

# Consumer Credit and Payment Cards

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# Motivation

- How does the provision of consumer credit affect the pricing of debit and credit cards?
- Two business models of consumer credit:
  - credit via overdraft on current account...
  - ...and credit via credit line associated with credit card
- Consider two cases
  - monopoly pricing by network
  - competition between debit and credit card networks (consumer multihomes)
- Policy context
  - Emergence of additional European card scheme
  - US Durbin amendment

# Key Results

## Monopolist networks

- Funding and default costs do not affect debit merchant fees, but do affect credit card merchant fees
- Interplay between overdraft costs and *credit card* fees

## Competing networks

- Competition drives down prices...
- ...but also element of complementarity between debit and credit cards, through 'grace' period of credit line
- Debit merchant fees may rise to monopolistic levels (above the socially optimal level)
- Default risk now affects both card merchant fees

## Review of Literature

- Chakravorti and To (2001)
- Weiner and Wright (2005)
- Bolt and Chakravorti (2008)
- Bedre and Calvano (2009)
- Rochet and Tirole (2010)
- Shy and Wang (2010)
- Verdier (2010)
- Bolt and Schmiedel (2011)

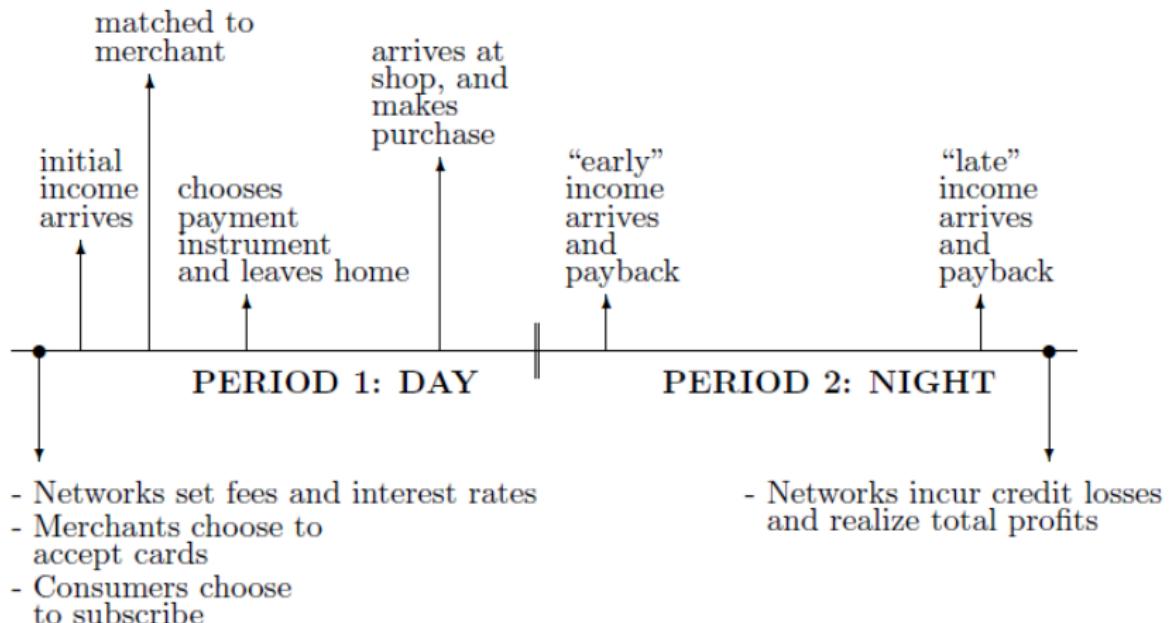
# Framework

- Card network sets consumer fees ( $F$ ) and merchant fees ( $f$ )
  - 3-party network so do not solve for interchange fee
  - but simple positive relationship between interchange fee and merchant fee if acquiring bank is perfectly competitive
  - network faces processing cost  $c$
- Heterogenous merchants
  - merchants vary in their profit margins  $\pi$ ;
  - cost of cash handling  $h$
- Homogenous consumers
  - single purchase, from which consumers obtain utility  $v_0$
  - card network sets consumer fee to extract full consumer surplus from card
  - cost of cash (probability  $(1 - \rho)$  of being mugged)

# Framework

- Period 1: Consumer may receive income, yet still requires credit to make purchase
  - in good state, only requires small amount of credit
  - in bad state, requires large amount of credit
- Overdraft
  - can be used with cash or debit card
  - only offers small amount of credit
  - interest accrues immediately on use
- Credit line of credit card
  - offers large amount of credit
  - initial interest-free 'grace' period
- Positive probability of default in both cases
  - Consumer may not receive period 2 income

# Timeline



# Interest Rates

$$r_d = r_d(r, \gamma_E, \gamma_L)$$

$$r_c = r_c(r, \gamma_E, \gamma_L)$$

- Interest rates determined in competitive aftermarket (NPV=0) as function of lender's funding cost and probability of default
  - overdraft competes with store credit
  - credit line competes with overdraft
  - expected cost of default covered by high interest rate
- Despite this, interest rates and probability of default may still affect equilibrium consumer and merchant fees
- Intuition:
  - Higher interest rates decrease consumers' willingness to pay
  - This lowers the consumer fixed fee and so requires an increase in the merchant fee

# Monopolistic Networks

## Debit card-only world

- Default risk and funding cost have no effect on consumer or merchant fees
- Intuition: debit card provides extra security over cash, rather than enabling extra credit

## Credit card-only world

- merchant fees *do* depend on default risk and funding cost
- Intuition: credit card enables payment in extra state of the world, with no period 1 income
- Credit card also competes with overdraft in states with positive period 1 income
  - implies higher expected costs of servicing overdraft may lead to lower credit card merchant fees
  - ... and so increase acceptance ratio of credit cards...

# Numerical Results (monopolistic networks)

	funding cost $r$		default $D$		early income $\gamma_E$		initial income $\delta$	
	1%	3%	5%	10%	50%	55%	95%	99%
$f_D^*$	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050
$\alpha_D^*$	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000
$f_C^*$	0.0314	0.0321	0.0314	0.0326	0.0314	0.0301	0.0314	0.0103
$\alpha_C^*$	0.4726	0.4601	0.4726	0.4517	0.4726	0.4939	0.4726	0.4837
$r_d$	0.0464	0.0679	0.0464	0.0885	0.0464	0.0100	0.0464	0.0464
$r_c$	0.1444	0.2111	0.1444	0.2885	0.1444	0.0322	0.1444	0.1444

Note: Where  $f^D$  and  $f^C$  denote the merchant fees for debit and credit cards, while  $\alpha^D$  and  $\alpha^C$  denote the proportion of merchants accepting the respective card. Interest rates on overdrafts and credit lines are denoted by  $r_c$  and  $r_d$  respectively. We set:  $c_d = c_c = 0.00$ ,  $h = 0.00$ ,  $v_0 = 0$ , and  $\rho = 0.99$ . Baseline parameters:  $r = 0.01$ ,  $\gamma_E = 0.50$ ,  $\gamma_L = 0.45$ , and  $\delta = 0.95$ .

# Competition between Debit and Credit Card Networks

- Competition drives down payment card fees
- Element of complementarity as well as competition
  - Debit card bank (DCB) can earn interest on positive balance in current account, during free 'grace' period of credit card
  - For high expected period 1 income, DCB's profit function actually *increases* with proportion of merchants accepting *credit card*
  - At margin, DCB sets high merchant fee to *discourage* debit acceptance in favour of credit cards
  - Debit merchant fees may approach monopolistic levels, as funding costs increase
- Default risk and funding cost now affect both cards
  - but stronger effect on credit card fees
  - debit merchant fees may increase with default risk, at the same time as increase in acceptance of debit cards

# Comparison between Competition and Monopoly

Default ( $r = 1\%$ )	Monopoly				Competition			
	debit		credit		debit		credit	
	$D = 5\%$	$D = 10\%$	$D = 5\%$	$D = 10\%$	$D = 5\%$	$D = 10\%$	$D = 5\%$	$D = 10\%$
$f^*$	0.0050	0.0050	0.0314	0.0326	0.0029	0.0030	0.0280	0.0293
$\alpha^*$	0.5000	0.5000	0.4726	0.4517	0.2114	0.2244	0.4954	0.4714
$r_d$	0.0464	0.0885	0.0464	0.0885	0.0464	0.0885	0.0464	0.0885
$r_c$	0.1444	0.2885	0.1444	0.2885	0.1444	0.2885	0.1444	0.2885
Funding cost ( $D = 5\%$ )	4				c	Competition		
	Monopoly					debit		
	debit		credit			$r = 1\%$	$r = 3\%$	$r = 1\%$
	$r = 1\%$	$r = 3\%$	$r = 1\%$	$r = 3\%$				$r = 3\%$
$f^*$	0.0050	0.0050	0.0314	0.0312	0.0029	0.0043	0.0280	0.0294
$\alpha^*$	0.5000	0.5000	0.4726	0.4601	0.2114	0.0875	0.4954	0.4924
$r_d$	0.0464	0.0679	0.0464	0.0679	0.0464	0.0679	0.0464	0.0679
$r_c$	0.1444	0.2111	0.1444	0.2111	0.1444	0.2111	0.1444	0.2111

Note: Where  $f$  denotes the merchant fee in each case, and  $\alpha$  the proportion of merchants accepting the respective card. Interest rates on overdrafts and credit lines are denoted by  $r_c$  and  $r_d$  respectively. We set:  $c_d = c_c = 0.00$ ,  $h = 0.00$ ,  $v_0 = 0$ ,  $\rho = 0.99$ ,  $\gamma_E = 0.50$ ,  $\delta = 0.95$ , and  $x_1 = 0.5$ . Baseline parameters:  $r = 0.01$  and  $0.03$ ,  $\gamma_L = 0.45$  ( $D = 5\%$ ) and  $0.40$  ( $D = 10\%$ ).

## Our Contribution

- Credit facilities affect equilibrium payment card fees, even when credit is priced competitively
- Close interaction between costs of servicing overdraft and credit card merchant fees
- Complementarity exists between debit card model and credit card model, even when competition drives down fees

# Implications and Further Work

- Implications
  - Supports different MIFs for debt and credit card payments
  - Debit card fees still depend on default risk, even if no extra risk of default from using debit card
  - Additional European Card scheme would increase competition with downward pressure on fees
- What does this mean for welfare?
  - Complementarity relationship between debit card and credit card models not relevant for welfare if interest rates are merely transfers between agents...
  - Seems likely therefore that competitive debit merchant fees are higher than socially optimal