



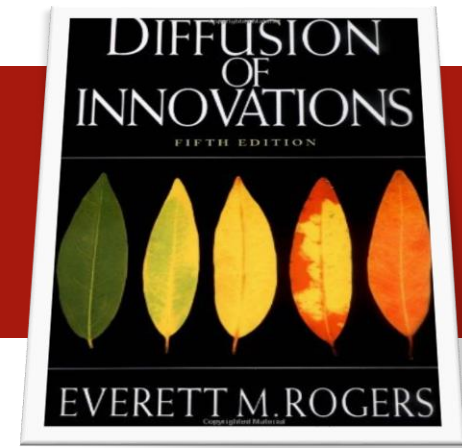
Wrocław University of Technology

Two faces of word-of-mouth

Understanding the impact of social interactions
on demand curves for innovative products

Katarzyna Byrka, Karolina Ćwik, Arkadiusz Jędrzejewski,
Anna Kowalska-Pyzalska, Tyll Krueger, Katarzyna Maciejowska,
Paul Nail, David Ramsey, Katarzyna Sznajd-Weron, Rafał Weron

Regensburg, 09.03.2016



The S-shaped curve

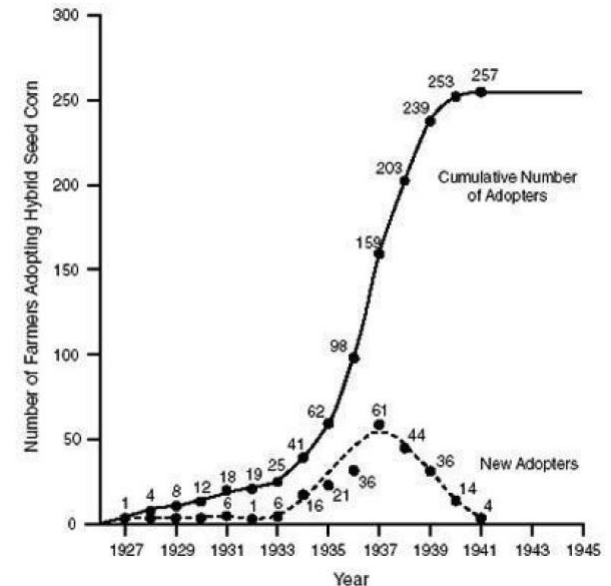
- **Diffusion of innovations**

- a process in which an innovation is communicated through certain channels over time among the members of a social system

- **Innovation**

- an idea, practice, object that is perceived as new

Everett M. Rogers (1931 –2004)
known for originating the diffusion
of innovations theory (1962)

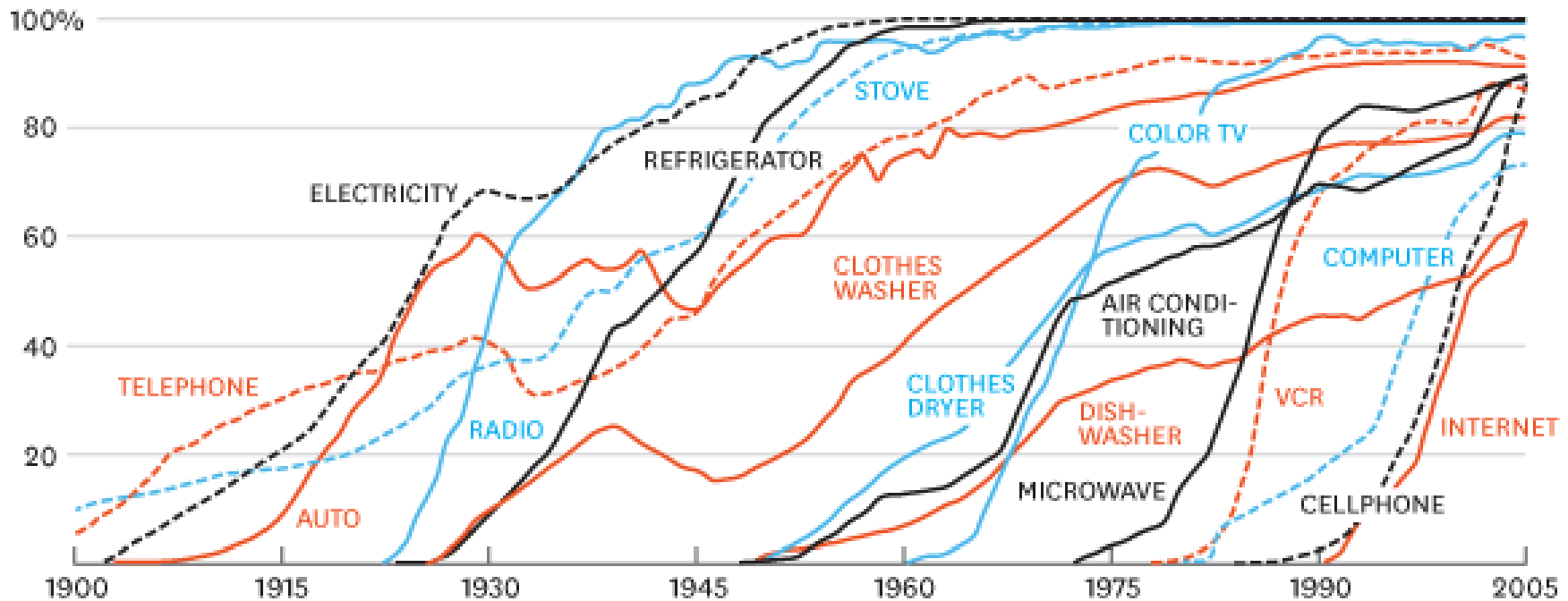




Patterns of successful innovation diffusion

Market penetration (Q)

PERCENT OF U.S. HOUSEHOLDS



SOURCE MICHAEL FELTON, THE NEW YORK TIMES

HBR.ORG

Questions asked ...



- How innovations spread in the society?
- Why does it take sometimes so long?
- Why does it fail sometimes? → *valley of death*
- Why does it fail after a promising start?
- What helps it to diffuse? The network?
- How and why is the critical mass reached?
- **What is the main driving factor?**



How can we get people to save electricity?

TED

Watch

Read

Attend

Participate


About

Alex Laskey:

How behavioral science can lower your energy bill

TED2013 · 8:11 · Filmed Feb 2013

Subtitles available in 35 languages

 [View interactive transcript](#)



Share this idea



934,310 Total views

OP@WER



How can we get people to save electricity?

- Behavioral experiment run in a hot summer in San Marcos, CA
- Different messages:
 - Some homes received a message that said: *Did you know that **you can save \$54** a month this summer? Turn off your air conditioning and turn on your fan* → **financial incentive**
 - “Save the planet” → **ecological**
 - “Be a good citizen & prevent blackouts” → **socially desired**
- **Which message worked?**

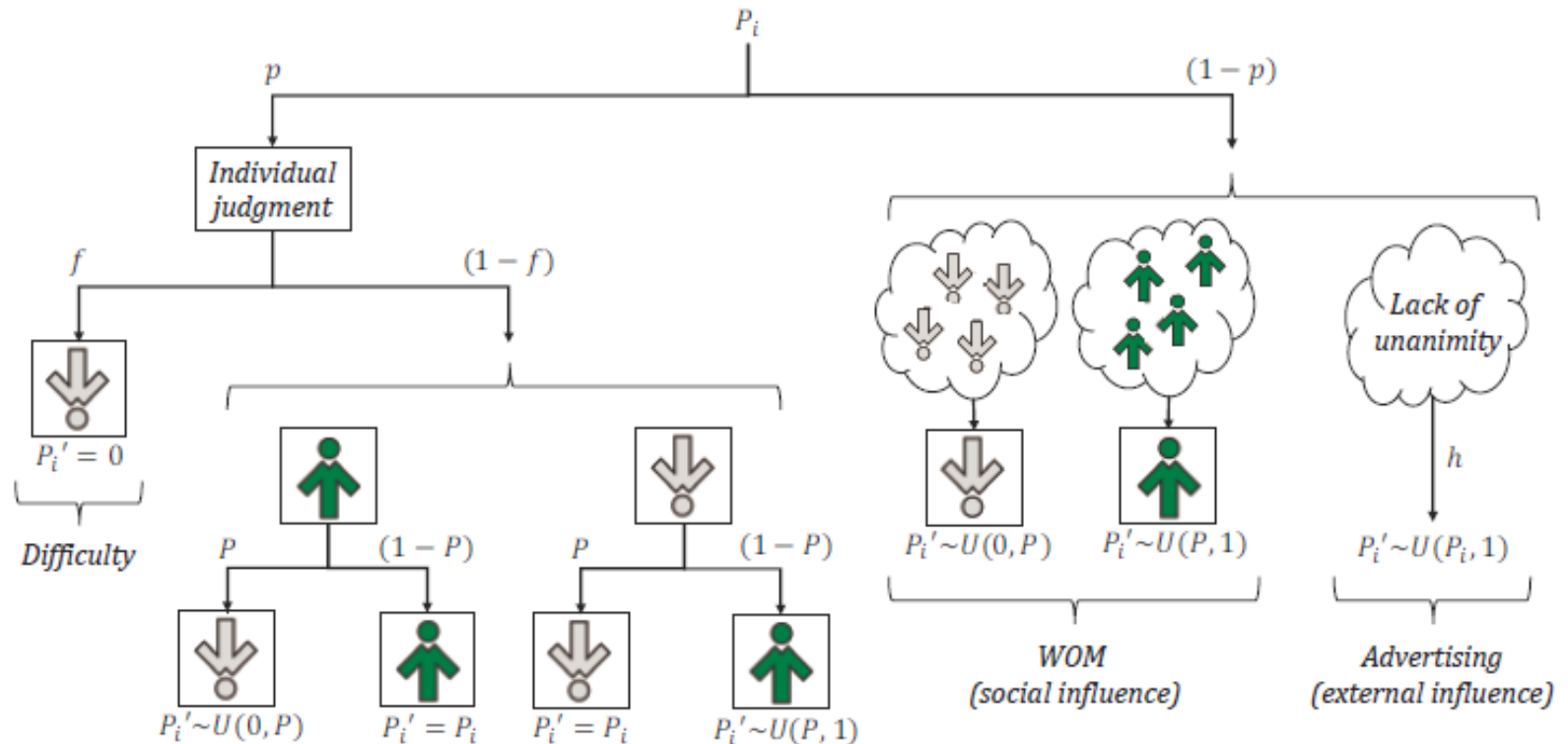


It's social pressure stupid!

- *77% of your neighbors said that they turned off their air conditioning and turned on their fans. Please join them by turning off your air conditioning and turning on your fan*



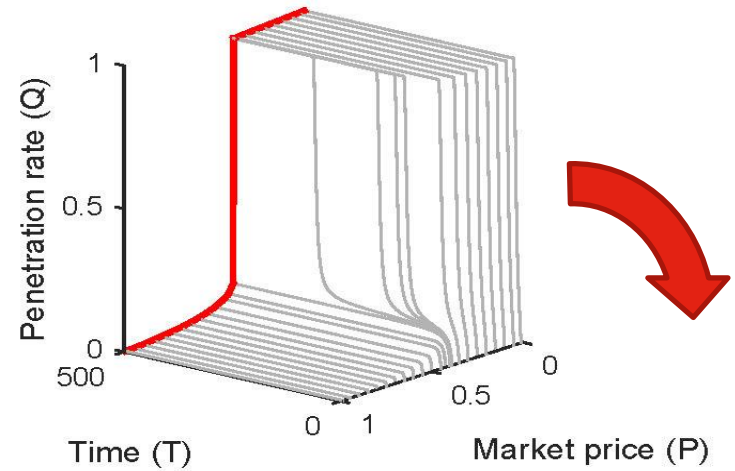
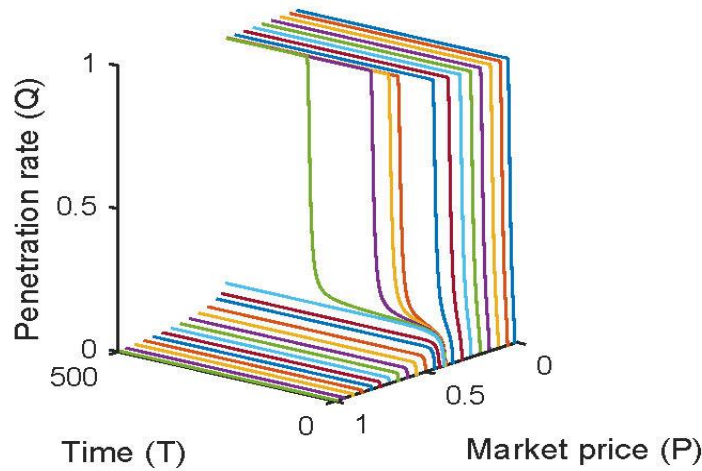
The model



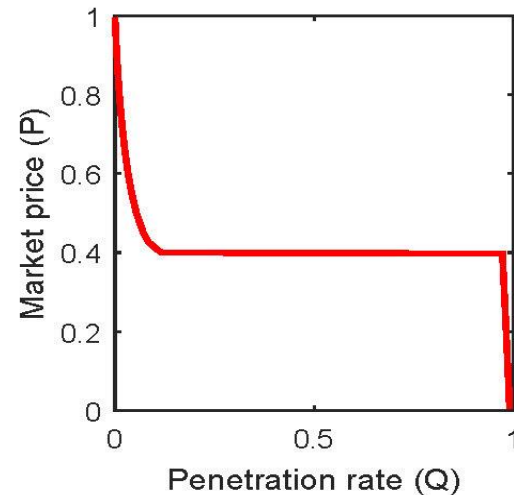
Reservation price (P_i), marginal price, willingness-to-pay is the maximum amount that a buyer will pay for the good



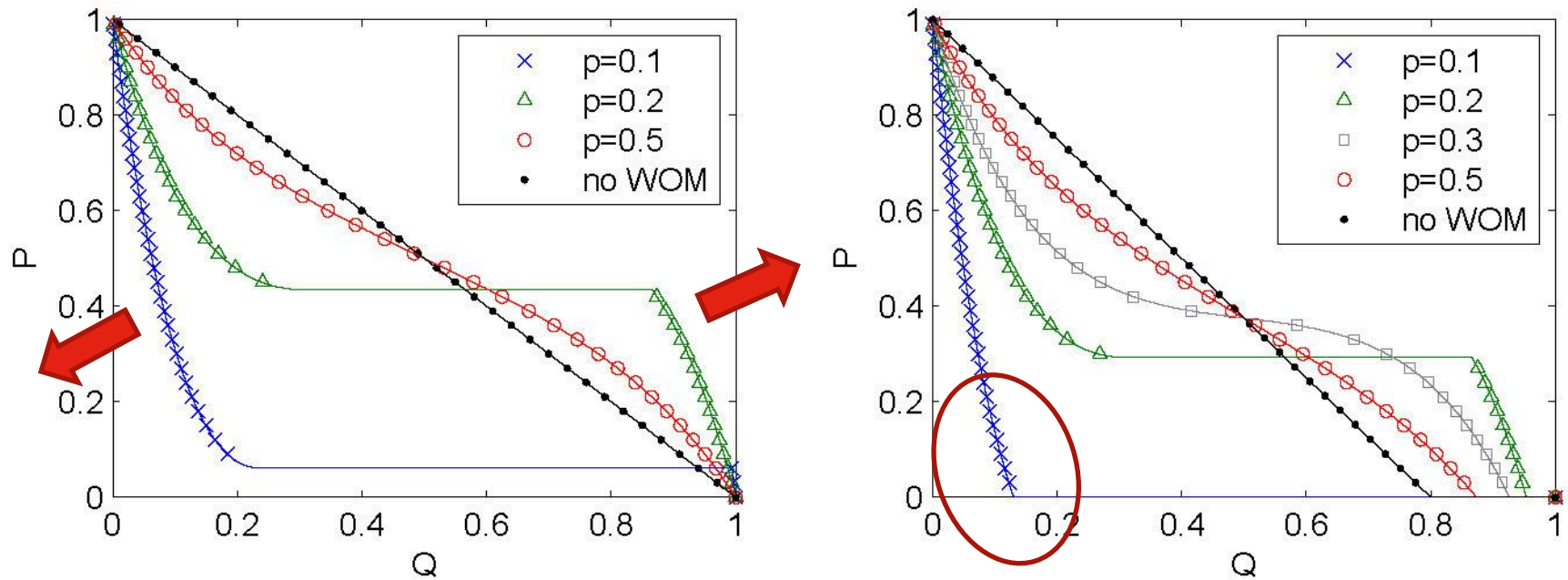
From the S-curve to the demand curve



Market demand curve $P(Q)$
– depicts the quantities that buyers would be willing and able to purchase at different prices

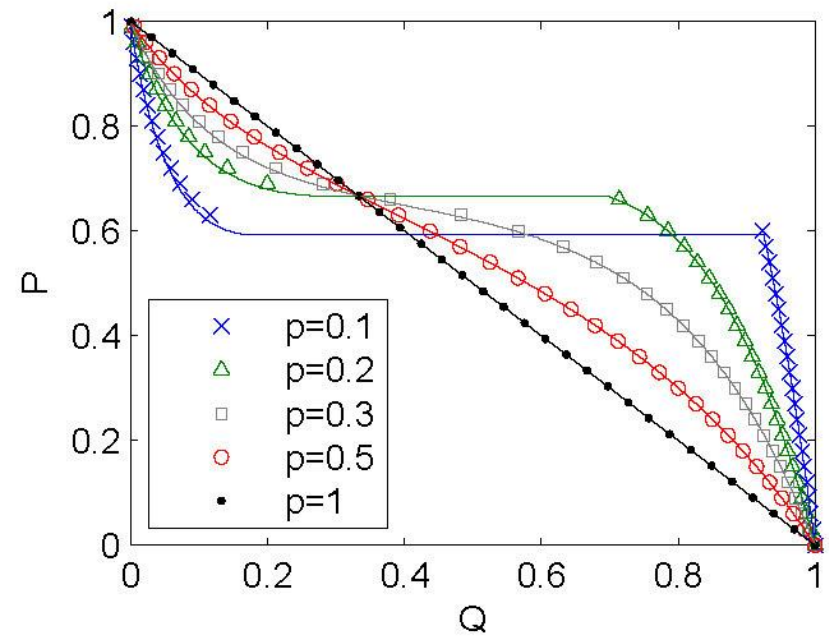
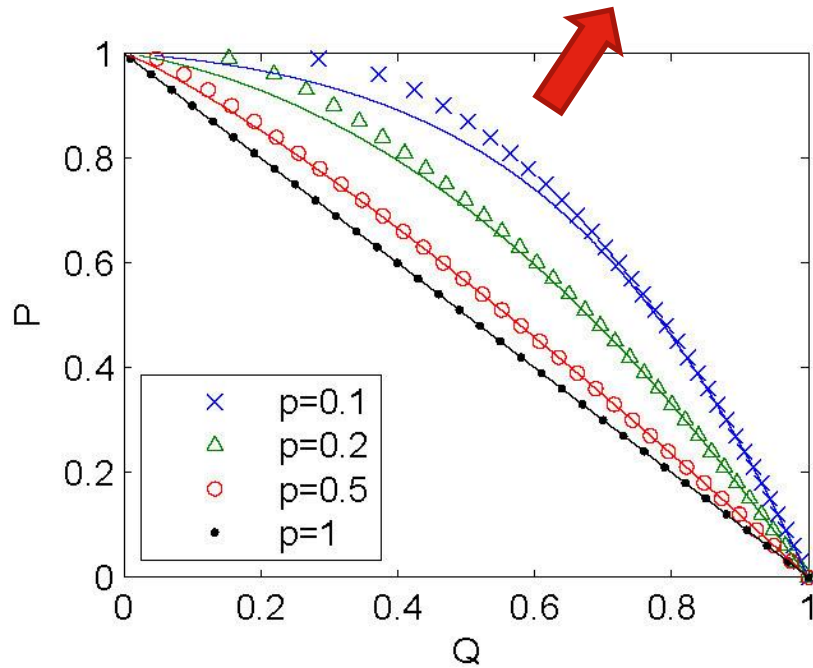


Results: WOM vs. difficulty



Demand curves $P(Q)$ for models with different independence probabilities ($p = 0.1, \dots, 0.5$), without advertising ($h = 0$) and either without ($f = 0$; *left*) or with the difficulty effect ($f = 0.2$; *right*)

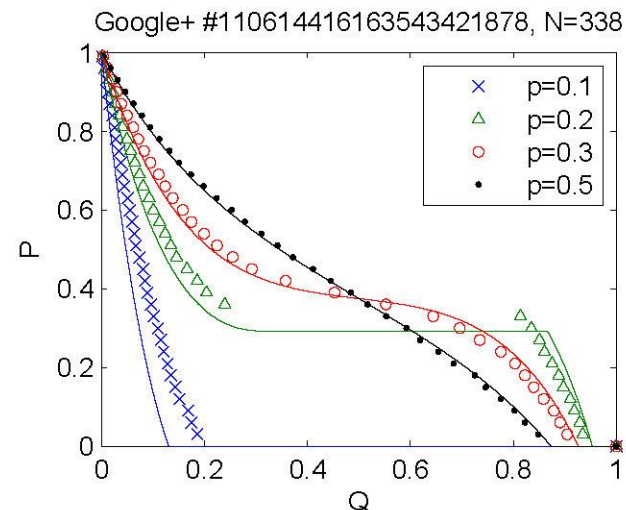
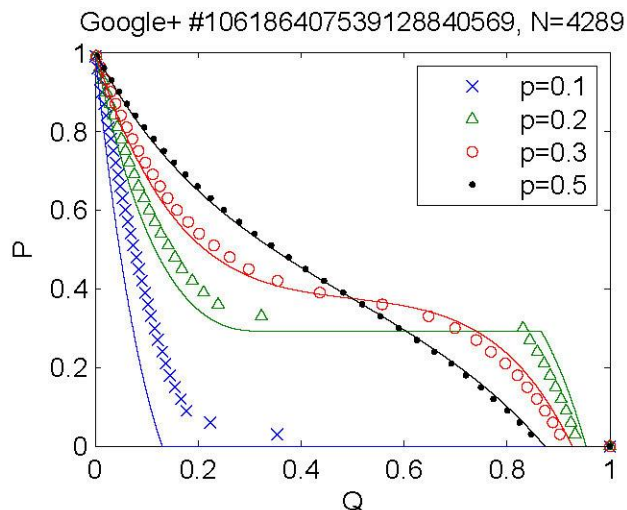
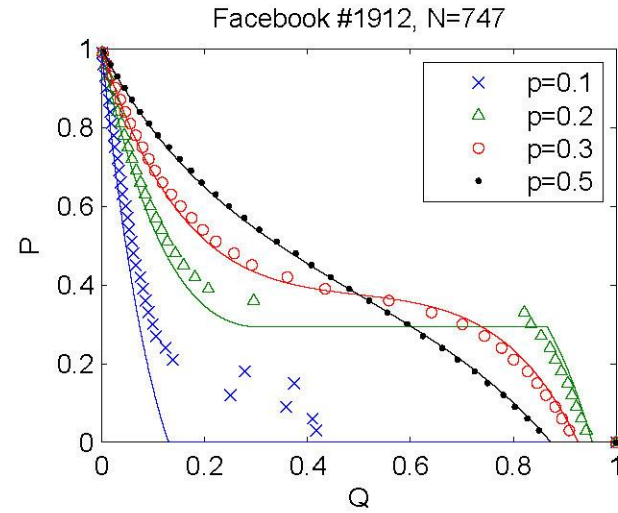
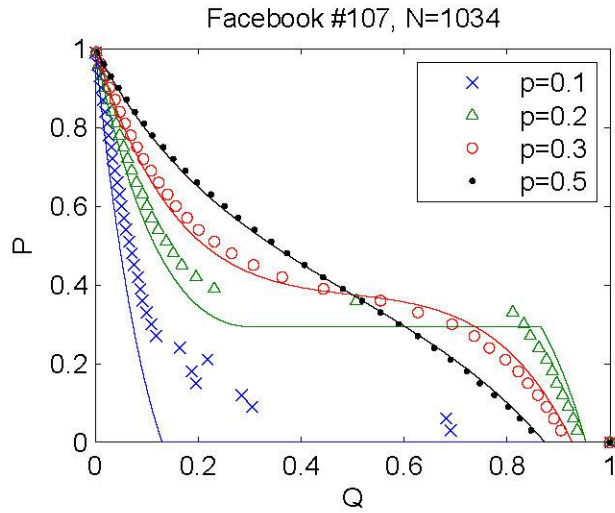
Results: no-WOM vs. WOM



Demand curves $P(Q)$ for models with different independence probabilities ($p = 0.1, \dots, 0.5$), without the difficulty effect ($f = 0$), with advertising ($h = 0.2$) and either without (*left*) or with the WOM effect (*right*)



Results for sample social networks ($f = 0.2$, no advertising)





Conclusions

- Demand curves $P(Q)$ are **an outcome** of our model, not an assumption as in most other studies
- Relatively strong WOM, i.e. $(1-p) > 0.7$, leads to **two separated price-quantity regimes**:
 - For high market prices WOM discourages diffusion and reduces the positive impact of advertising and strengthens the influence of the adoption difficulty
 - For low market prices, WOM boosts the diffusion
- Conditional on the targeted penetration level and the market price, the company should aim either at weakening or strengthening the WOM effect



Conclusions cont.

- In contrast to other models, our setup shows that the product will not diffuse even for very low prices regardless of the price decision of the producer (high f and strong WOM, i.e. low p)
- Similar results are obtained for complete graphs and for sample FB and Google+ networks variable size and characteristics