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Credit Card Interchange Fees

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MOTIVATION (1)

Payment cards: often a very efficient means of payment.

But criticized on many fronts:

- retailers complain about excessive fees (for credit cards)
- competition authorities suggest banks give exaggerated incentives to cardholders.

MOTIVATION (2)

Usual suspects: interchange fees (IFs)

- Transfer of more than \$ 60 bn in the US only in 2007.
- Not clear why IFs are so high (typically 1 % or 2 % of the transaction value) for credit cards (Hayashi 2008).

More than 50 lawsuits in the USA only, more than 20 countries have taken regulatory action (Bradford and Hayashi 2008).

THIS PAPER

- We adapt previous literature on cards (Schmalensee 2002, Rochet and Tirole 2002, Wright 2003) that focused on the payment service (more suited to debit cards).

- We show when, why and how IFs for credit should be regulated.

- Among the first papers to explicitly model credit functionality (exceptions: Chakravorti and To (2007), Bolt and Chakravorti (2008), but do not study the regulation of IFs).

MAIN RESULTS (1)

We determine three IF levels:

- monopoly card network: a_M
- competitive card networks: a_C
- consumer surplus maximum: a_{CS}

We show $a_M \geq a_C \geq a_{CS}$

More precisely $a_C = a_{CS}$ only occurs when **all** cardholders "multi-home" and cards are perfect substitutes

MARKET FAILURE $\Rightarrow$ Need for regulating IFs.

MAIN RESULTS (2)

Two regimes for a_{CS} :

a) either $a_{CS} = a_T$, based on merchant avoided cost

thus merchant specific, related to Tourist Test (Rochet and Tirole 2008)

b) or $a_{CS} = a^*$ based on issuer cost

thus issuer specific, related to cap implemented by RBA).

- We give a condition for regime ***b)*** to prevail (may be difficult to check).
- Cap based on merchant avoided cost $\left(a \leq a_T\right)$ always increases Consumer Surplus.
- However, cap based on issuer cost $\left(a \leq a^*\right)$ may sometimes decrease Consumer Surplus.

THE MODEL (1)

- Fraction x of consumers have credit cards (exogenous)

- Monopoly credit card network sets IF a.

- Banks compete for consumers and retailers:

cardholder fee $f = c_I + \pi_I - a$ (issuers)

merchant fee $m = c_A + a$ (acquirers).

- Our results are true more generally if banks' profit increase with cards volume and thus with IF level

THE MODEL (2)

2 types of purchases:

- "ordinary"
  - cash (or debit): no cost no benefit (normalization)
  - credit card: chosen by consumer when $f < 0$
    costs c_I and c_A for banks

This situation is socially wasteful (convenience users).
Notation: $L_C = 1$ if $f < 0$.

- "credit"
  - credit card: no cost no benefit (normalization)
  - store credit: $\begin{cases} \text{cost } c_S \text{ for seller} \\ \text{cost } c_B \text{ for buyer} \end{cases}$

c_S is merchant specific while c_B is transaction specific. $D(f) \equiv \Pr\left(c_B \geq f\right)$

THE MODEL (3)

Two retailers/merchants (i = 1, 2) compete for consumers in two dimensions: retail price p_i and decision to accept cards $\Leftrightarrow$ $L_i = 1$.

Consumers select retailer based on retail prices, transport cost (Hotelling) and quality of service (cards accepted or not).

Once in the shop, opportunity for credit purchase arises with (exogenous) probability θ.

Retailers cannot distinguish between ordinary and credit purchases

$\Rightarrow$ same price p_i)

THE MODEL (4)

Expected utility of a customer of shop i:

Cash user

$$U_i^{cash} = u_O + \theta u_C - tx_i - \theta E(c_B) - (1+\theta)p_i$$

Cardholder

$$U_i^{card} = U_i^{cash} + L_i\left[-f\,L_C + \theta E(c_B - f)_+\right]$$

Term between brackets = expected cardholder surplus $S(a)$
Decreasing in f and thus increasing in IF a.

COMPETITION BETWEEN RETAILERS

Sequential game:

Stage 1: Given a (and thus f and m), retailers simultaneously choose $L_i = 1$ if i accepts cards
$= 0$ otherwise.

Stage 2: Given (L_1, L_2) and a, retailers compete in prices.

Notation

$$\Gamma(a) = (c_A + a)L_C + \theta\left(m(a) - c_S\right)D(f(a))$$

expected net cost of accepting cards for retailer (increases in IF a)

$\phi(a) = S(a) - \Gamma(a)$ *total user surplus*

COMPETITION BETWEEN RETAILERS (2)

Proposition 1: *Equilibrium prices and profits of retailers (at stage 2) are:*

$$p_i(a) = \gamma + \frac{1}{1+\theta}\left[t + \theta c_S + x\Gamma(a)L_i + \frac{x}{3}\phi(a)(L_i - L_j) \right]$$

$$\pi_i(a) = 2ts_i^2(a)$$

where $\Gamma(a)$ *expected net cost of accepting cards for retailer*

$\phi(a) = S(a) - \Gamma(a)$ *total user surplus*

$s_i(a) = \dfrac{1}{2} + \dfrac{x}{6t}\phi(a)(L_i - L_j)$ *market share of* i.

IMPACT OF INTERCHANGE FEES (1)

Corollary 1: Retailer *i* accepts cards only when they increase this market share s_i (and profit π_i):

$$L_i = 1 \quad \text{iff} \quad \phi(a) \geq 0.$$

This is satisfied if and only if $a \leq a_M = \phi^{-1}(0)$

Corollary 2: A monopoly card network maximizes banks' profit by setting $a = a_M$.

IMPACT OF INTERCHANGE FEES (2)

Corollary 3: Equilibrium retail prices increase in the expected cost of cards for retailers $\Gamma(a)$ which is increasing in *a*:

$$(1+\theta)\,p(a) = t + \gamma(1+\theta) + \theta c_S + x\Gamma(a).$$

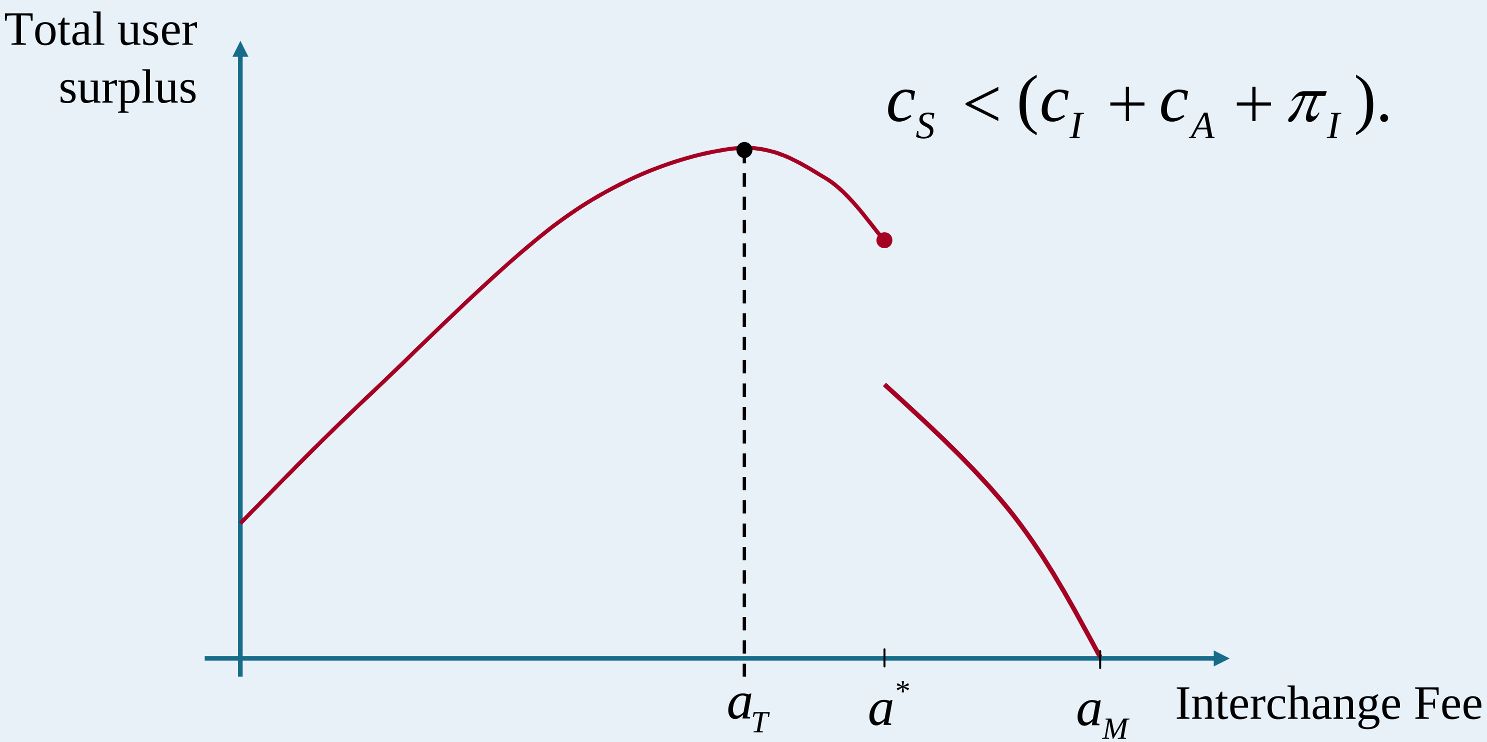
Corollary 4: Surplus of cash users decreases in *a*.

Corollary 5: Total Consumer Surplus consumers is an increasing function of $\phi(a)$:

$$CS(a) = (u_O - \gamma) + \theta(u_C - \gamma) - \frac{3t}{2} - \theta(c_S + E(c_B)) + x\phi(a).$$

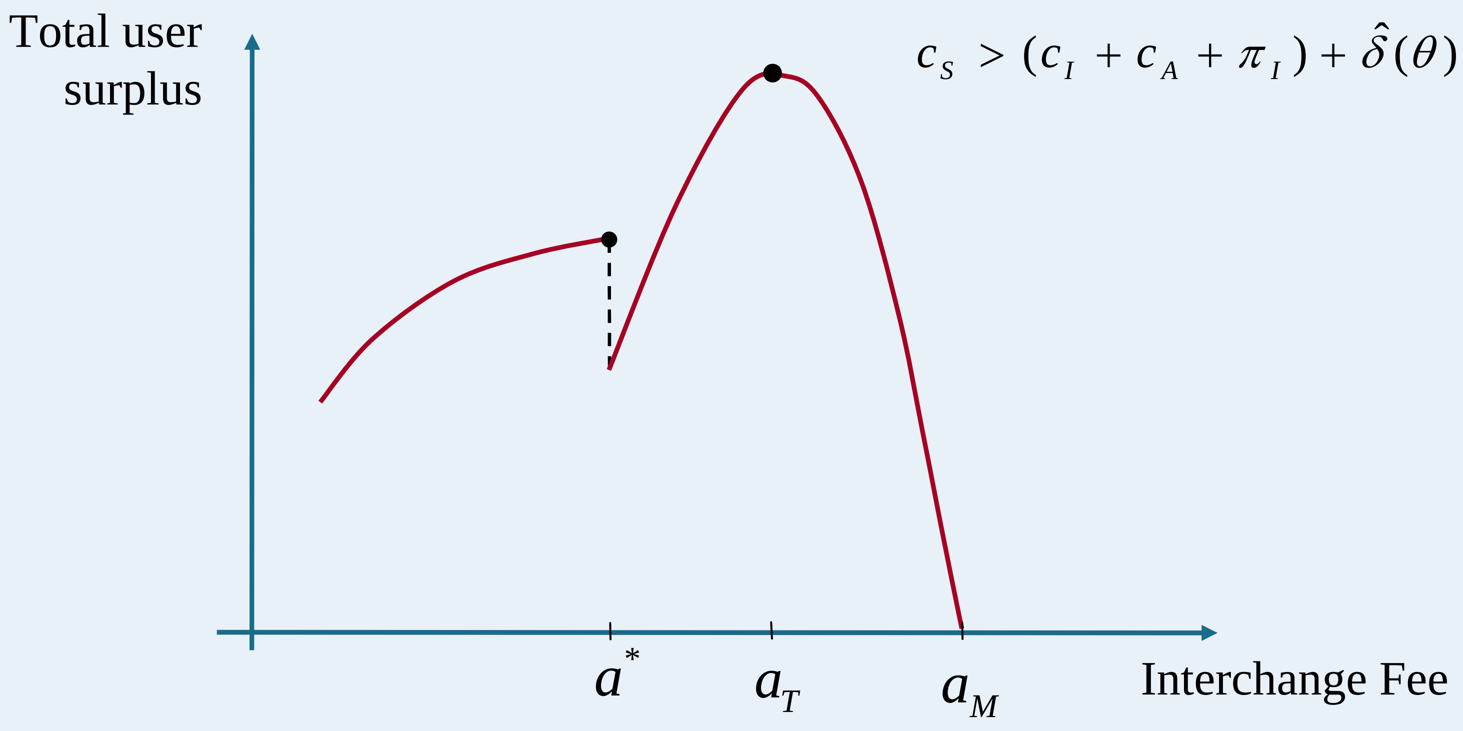
CONSUMER SURPLUS MAXIMIZATION (1)

There are 3 regimes:



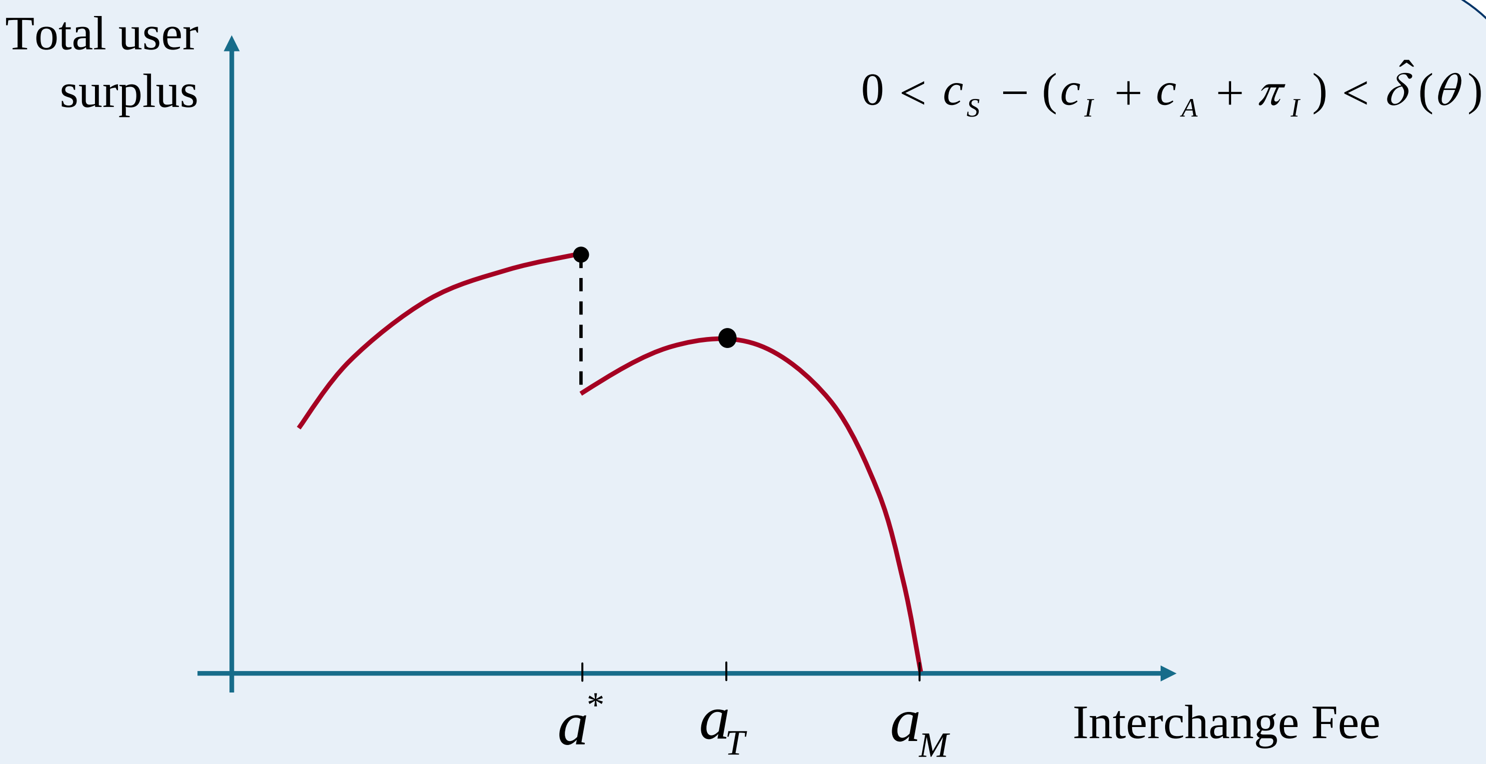
First regime: total user surplus is maximum for $a = a_T < a^*$.

CONSUMER SURPLUS MAXIMIZATION (2)



Second regime: total user surplus is maximum for $a = a_T > a^*$.

CONSUMER SURPLUS MAXIMIZATION (3)



Third regime: total user surplus is maximum for $a = a^* < a_T$.

COMPETING CARD SCHEMES

We assume now that two competing card schemes offer perfectly substitutable cards (Bertrand competition)

We take as given the proportion y of cardholders who multi-home (multi-homing index)

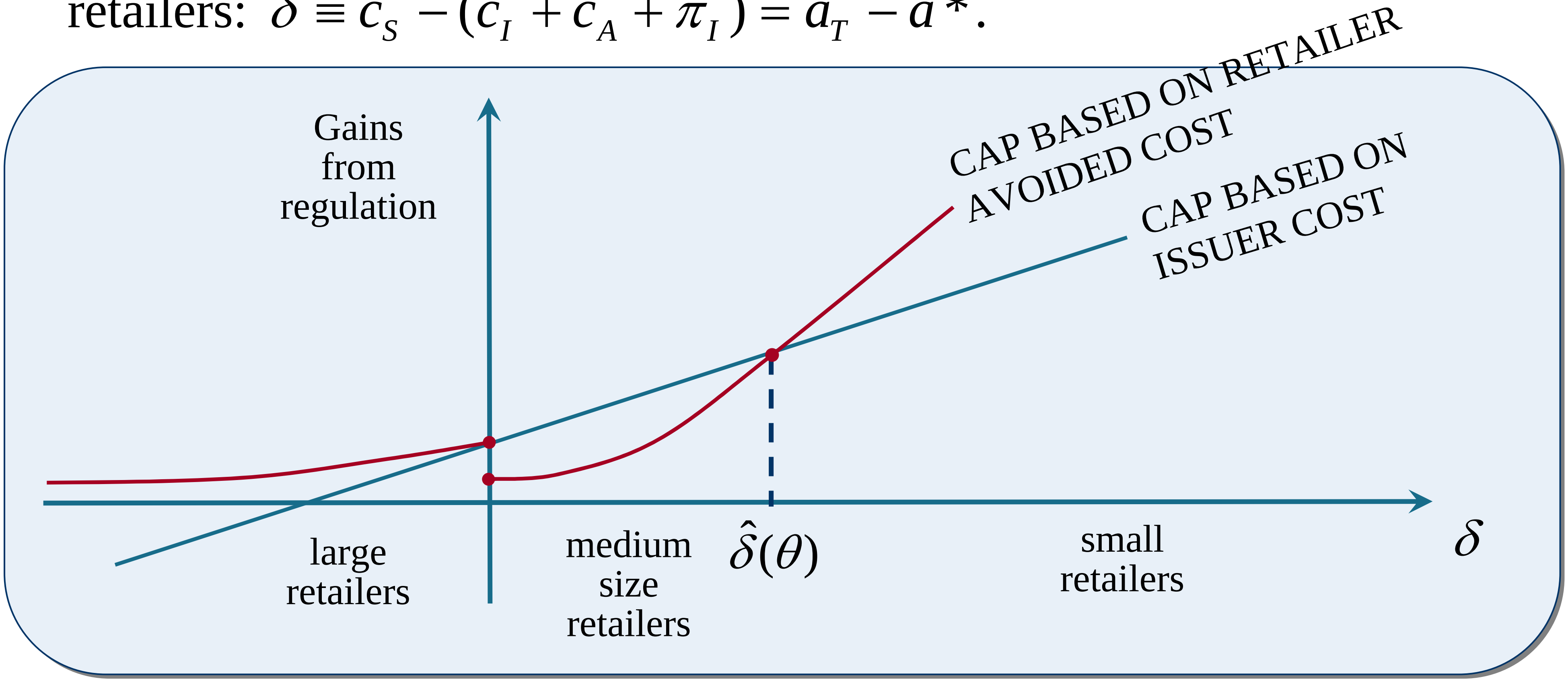
Proposition 2: There is a unique Bertrand equilibrium:

- Both card schemes choose the same IF *a(y)*.
- *a(y)* is an decreasing function of multi-homing index *y*
- $a(0) = a_M \, , a(1) = a_{CS}$

Thus competition leads to CS maximization only when y=1 (complete multi-homing) . In all other cases there is a market failure.

BENCHMARK FOR REGULATION OF IF

It differs according to the relative efficiency of credit cards for retailers: $\delta \equiv c_S - (c_I + c_A + \pi_I) = a_T - a^*$.



Except for medium size retailers, a cap based on retailer avoided cost $a \leq a_T = c_S - c_A$ is better than a cap based on issuer cost $a \leq a^* = c_I + \pi_I$.

SUMMARY AND CONCLUSIONS

1- Privately set IFs are excessive: $a_M \geq a(y) \geq a_{CS}$.

2- Socially optimal IFs can be either

$$a_T = c_S - c_A = \text{ net avoided cost by retailer}$$

(related to Tourist Test: Rochet and Tirole 2008) or

$$a^* = c_I + \pi_I = \text{ issuer cost } + \text{ profit margin.}$$

(related to cap implemented by RBA)

3- A regulatory cap based on a_T is always better than no regulation.

4- This is not true for a^*.