Adverse Selection and the Credit Card Market

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Market for Lemons

- Nice simple mathematical example of how asymmetric information (AI) can force markets to unravel
- Attributed to George Akeloff, Nobel Prize a few years ago
- Good starting point for this analysis, although it does not deal with CCs

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Problem Setup

- Market for used cars
- Sellers know exact quality of the cars they sell
- Buyers can only identify the quality by purchasing the good
- Buyer beware: cannot get your $ back if you buy a bad car

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- Two types of cars: high and low quality
- High quality cars are worth $20,000, low are worth $2000
- Suppose that people know that in the population of used cars that ½ are high quality
  - Already a strong (unrealistic) assumption
  - One that is not likely satisfied

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- Buyers do not know the quality of the product until they purchase
- How much are they willing to pay?
- Expected value = (1/2)$20K + (1/2)$2K = $11K
- People are willing to pay $11K for an automobile
- Would $11K be the equilibrium price?

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- Who is willing to sell an automobile at $11K
  - High quality owner has $20K auto
  - Low quality owner has $2K
- Only low quality owners enter the market
- Suppose you are a buyer, you pay $11K for an auto and you get a lemon, what would you do?

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- Sell it for on the market for $11K
- Eventually what will happen?
  - Low quality cars will drive out high quality
  - Equilibrium price will fall to $2000
  - Only low quality cars will be sold

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Some solutions?

- Deals can offer money back guarantees
  - Does not solve the asymmetric info problem, but treats the downside risk of asy. Info
- Buyers can take to a garage for an inspection
  - Can solve some of the asymmetric information problem

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CC Facts

- About 25% have no credit cards
- About 40% pay of CC users pay their charges each month (2006)
- Average balance (among those with balances) is $2200/month
- 8.3% owe more than $9000 in CC debt
- Typical debt is 5% of annual household income

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Credit Card Facts

- Average person as 13 credit obligations (cc, store cards, gas cards, etc)
- ½ have 2+ CCs
- 10% have 10+ CCs
- US consumer debt (car loans, cc's, etc), $2.5 trillion in 2007
- CC's make up $904 billion

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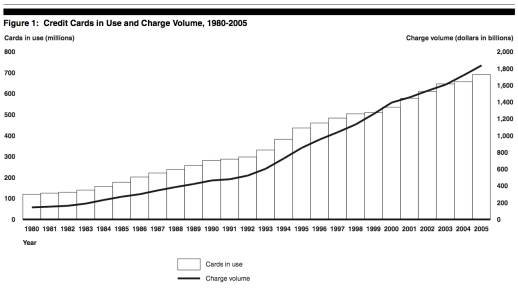

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Table 3: Gross Monthly Income and Credit Card Debt

Gross Monthly Income	Number of Cases	Average CC Debt	Median CC Debt	% of Cases with no CC Debt
$0	208	$22,867	$12,951	16.3%
$1-$1,000	526	$14,298	$8,485	14.6%
$1000-$1,999	1,555	$14,707	$8,273	14.1%
$2,000-$2,999	1,342	$15,850	$10,231	11.3%
$3,000-$3,999	835	$19,387	$13,849	7.9%
$4,000-$4,999	400	$21,050	$16,291	5.3%
$5,000-$5,999	182	$26,153	$20,067	3.3%
$6,000 or more	155	$41,978	$33,542	2.6%

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Table 4: Gross Credit Card Debt, Gender and Marital Status

Gender & Marital Status	Number of Cases	Average CC Debt	Median CC Debt	% of Cases with no CC Debt
Male				
Married	318	$19,987	$10,820	19.8%
Separated	90	$17,968	$9,337	10.0%
Divorced	319	$19,589	$12,210	9.4%
Single	770	$16,281	$9,900	16.8%
Widowed	24	$24,745	$18,895	0%
Female				
Married	266	$15,383	$10,999	10.9%
Separated	159	$17,733	$9,150	10.1%
Divorced	448	$15,717	$12,281	8.0%
Single	965	$13,745	$8,276	11.5%
Widowed	110	$16,052	$12,081	8.2%
Joint Filings				
Married	1,600	$20,769	$13,306	8.4%
Separated	75	$20,161	$10,891	8.0%

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Figure 2: The 10 Largest Credit Card Issuers by Credit Card Balances Outstanding as of December 31, 2004

Card issuer	Outstanding receivables	Percent of total market
Citigroup Inc.	$139,600,000,000	20.2
Chase Card Services	135,370,000,000	19.5
MBNA America	101,900,000,000	14.7
Bank of America	58,629,000,000	8.5
Capital One Financial Corp.	48,609,571,000	7.0
Discover Financial Services, Inc.	48,261,000,000	7.0
American Express Centurion Bank	39,600,000,000	5.7
HSBC Credit Card Services	19,670,000,000	2.8
Providian Financial Corp.	18,100,000,000	2.6
Wells Fargo	13,479,889,059	1.9
	$623,219,460,059	**90.0**

Source: GAO analysis of Card Industry Directory data.

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College students

- % with CC from parents: 70%
- % with their own CC: 48%
- % with debit card: 58%
- Average balance on CC: $1050
- % who have paid late once/year: 58%
- % who have paid late 3+ times/year: 25%
- Colleges than ban CC promotion on campus: 1280 (2000 colleges)
- # direct mail offers/semester: 17

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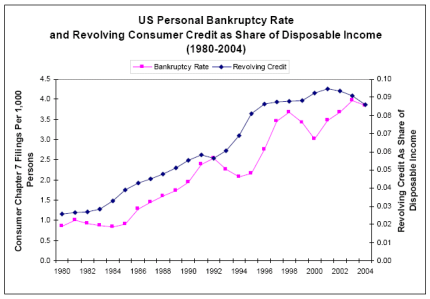

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TABLE 5—COMPONENTS OF PROFITS FOR MARYLAND BANK, N.A.

Components	1985	1986	1987
Finance charges	16.66%	14.92%	13.21%
Annual fees	1.40%	1.58%	1.29%
Other customer charges	1.10%	1.42%	1.17%
Interchange fees	3.06%	3.00%	2.92%
Total revenue:	22.22%	20.92%	18.60%
Interest expenses	9.57%	7.80%	7.13%
Noninterest expenses	4.47%	4.71%	4.87%
Net charge-offs	1.09%	1.77%	1.80%
Total cost:	15.13%	14.28%	13.80%
Return on assets (pretax profits expressed as a percentage of outstanding balances)	7.09%	6.63%	4.80%

Sources: Consolidated reports of condition and income (call reports), prospectuses, and registration statements for Maryland Bank, N.A.

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Two type of customers

- People who intent to pay off their loan every month
  - Sometimes they get in a pinch and generate interest charges
- People who need the money
- In this situation – will firms compete on interest rate?

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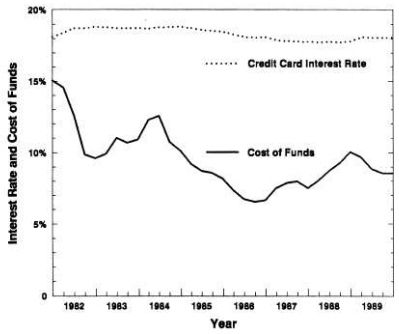

FIGURE 1. STICKY CREDIT CARD INTEREST RATES, 1982–1989

Notes: Credit card interest rate is the quarterly Federal Reserve System series; cost of funds is the quarterly one-year Treasury bill yield plus 0.75 percent.

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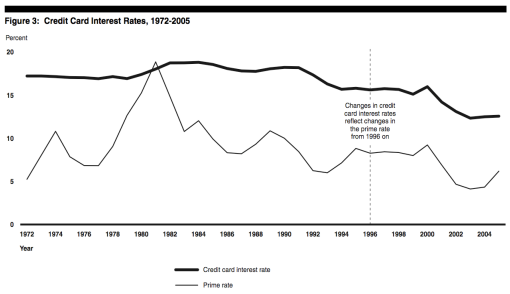

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TABLE 1: SUMMARY OF MARKET EXPERIMENTS

MARKET EXPERIMENT	MARKET CELL	NUMBER OF SOLICITATIONS MAILED	EFFECTIVE RESPONSE RATE	PERCENT GOLD CARDS	AVERAGE CREDIT LIMIT
MKT EXP I	A: 4.9% Intro Rate 6 months	100,000	1.073%	83.97%	$6,446
MKT EXP I	B: 5.9% Intro Rate 6 months	100,000	0.903%	80.18%	$6,207
MKT EXP I	C: 6.9% Intro Rate 6 months	100,000	0.687%	80.06%	$5,973
MKT EXP I	D: 7.9% Intro Rate 6 months	100,000	0.645%	76.74%	$5,827
MKT EXP I	E: 6.9% Intro Rate 9 months	100,000	0.992%	81.15%	$6,279
MKT EXP I	F: 7.9% Intro Rate 12 months	100,000	0.944%	82.31%	$6,296

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TABLE 2A: MARKET EXPERIMENT I (RANDOMIZATION)

MARKET CELL	NUMBER OF OBSERVATIONS	MONTHS ON FILE	CREDIT SCORE	NUMBER OF BANKCARDS	HIGHEST LIMIT ON A BANKCARD	PRELIMINARY REVOLVING BALANCE	PRELIMINARY REVOLVING LIMIT
A: 4.9% Intro Rate 6 months	99,886	174.11 (0.2236)	642.06 (0.2798)	3.7717 (0.0059)	$7,698.89 (15.03)	$2,515.60 (12.88)	$17,481.47 (36.56)
B: 5.9% Intro Rate 6 months	99,872	173.99 (0.2239)	642.92 (0.2801)	3.7693 (0.0060)	$7,698.26 (14.91)	$2,506.83 (12.85)	$17,471.60 (36.83)
C: 6.9% Intro Rate 6 months	99,869	174.41 (0.2232)	642.96 (0.2805)	3.7703 (0.0060)	$7,703.96 (15.61)	$2,506.68 (12.79)	$17,507.78 (36.77)
D: 7.9% Intro Rate 6 months	99,880	174.08 (0.2236)	642.77 (0.2810)	3.7790 (0.0060)	$7,693.67 (15.22)	$2,500.49 (12.66)	$17,509.64 (36.97)
E: 6.9% Intro Rate 9 months	99,890	174.38 (0.2237)	643.22 (0.2801)	3.7703 (0.0059)	$7,675.33 (15.82)	$2,510.87 (13.02)	$17,462.76 (36.53)
F: 7.9% Intro Rate 12 months	99,860	174.02 (0.2238)	642.85 (0.2815)	3.7713 (0.0060)	$7,676.28 (15.19)	$2,512.21 (12.86)	$17,450.82 (36.50)

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TABLE 2B: MARKET EXPERIMENT II (RANDOMIZATION)

MARKET CELL	NUMBER OF OBSERVATIONS	MONTHS ON FILE	CREDIT SCORE	NUMBER OF BANKCARDS	HIGHEST LIMIT ON A BANKCARD	PRELIMINARY REVOLVING BALANCE	PRELIMINARY REVOLVING LIMIT
A: 5.9% Intro Rate 6 months	149,635	178.20 (0.1968)	671.74 (0.1942)	3.1057 (0.0065)	$6,305.35 (12.53)	$1,159.67 (4.85)	$15,200.98 (35.02)
B: 5.9% Intro Rate 9 months	137,192	178.16 (0.2047)	671.95 (0.2025)	3.1113 (0.0068)	$6,294.29 (12.88)	$1,156.12 (5.05)	$15,169.74 (35.78)
C: 5.9% Intro Rate 12 months	124,710	178.14 (0.2154)	672.22 (0.2116)	3.1130 (0.0071)	$6,321.03 (13.75)	$1,163.35 (5.32)	$15,193.69 (37.57)
D: 6.9% Intro Rate 12 months	72,337	178.06 (0.2826)	671.61 (0.2798)	3.1072 (0.0093)	$6,292.11 (18.05)	$1,163.35 (6.98)	$15,166.74 (49.54)
E: 7.9% Intro Rate 6 months	379,028	178.12 (0.1236)	672.06 (0.1216)	3.1038 (0.0041)	$6,303.38 (7.79)	$1,159.96 (3.05)	$15,153.72 (21.47)

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TABLE 4A: MARKET EXPERIMENT I (RESPONDENT CHARACTERISTICS)

MARKET CELL	EFFECTIVE RESPONSE RATE	INCOME	GOLD	CREDIT LIMIT	REVOLVING BALANCE	REVOLVIN LIMIT
A: 4.9% Intro Rate 6 months	0.01073 (0.00033)	43019.20 (609.36)	0.83970 (0.01121)	6446.00 (92.76)	5240.32 (181.68)	19209.2 (452.6
B: 5.9% Intro Rate 6 months	0.00903 (0.00030)	41896.14 (680.94)	0.80177 (0.01327)	6206.90 (100.19)	4923.39 (201.11)	18967.8 (552.7
C: 6.9% Intro Rate 6 months	0.00687 (0.00026)	41232.76 (787.46)	0.80058 (0.01526)	5972.54 (116.98)	4806.17 (213.93)	18677.6 (531.0
D: 7.9% Intro Rate 6 months	0.00645 (0.00025)	39702.43 (788.82)	0.76744 (0.01665)	5827.24 (115.88)	5152.29 (254.77)	18421.5 (585.1
E: 6.9% Intro Rate 9 months	0.00992 (0.00031)	41781.08 (642.96)	0.81149 (0.01242)	6279.99 (95.83)	5247.73 (190.90)	18161.0 (482.5
F: 7.9% Intro Rate 12 months	0.00944 (0.00031)	42122.87 (654.78)	0.82309 (0.01243)	6295.60 (96.75)	5768.35 (220.30)	18039.4 (486.0

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TABLE 4B: MARKET EXPERIMENT I (EXPERIENCE AFTER 27 MONTHS)

MARKET CELL	EFFECTIVE RESPONSE RATE	DELINQ. RATE	CHARGEOFF RATE	CHARGEOFF BALANCES	ACTIVITY RATE	BANKRUPTCY RATE
A: 4.9% Intro Rate 6 months	0.01073 (0.00033)	0.05985 (0.00723)	0.04101 (0.00606)	217.21500 (37.04670)	0.36999 (0.01475)	0.02796 (0.00504)
B: 5.9% Intro Rate 6 months	0.00903 (0.00030)	0.07530 (0.00879)	0.04873 (0.00717)	274.60900 (46.48750)	0.39978 (0.01631)	0.02658 (0.00536)
C: 5.9% Intro Rate 6 months	0.00687 (0.00026)	0.10917 (0.01191)	0.06987 (0.00973)	355.26700 (57.85630)	0.41495 (0.01881)	0.03202 (0.00672)
D: 7.9% Intro Rate 6 months	0.00645 (0.00025)	0.10078 (0.01186)	0.07132 (0.01014)	377.10900 (61.01490)	0.46357 (0.01965)	0.04341 (0.00803)
E: 6.9% Intro Rate 9 months	0.00992 (0.00031)	0.08468 (0.00884)	0.06250 (0.00769)	351.41600 (49.60870)	0.40323 (0.01558)	0.03528 (0.00586)
F: 7.9% Intro Rate 12 months	0.00944 (0.00031)	0.06780 (0.00819)	0.04025 (0.00640)	212.19300 (37.18960)	0.43326 (0.01614)	0.02225 (0.00480)

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TABLE 5: MARKET EXPERIMENT II (RESPONDENT CHARACTERISTICS)

MARKET CELL	EFFECTIVE RESPONSE RATE	INCOME	GOLD	CREDIT LIMIT	REVOLVING BALANCE	REVOLVING LIMIT	UTILIZATION RATE	DEBT BURDEN
A: 5.9% Intro Rate 6 months	0.00610 (0.00020)	35607.28 (683.60)	0.66818 (0.01533)	4794.39 (81.20)	2693.92 (127.05)	15898.95 (581.16)	0.23524 (0.00811)	0.08881 (0.00424)
B: 5.9% Intro Rate 9 months	0.00760 (0.00023)	37471.82 (599.67)	0.74617 (0.01348)	5196.33 (79.75)	3130.80 (116.73)	19638.50 (579.97)	0.21377 (0.00838)	0.09056 (0.00346)
C: 5.9% Intro Rate 12 months	0.01135 (0.00300)	40462.38 (578.16)	0.76853 (0.01121)	5494.68 (69.18)	3938.94 (120.55)	25037.09 (570.82)	0.21259 (0.00537)	0.11214 (0.00366)
D: 6.9% Intro Rate 12 months	0.00936 (0.00336)	38893.05 (743.79)	0.77729 (0.01599)	5388.10 (93.42)	3567.96 (156.97)	21213.56 (772.53)	0.21389 (0.00753)	0.09754 (0.00414)
E: 7.9% Intro Rate 6 months	0.00456 (0.00007)	33815.54 (477.38)	0.65818 (0.01141)	4540.12 (57.65)	2529.43 (97.29)	13425.76 (378.10)	0.24236 (0.00584)	0.08362 (0.00301)

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