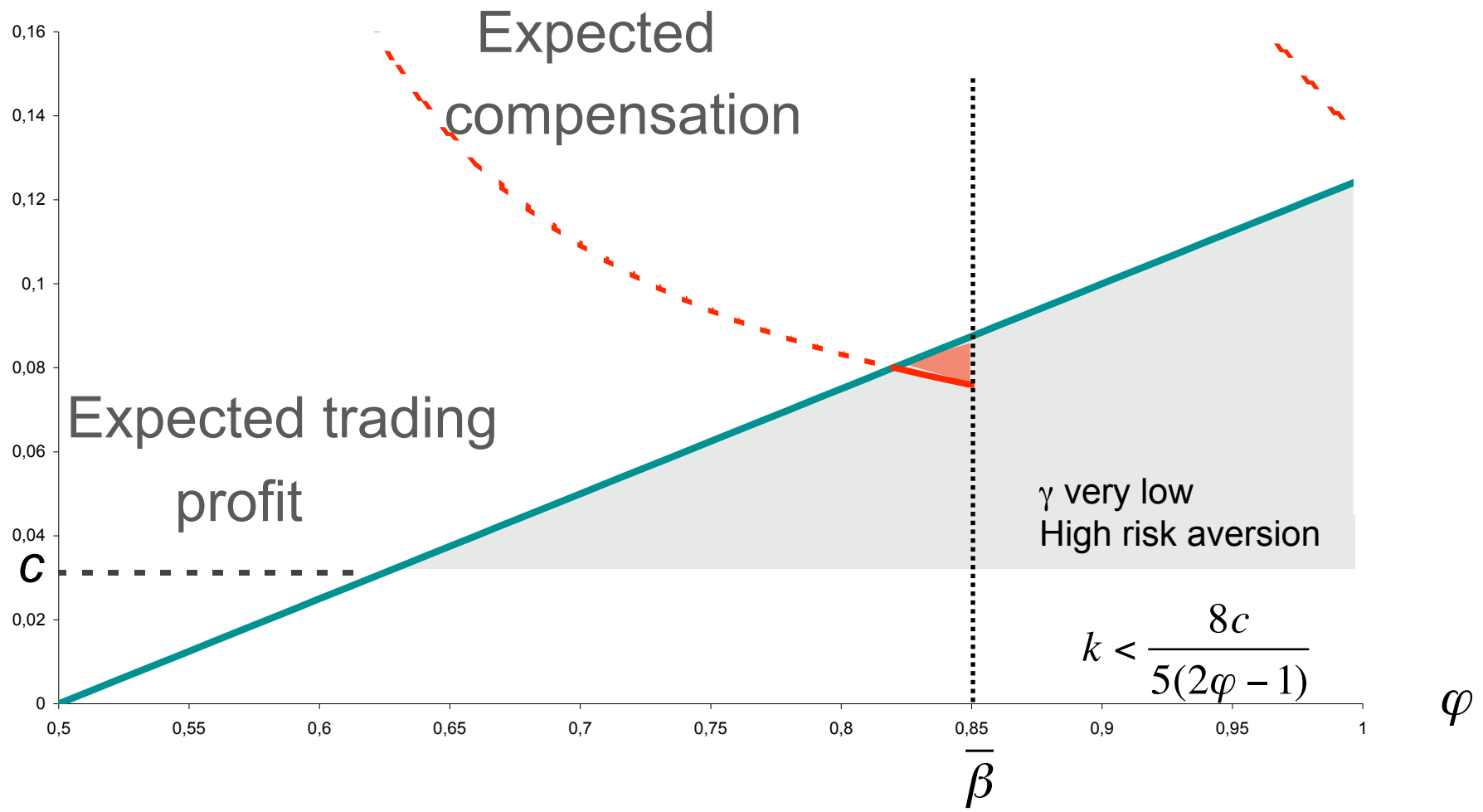
Risk aversion and short-termism



Risk aversion and short-termism



Risk aversion and short-termism



Origins of short-termism

1) Cost of information acquisition compared to trading profit

2) Agency rent due to moral hazard

3) Feedback effect of future fund managers' decisions

$\Rightarrow$1) and 2) decrease with φ

$\Rightarrow$ 3) Increases with φ

Impact of information precision

- Non monotonic relation between LT information acquisition and information precision:
  - Prediction: more LT information for very innovative or very mature industries
- Non monotonic relation between managers' expected wages and information precision:
  - Wages should not necessarily decrease with information precision

Impact of moral hazard

- Moral hazard and information acquisition
  - MH reduces LT information and increases ST information
  - Prediction: less LT information when less proprietary trading

- Moral hazard and price efficiency
  - MH reduces price efficiency at dates 1 and 2
  - Prediction: less price efficiency when less proprietary trading

Impact of market liquidity

- Feedback effect more likely when markets are illiquid
  - More short-termism when investors anticipate illiquidity in the future
  - More long-term information into price in developed markets compared to emerging, illiquid markets

Conclusion

- Study how a long-term investor can provide incentives to a risk averse fund manager
- Short-termism arises in equilibrium because of:
  - Moral hazard
  - Negative externality across investors over time through market efficiency
- Implications concerning: timing of information acquisition, fund managers' wages, and price efficiency according to the market structure
- Next step is social welfare: cost of short-termism?

Risk aversion and expected compensation

- Assume that the fund manager is not very risk-averse

$$k \geq \frac{8c}{5(2\varphi - 1)}$$

- The expected compensation is:

$$E(R) = \frac{2\varphi c}{2\varphi - 1} \quad \forall \varphi$$

Risk aversion and expected compensation

- If the fund manager is more risk averse

$$k < \frac{8c}{5(2\varphi - 1)}$$

- The expected compensation is:

$$\text{if } \varphi \le \overline{\beta} \begin{cases} E(R) = \dfrac{2\varphi c}{2\varphi - 1} \text{ if } k \ge \dfrac{8c}{6(2\varphi - 1)} \\ E(R) = \dfrac{1}{\gamma}\left(\dfrac{2\varphi c}{2\varphi - 1} - \dfrac{\varphi}{4} 6k(1-\gamma) \right) \text{ if } k < \dfrac{8c}{6(2\varphi - 1)} \end{cases}$$

$$\text{if } \varphi > \overline{\beta}, E(R) = \frac{1}{\gamma}\left(\frac{2\varphi c}{2\varphi - 1} - \frac{\varphi}{4} 5k(1-\gamma) \right)$$

Incentive compatibility constraints (1/2)

- Incentive to buy after observing a high signal: IC_H^1

$$E_e\left(\sum_{t=1}^{3} U\left[R_t^1\left(q_m^1=1\right)\right]\middle| s_1=H\right) \geq E_e\left(\sum_{t=1}^{3} U\left[R_t^1\left(q_m^1=0\right)\right]\middle| s_1=H\right)$$

Incentive compatibility constraints (2/2)

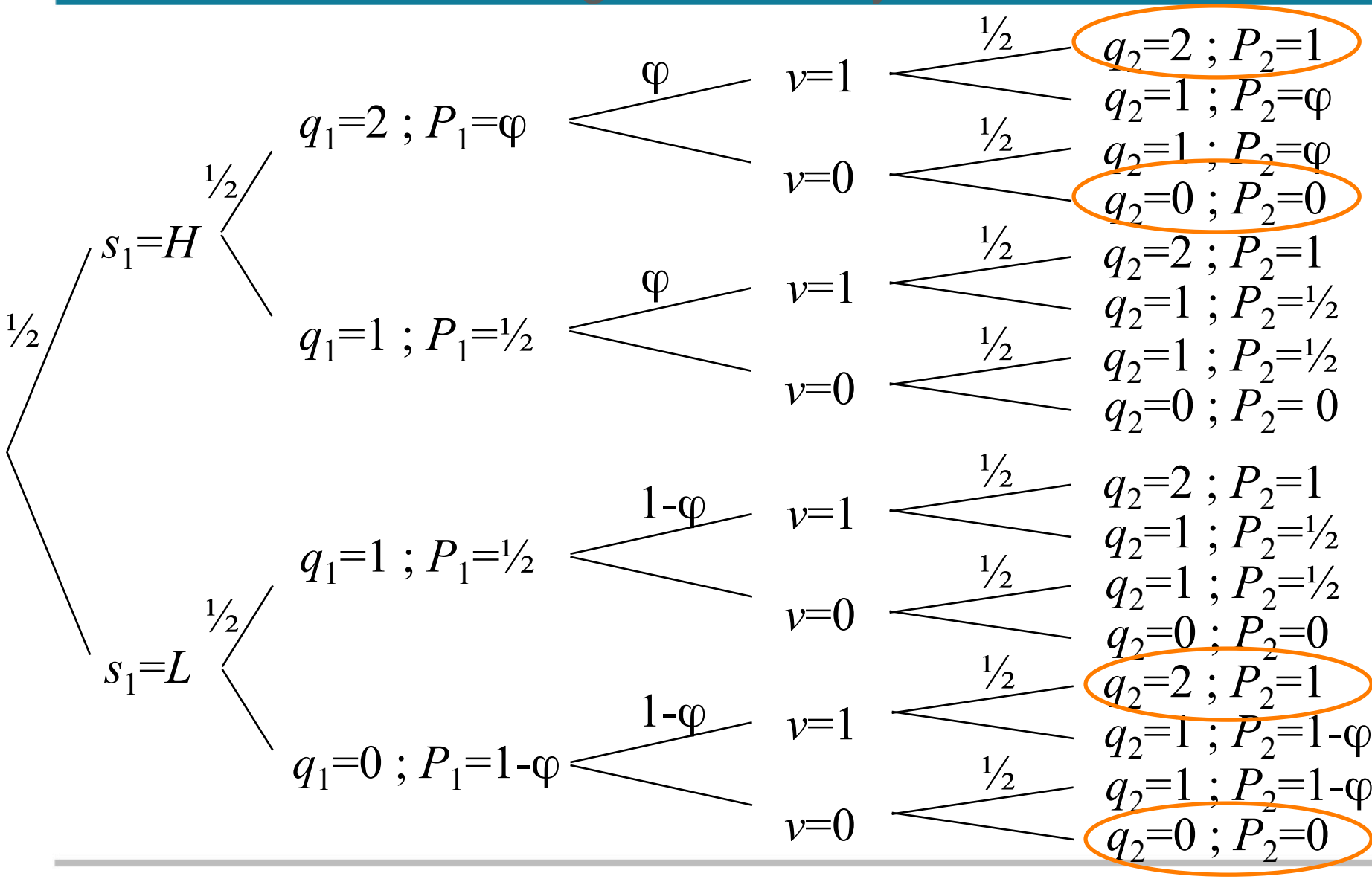
- Incentive to exert effort: IC_e^1

$$\Pr_e\left(s_1 = H\right)E_e\left(\sum_{t=1}^{3} U\left[R_t^1\left(q_m^1 = 1\right)\right]\right) + \Pr_e\left(s_1 = L\right)E_e\left(\sum_{t=1}^{3} U\left[R_t^1\left(q_m^1 = 0\right)\right]\right) - c \geq$$

$$\max_{q_m^1} E_{ne}\left(\sum_{t=1}^{3} U\left[R_t^1\left(q_m^1\right)\right]\right)$$

Delegation in the long-run

Outcomes when manager 2 is always offered a contract: $\varphi \leq \overline{\beta}$



Delegation in the long-run

Outcomes when manager 2 is not always offered a contract: $\varphi > \overline{\beta}$