tourists are a flock of sheep! revisiting herd behavior in purchasing tourism services

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motivation and research questions

- confess: how many times did you not enter in a restaurant because it was too empty?
- it is a common reason to argue with own partners
- i therefore decided to write a paper to convince her that in most cases empty or full restaurants are not qualitatively different
- why are we attracted by restaurants with people queuing up?
- is it rational to do it?
- if yes, how do empty restaurants survive?
- when is the queue a reliable signal of quality?
- what is the best strategy for a restaurant?

introduction

- sometimes actions speak louder than words

  we often decide on what stores and restaurants to patronize or what schools to attend on the basis of how popular they seem to be (Banerjee, 1992, p. 797)

- a commonly observed behaviour
  - ✓ apparently irrational and imitating individual behaviour
  - ✓ individual decisions are affected by what other people are doing
  - ✓ herding: everyone does what everyone else is doing
- herding can be the equilibrium behaviour of rational players
  - ✓ what other people are doing reflects information they (do not) have
  - ✓ this information may dominate a player's own private information
- however, herding is inefficient
  - ✓ information of late movers is not used
  - ✓ it is possible that all the agents made the wrong choice

review of the literature

- ✓ Banerjee (1992); Bikhchandani et al. (1992); Welch (1992)
  … and the followers!
- ✓ Bikhchandani and Sharma (2000)
- ✓ Devenow and Welch (1996) and a few others

several applications

- ✓ financial bubbles, self-fulfilling crises, contagions and bank runs
- ✓ fads and fashions
- ✓ investment decisions; technology adoption
- ✓ crime and politics...
- ✓ … but no application to the tourism case

the basic model (1)

- think about the typical setting of a mass tourism destination with many competing and similar activities (e.g. the seaside avenue, with dozens of restaurants with the same menu and the same price)
  - why do crowded and empty tourism activities coexist in the same place? and how do empty restaurants survive in the long run?
  - sometimes tourists are a flock of sheep
- the restaurants' quality is unknown, it can be high (*H*) or low (*L*).
- incomplete set of information: the dinner is an experience good
  - ✓ uniform prior: each restaurant is evenly likely to be *H* or *L*
  - with probability p the signal is correct, with probability $(1-p)$ the signal is incorrect

the basic model (2)

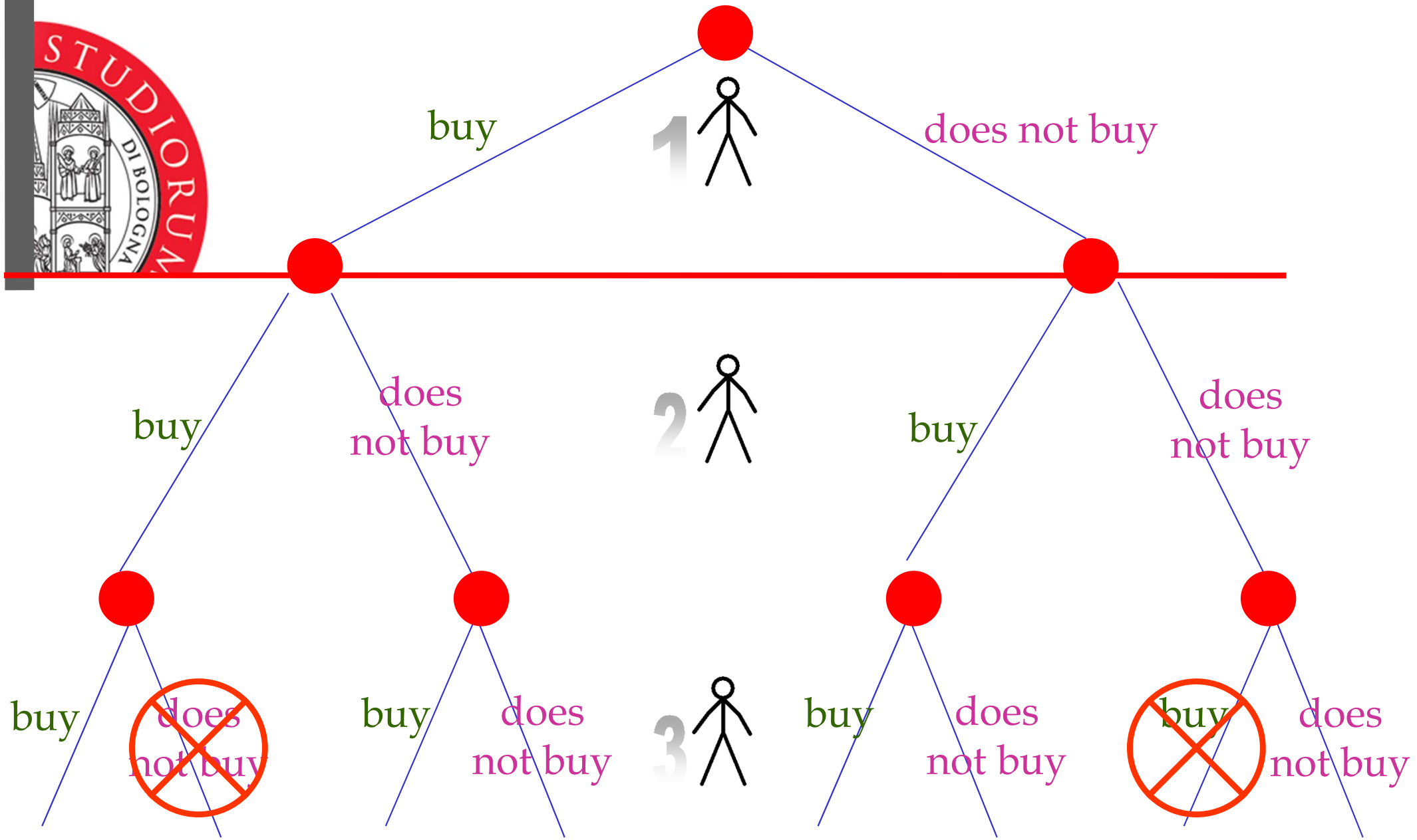
- N new and homogeneous tourists arrive every period (day, week)
- each of them has to select among a set of K restaurants (actions are discrete)
- the restaurants can serve a maximum of S tourists
  - the average number of seats in each restaurant is S/K
  - the probability tourists select randomly a restaurant is N/S
- sequential decision making
  - exogenous order of tourists
  - each person is able to observe the decision of the people who moved before him, but not the signals they own
- adoption cost is symmetric and equal to $C = ½$

the basic model (3)

- ✔ consumption of the service provides a benefit V to tourists:
  - V=1 if the good is H, with prior probability q_i
  - V=0 if the good is L, with prior probability $(1-q_i)$.
- ➢ decision based on two sets of information:
  - ✓ a privately owned signal on the quality
    - signals are informative but imperfect and they are conditionally independent
    - the private information is correct with probability p
      - $p = 1$ → perfect and complete information
      - $½ < p < 1$ → the signal is wrong with some probability
      - $p = ½$ → noisy and uninformative signal
  - ✓ behaviour of previous agents
    - each person observes the choices made by former agents
- ✔ cascade occurs if the agents do not use own quality signal and base their choices by looking at what previous agents did (Bayesian Nash equilibrium)

the basic model (4)

- the first agent
  - ✓ buys if his signal says the service is *H* (when $p = 1/2$, random choice)
- the second agent
  - ✓ buys if her and the 1st mover's signals are both *H*
  - ✓ if her signal is *H* whereas the 1st mover's signal was *L*, she decides randomly (with prob. ½)
- the third agent
  - ✓ if the 1st and the 2nd movers bought the service, he buys it too, regardless his signal (UP cascade).
  - ✓ if the 1st and the 2nd movers disagreed, he uses only his private signal.
- the fourth agent
  - ✓ herds if all the previous agents bought (or did not buy)
  - ✓ behaves as the 2nd mover if the first two agents behaved differently
- … and so on…



the basic model (6)

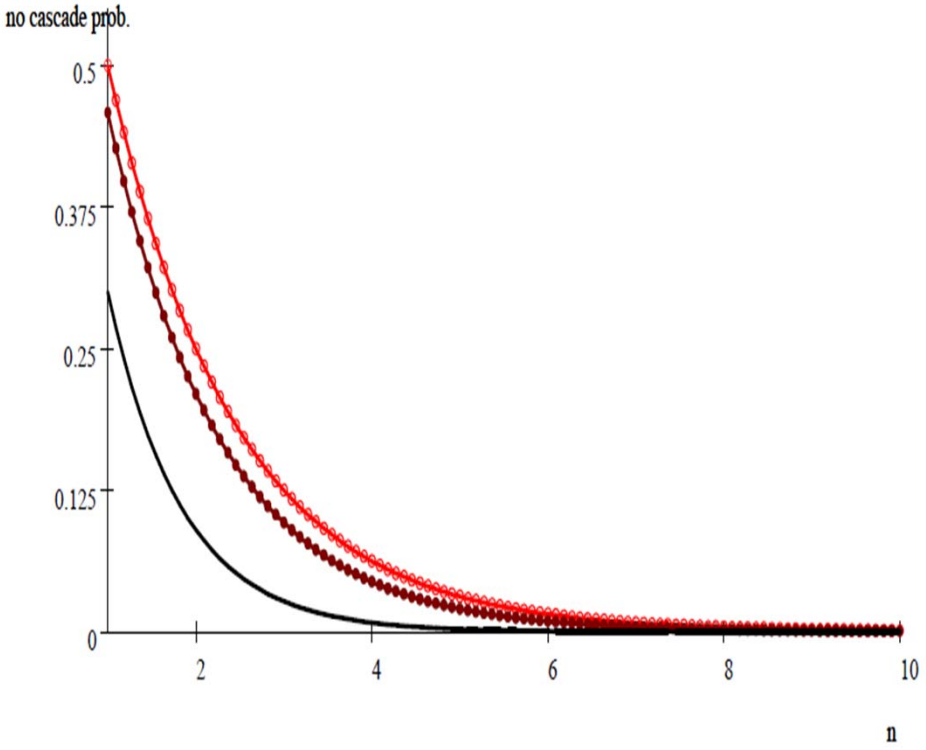
unconditional ex-ante probability:

$$\text{UP cascade:} \quad \frac{1-(p-p^2)^{n/2}}{2}$$

$$\text{DOWN cascade} \quad : \quad \frac{1-(p-p^2)^{n/2}}{2}$$

$$\text{NO cascade} \quad : \quad (p-p^2)^{n/2}$$

the probability of avoiding a cascade strongly decreases with *n* and *p*:



the basic model (7)

conditionally on tourists' information, the probabilities of ending up with the (in)correct cascade are:

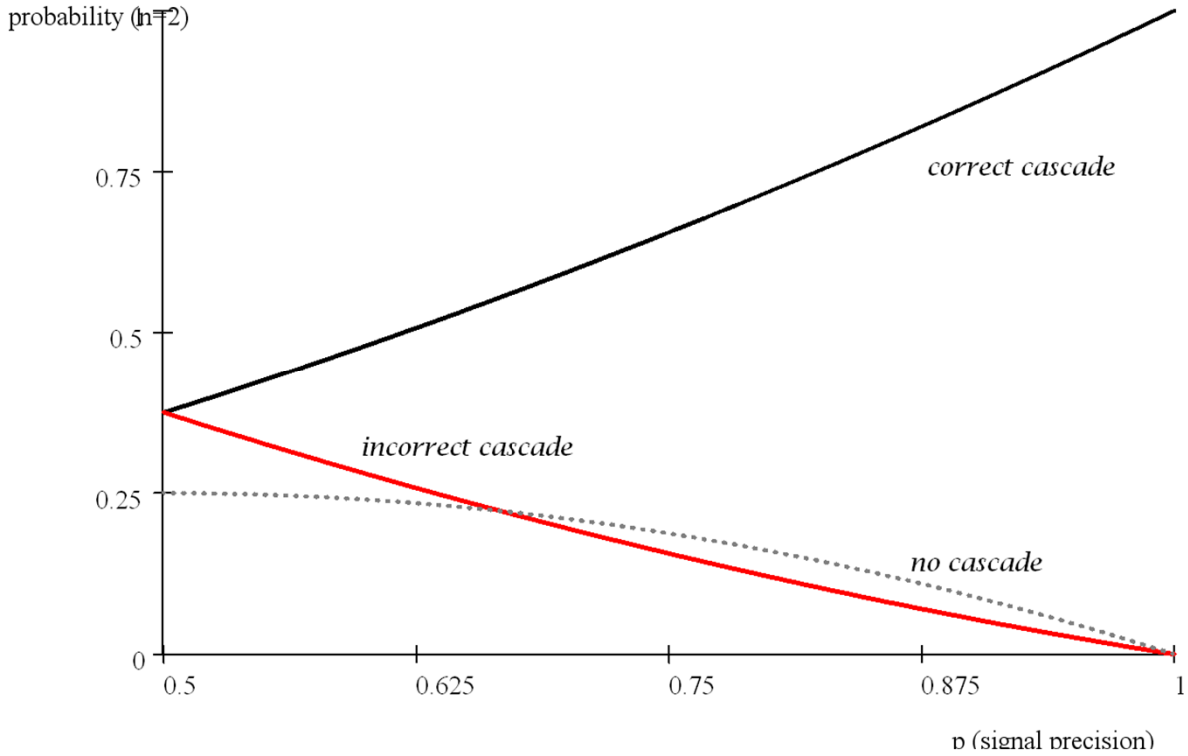
$$\text{correct UP cascade} \quad : \quad \frac{p(p+1)[1-(p-p^2)^{n/2}]}{2(1-p+p^2)}$$

$$\text{incorrect DOWN cascade} \quad : \quad \frac{(p-2)(p-1)[1-(p-p^2)^{n/2}]}{2(1-p+p^2)}$$

$$\text{NO cascade} \quad : \quad (p-p^2)^{n/2}$$

the basic model (8)

the more accurate the signal, the larger the probability to fall in the correct cascade



the more imprecise the signal, the larger the probability to avoid cascades and to end up in the wrong cascade

the extended model (1) – consequences on profits

- assume that tourists herd, following the basic model
- why do restaurants survive and do not close down even if they are observed to be empty?
  - if tourists change, the game restarts at any period of time
- what would be the consequence on the profitability of restaurants?
  - restaurants' expected profit is conditional on the quality served:

$$E[\pi_H] = \frac{p(p+1)[1-(p-p^2)^{n/2}]}{2(1-p+p^2)}\frac{N}{S}\left(\frac{S}{k}m-\frac{S}{k}c_H\right)-C_H$$

$$E[\pi_L] = \frac{(p-2)(p-1)[1-(p-p^2)^{n/2}]}{2(1-p+p^2)}\frac{N}{S}\left(\frac{S}{k}m-\frac{S}{k}c_L\right)-C_L$$

the extended model (2)

a restaurant will supply high quality meals, given a uniform price *m*, if:

$$E\ [\pi_H] > E[\pi_L]$$

$$-[c_H - c_L]\frac{S}{k}p^2 \quad + \quad [4m - (c_H + 3c_L)]\frac{S}{k}p - 2\left(\frac{S}{k}m - \frac{S}{k}c_L\right) > 0$$

which roots in *p* are, with $p \in [0,1]$:

$$p_1 = \frac{1}{c_L - c_H}\frac{1}{2}\left[c_H + 3c_L - 4m - \sqrt{14c_H \cdot c_L - 16m \cdot c_H - 16m \cdot c_L + c_H^2 + c_L^2 + 16m^2}\right] \quad (P0)$$

$$p_2 = \frac{1}{c_L - c_H}\frac{1}{2}\left[c_H + 3c_L - 4m + \sqrt{14c_H \cdot c_L - 16m \cdot c_H - 16m \cdot c_L + c_H^2 + c_L^2 + 16m^2}\right] \quad (P1)$$

the extended model (3)

the maximum differential costs due to quality gap, acceptable to stimulate investments in quality is:

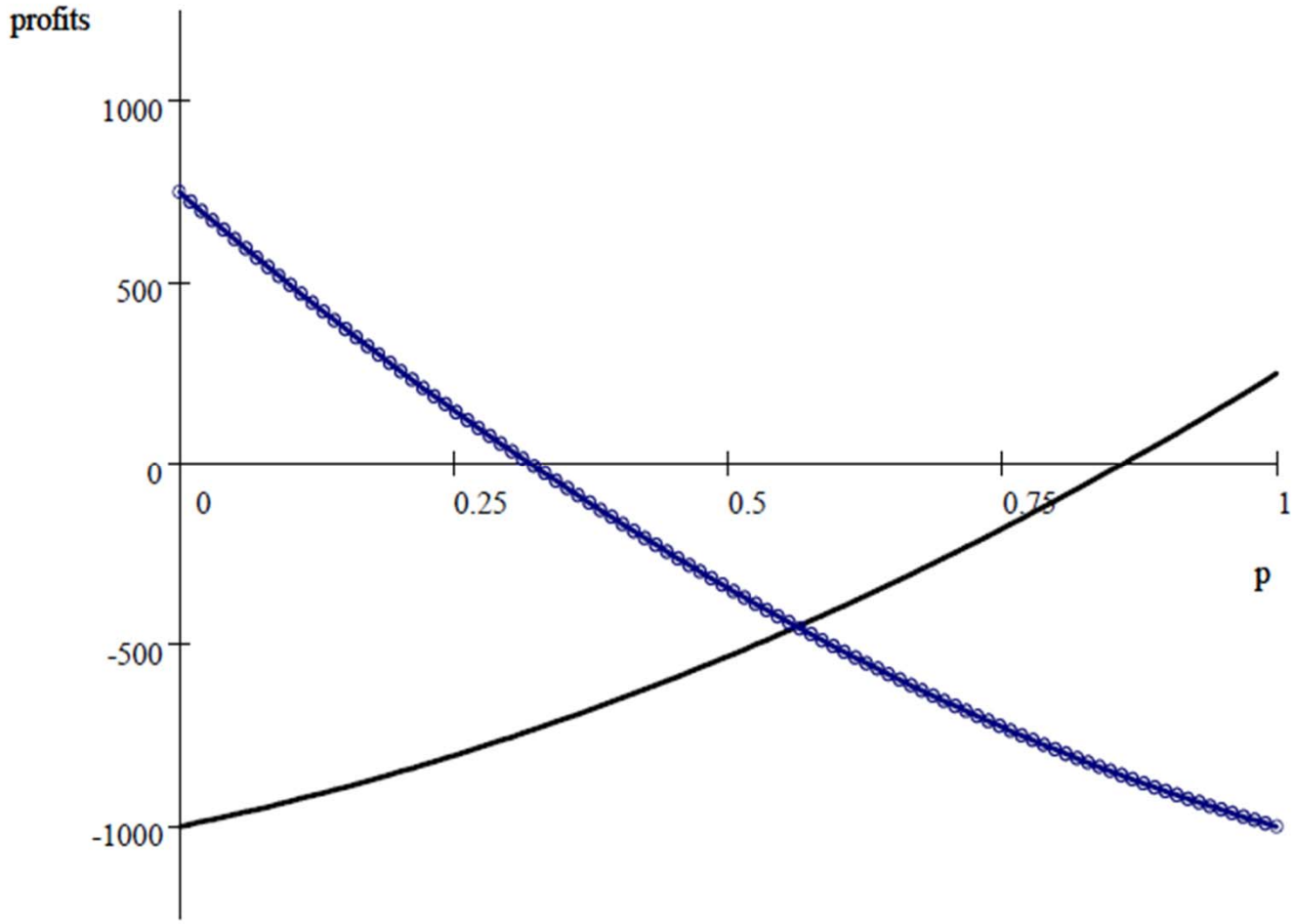
$$c_H - c_L < \frac{2(1-2p)(c_L - m)}{(1+p)p}$$

therefore, restaurants invest in high-quality food only if the difference in variable costs due to the quality of food served is less than a critical threshold

simulation

- $c_H=100$
- $c_L=80$
- $m=150$
- $S=5000$
- $k=100$
- $N=2500$
- $C_H=C_L=1000$

it is likely that investing in *H* is not profitable for low values of *p*.



other extensions of the model (1)

- what if tourists love the crowd (band-wagon effect)?
  - the observation becomes a precise and correct signal: $H=H(S/k)$
  - probability of having a correct cascade = 1
  - no incentive for investing in the quality of the service
  - strong incentive for investing in happy hours, early birds and buddy customers
  - demarketing policies, in order to increase queuing (http://www.theguardian.com/lifeandstyle/2013/nov/03/eat-out-queue-for-table)

other extensions of the model (2)

- has the behaviour changed following the ICT revolution?
- what if tourists use mobile apps to choose and to spread the e-word-of-mouth?
  - theoretically, this brings $p = 1$,
  - a new (separating) equilibrium with two segments of different quality and different price arises
  - empirically, how reliable is the signal?
  - look into the average and the inequality of evaluations in TripAdvisor and in Booking.com

conclusions

- application of informational cascade to tourism
- simple explanation of empirical evidence in many tourism contexts
- public and private policy recommendations
- further research: empirical analysis
  - 1. observation of tourists in mass tourism destinations
  - 2. analysis of e-word-of-mouth
- as for the main motivation of the paper, I keep arguing with my partner in front of restaurants, her looking TripAdvisor, me waving this paper...

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THANK YOU

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