Does It Pay to Read Your Junk Mail?

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1. Introduction

- In 2005, the Top 100 US advertisers spent over $271 billion.
- Where was this money spent?
  - Television (broadcast & cable): $67.9 billion
  - Direct Mail: $55.2 billion
  - Newspapers: $29.0 billion
  - Radio: $11.1 billion
  - Internet: $8.2 billion

1. Introduction

- Who spends the most?
  - Automotive (1): $20.9 billion
  - Retail (2): $18.6 billion
  - Telecom (3): $ 9.9 billion
  - **Financial Services (4) : $ 8.5 billion**
  - Medicine (5): $ 8.4 billion

1. Introduction

- Research Question:
  - Does advertising or persuasion impact consumer financial decisions?
- Timely topic:
  - April 26th, 2007 *WSJ* reported that banks were gearing up new marketing efforts to sell home equity loans and lines.
    - Simon, R., “Home Equity Stalls As Housing Market Cools and Rates Rise…” *Wall Street Journal* (April 26, 2007), D1.

1. Introduction

- Previous research in economics and marketing indicates that advertising is effective.
- However, little is known about the impact that advertising has on altering consumer evaluation of financial decisions.

1. Introduction

- Can advertising lead consumers to ignore important financial factors when faced with an economic decision?
  - Bertrand et al. (2006)
    - Field experiment showing advertising impacts loan take-up rate.
  - Russo, Carlson and Meloy (*Psych Science* 2006)
    - Persuasive information can lead decision makers to choose inferior alternatives.
  - Theory work in economics:
    - Mullainathan, Schwartzstein and Shliefer (2006)
    - Mullainathan and Shliefer (2005)
    - Shapiro (2006)

2. Mortgage Choice and Advertising

- Not aware of any research that has examined the impact that advertising and persuasion can have on consumer choice in the mortgage market.
- The mortgage is the single largest financial liability for most households.
- The choice of variable-rate or fixed-rate contract can have substantial impact on cost of homeownership.

2. Advertising

- Three competing economic views of advertising (Bagwell, 2005):
  - Persuasive
    - "Advertising alters consumers' tastes" and thus consumers make mistakes
  - Informative
    - Advertising provides information and lowers consumer search costs
  - Complementary
    - Advertising complements consumer tastes to encourage consumption

3. Empirical Setting

- Study home equity lines of credit (HELOCs) and home equity loans (HELs) originated by a large financial institution from March 2002 to December 2002.
- Differences between Lines and Loans
  - HELOCS – variable rate
  - HELs – fixed rate

4. Data

- Applications received via 2 channels:
  - Walk-in (WI): 108,117
  - Direct Mail (DM): 31,749
    - From March 2002 to May 2002, bank mailed over 3 million solicitations in 12 equally distributed waves to potential customers with FICO scores above 640.
      - 2.1 million were targeted with a line of credit offer (variable rate)
      - 981 thousand were targeted with home equity loan offer (fixed rate)
      - Line or Loan selection was random
      - No difference in average FICO scores across groups.

4. Data

- Direct Mail Response Rate
  - 20,500 responded to line of credit offer (0.99%)
  - 11,249 responded to loan offer (1.15%)
    - Credit quality of responding customers lower than population receiving solicitation.
  - All customers shown full product menu and were free to choose either product.

Some Examples of Direct Mail Solicitations

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PERSONAL AND CONFIDENTIAL
Brent W. Ambrose

You're Pre-Approved for a Citi Home Equity Loan

Dear Brent W. Ambrose,

Good News! If you're looking for a way to consolidate debt, make home improvements or pay for college tuition, Citi has a smart financing option available with our Preferred-Rate Home Equity Loan. **And – You've been Pre-Approved for a Preferred-Rate Home Equity Loan of $75,000.**[1] If you accept this offer by March 24th, your rate will be **6.99% APR** for the life of your loan.[2] Plus, you'll pay no application fees, closing costs or points.[3]

Need a low monthly payment?

With our ***Preferred-Rate Home Equity Loan*** of **6.99% APR** for a loan of $75,000 or more and an 80% combined loan-to-value ratio, here's how low your monthly payments could be for 30 years:

Loan Amount	$75,000	$100,000
Low Monthly Payment[4]	$499	$665

Want to save even more money?

Pay off those high interest-rate credit cards and loans! Many customers save hundreds of dollars each month by consolidating debt. And, with our Home Equity Loan, you'll pay no application fees, closing costs or points. Such fees with other lenders can be as much as $500 – this alone is a big savings. Plus, the interest you pay is potentially 100% tax-deductible.[5] There are few financing options available that offer these significant savings.

Prefer a variable interest rate?

If you prefer, you can apply for a variable rate Home Equity Line of Credit. If you like the flexibility of a line of credit, you have the option to convert all or some of your variable rate balance to a fixed rate at a later date. Ask our Home Equity Specialists for more details.

Call 1-866-312-1006 today.[6] You're already Pre-Approved!

Since you're already pre-approved, we can process your loan in minutes and may be able to schedule your closing in as little as ten days. There are few or no documents to provide and we come to you to sign loan documents so the process is *quick and hassle-free*. Our Home Equity Specialists are ready to assist you Monday through Thursday, until 10:00 pm, Friday until 8:00 pm, and Saturday until 3:00 pm, Eastern Time. And remember, this offer expires on March 24th, 2008.

Sincerely,

B.C. Collins

B.C. Collins
Vice President, Marketing
Citibank, N.A.

Preferred-Rate Home Equity Loan

Rate and Payment:

6.99%
Fixed APR

$499
Monthly Payment

$0
Closing Costs / Points

Call Today!
1-866-312-1006

Offer Expires on
March 24, 2008

Mention Offer Code:
JAN8U0000329145

You can choose to stop receiving "prescreened" offers of credit from this and other companies by calling toll-free 1-888-5-OPTOUT (1-888-567-8688). See PRESCREEN & OPT-OUT NOTICE

ThirdFederal®
SAVINGS & LOAN

D1 M07 42 0048 892741
BRENT AMBROSE

Home Equity Line of Credit
Prime -1.01%
BALANCE OF $50,000 OR MORE PRIME -1.01%
BALANCE OF $49,999 OR LESS PRIME -.51%

LOWEST RATE GUARANTEED

We'll Beat Any Rate or Give You $500!

Dear Brent Ambrose,

Third Federal is the only bank that guarantees you the lowest rate on a home equity line of credit. Other lenders promise you low rates but none are willing to back it up with a 100% iron-clad guarantee.

Open a Third Federal Home Equity Line of Credit at the guaranteed lowest rate anywhere — currently **4.99% APR on balances of $50,000 or more — an incredible 1.01% below prime.** Only Third Federal guarantees you the lowest rate on a home equity line, and we guarantee it will stay the lowest throughout the entire life of the line. Think about it. A rate already lower than prime, and we'll lower it even more if you ever find a better rate.

But our Home Equity Line gets even better. **There are no hidden fees.** You will never pay closing costs, an annual fee, or a prepayment penalty. Plus, there is no initial draw requirement. And Third Federal will never change your rate because of your credit score.

No teaser rates, no introductory rates, no games. That's why Third Federal has become one of the top home equity lenders in the U.S.A. In fact, Third Federal is ranked #1 in customer satisfaction among the top 100 home equity lenders.

So go ahead and make that home improvement, buy a new car, or consolidate high-interest debt. Use your home equity line of credit for whatever you need, whenever you need it. You may be able to deduct 100% of the interest from your taxes. And if you have a line of credit elsewhere, we'll even handle transferring the balance.

It's so easy! To apply for your home equity line, just call 1-888-79-HELOC (794-3562) between 8:30am and 5:00pm EST. Or visit www.thirdfederal.com/offer by March 27, 2008. It only takes a few minutes and you can sign the loan papers right in your own home.

Sincerely,

Marc A. Stefanski

Marc A. Stefanski
Chairman & CEO

P.S. Open your Third Federal Home Equity Line of Credit by March 27, 2008, and we'll give you a $200 Gift Card to The Home Depot®!

- **Rate good for life of line**
- **No initial draw**
- **Fixed-rate options available**
- **No closing costs, fees, or penalties**
- **Rate won't change because of credit score**

Rate effective 2/1/08. Variable APR of 4.99% and 5.49% is *The Wall Street Journal* Prime Rate less 1.01% and less .51% respectively. Subject to change.

EQUAL HOUSING LENDER

Key Features From Examples:

Prefer a variable interest rate?

If you prefer, you can apply for a variable rate Home Equity Line of Credit. If you like the flexibility of a line of credit, you have the option to convert all or some of your variable rate balance to a fixed rate at a later date. Ask our Home Equity Specialists for more details.

So go ahead and make that home improvement, buy a new car, or consolidate high-interest debt. Use your home equity line of credit for whatever you need, whenever you need it. You may be able to deduct 100% of the interest from your taxes. And if you have a line of credit elsewhere, we'll even handle transferring the balance.

- **Fixed-rate options available**
- **No closing costs, fees, or penalties**
- **Rate won't change because of credit score**

5.1 Model of Mortgage Choice

- Empirical Specification
  - Assume consumers choose contract that maximizes personal utility.
  - Include demand shift variable (I) to reflect marketing effect.

$$\Pr\left(Y_i = 1\right) = \beta X_i + \alpha I_i + \pi_R X_i^R I_i + \pi_E X_i^E I_i + \varepsilon_i$$

5.1 Model of Mortgage Choice

- Model Specification (X):
  - Economic Environment Variables
    - Interest Rate Difference and FRM Level
  - Loan-to-Value Variables
    - Loan amount requested and borrower estimate of house value
  - Borrower Stated Use of Funds
    - Consumption, Refinancing, or Home Improvement
  - Borrower Characteristics
    - FICO, Income, Age, Job tenure, 1^{st} Mortgage Balance, House tenure, Employment status

5.1 Model of Mortgage Choice

$$\Pr(Y_i = 1) = \beta X_i + \alpha I_i + \pi_R X_i^R I_i + \pi_E X_i^E I_i + \varepsilon_i$$

- Hypotheses:
  - Persuasive view implies that DM customers will ignore economic factors.
    - We should observe the DM customers selecting the advertised product.

$$\alpha_v > 0,\ \alpha_f < 0,\ \pi_E = \pi_R = 0$$

5.1 Model of Mortgage Choice

$$\Pr(Y_i = 1) = \beta X_i + \alpha I_i + \pi_R X_i^R I_i + \pi_E X_i^E I_i + \varepsilon_i$$

- Hypotheses:
  - Informative views implies that advertising lowers customer search costs, but do not alter preferences.
    - The interaction terms (π) should have same sign as base parameters (β)
    - Customer choice should correspond to product advertised.

5.1 Model of Mortgage Choice

$$\Pr(Y_i = 1) = \beta X_i + \alpha I_i + \pi_R X_i^R I_i + \pi_E X_i^E I_i + \varepsilon_i$$

- Hypotheses:
  - Complementary view implies that customer preferences are stable and advertising encourages consumption.
    - The interaction terms (π) should have same sign as base parameters (β)
    - But no direct effect of advertising

5.1 Sample Selection

- What if consumer's response to marketing effort is endogenous?
  - Theoretical argument against this problem:
    - Rosenthal and Zorn (1993) show that more mobile borrowers prefer ARMS
    - Our study focuses on home equity products (not first mortgages)
    - Reasonable to assume that these borrowers have lower mobility on average.
    - Thus have unbiased preference for FRMs, all else equal.
    - Effect is to bias our estimate downward.
    - Suggests that our findings are stronger than indicated.

5.1 Sample Selection

- Empirical Test
  - Estimate a bivariate probit model

$$\Delta_i = \gamma Z_i + \nu_i;$$

$$Pr(Y_i = 1) = \beta X_i + \alpha I_i + \pi_R X_i^R I_i + \pi_E X_i^E I_i + \varepsilon_i.$$

$$\rho = Cov[\nu_i, \varepsilon_i].$$

  - Correlation parameter is insignificant

5.1.3 Impact of Advertising Campaign

- Results indicate that:

$$\alpha_v > 0,\ \alpha_f < 0,\ \pi_E = \pi_R = 0$$

  - Consistent with Persuasive View

	Coeff. Value	Standard Error	P-value	Marginal Impact
Economic Environment Variables:				
DM Line Offer Dummy	0.22640	0.05600	<.0001	17.74%
DM Loan Offer Dummy	-0.21220	0.03600	<.0001	-14.67%

Simulation

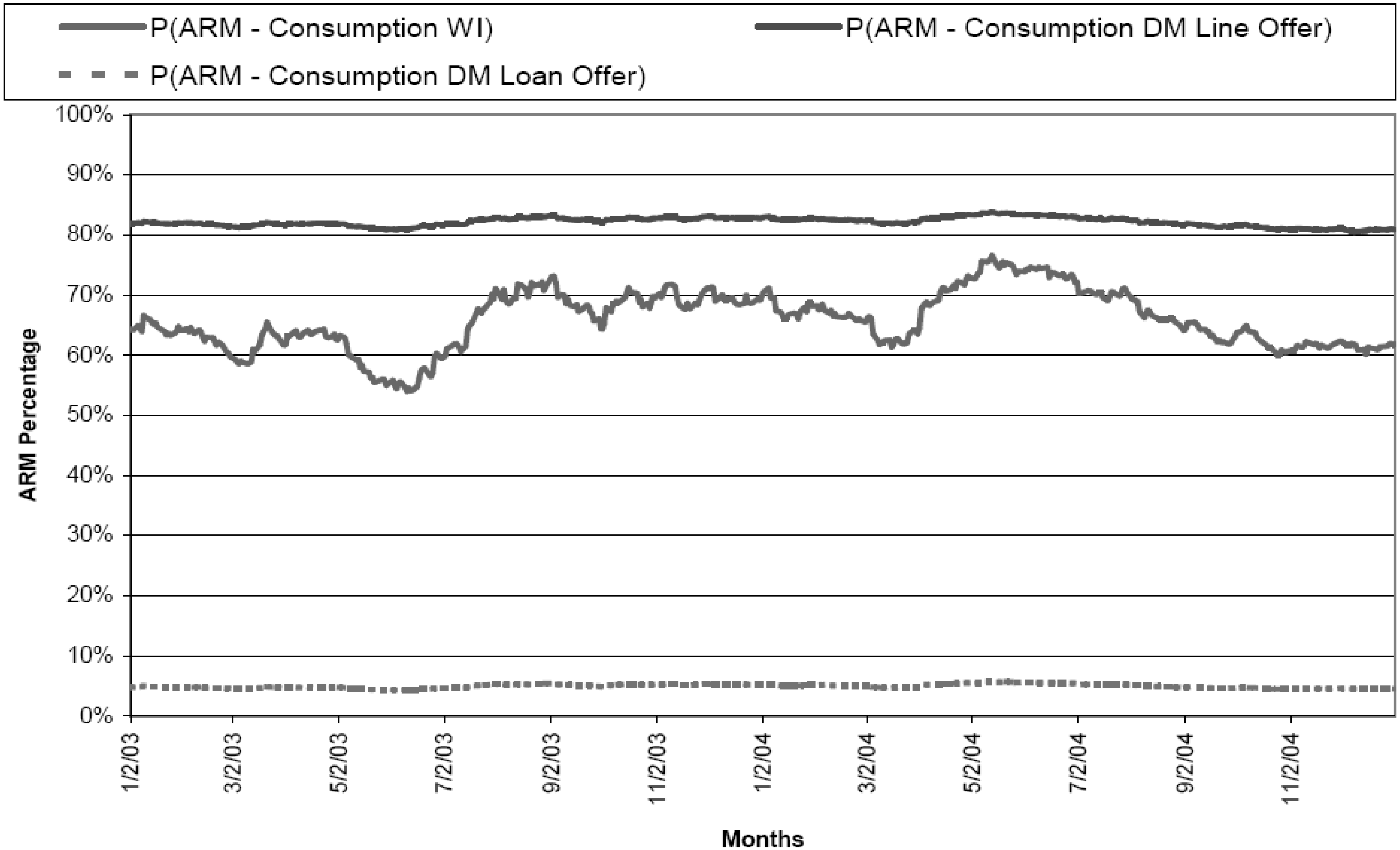

Figure 3: **Probability of Choosing an ARM for Consumption Motive Borrowers with varying FRM APR and Rate Differences**

Simulation

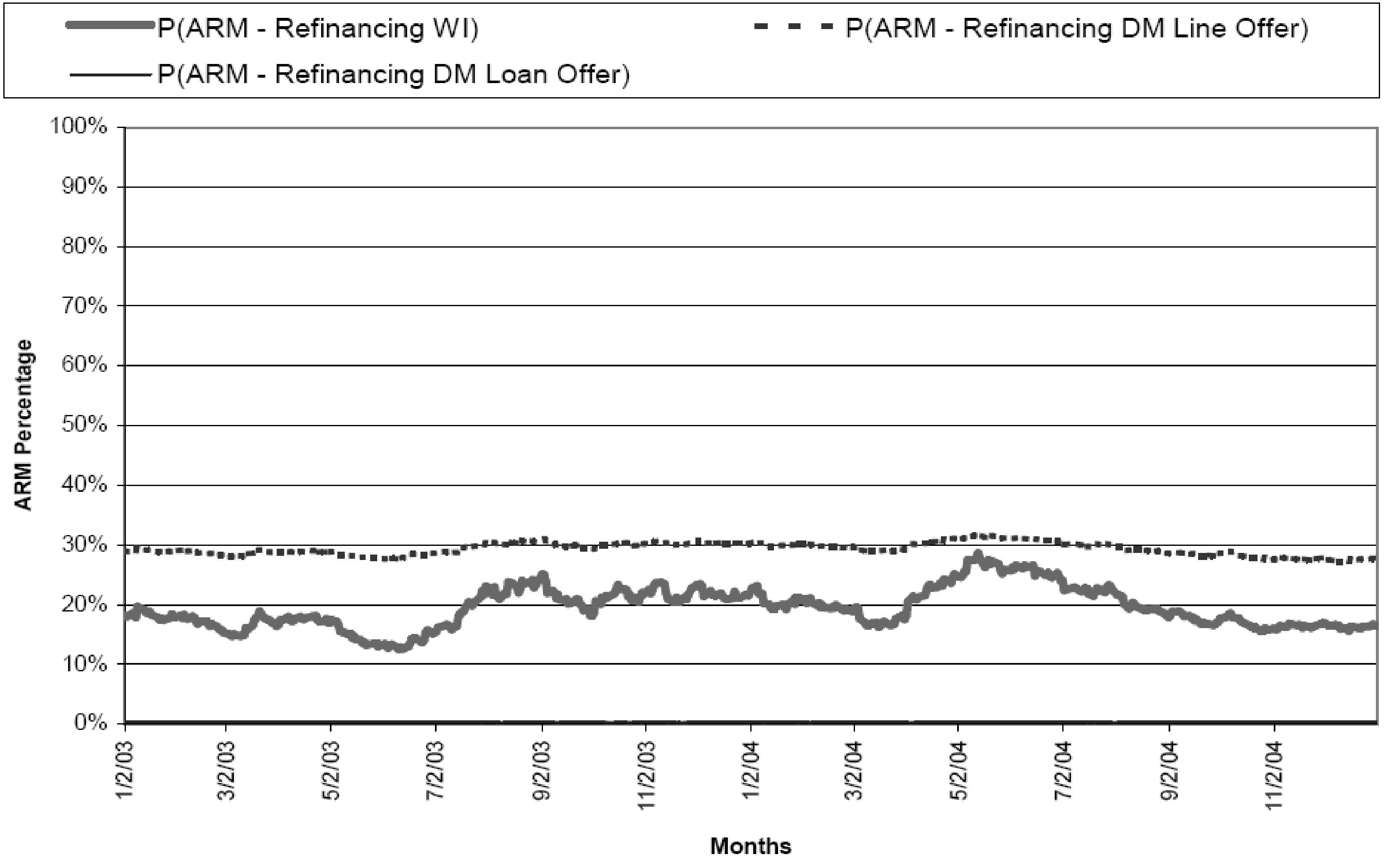

Figure 4: **Probability of Choosing an ARM for Refinancing Borrowers with varying FRM APR and Rate Difference**

Summary of Initial Results

- Mortgage choice is sensitive to the economic environment.
- Borrowers who received solicitations did not select product in manner consistent with theory.
- Advertising campaign had persuasive effect.

6. Switchers versus Non-Switchers

- We matched the solicitation database with the application database, thus we can identify the customers that received a line (or loan) offer but selected a loan (or line) product.
  - We label these customers as switchers.
- Do observable differences exist between switchers and non-switchers?
  - Can we identify customers that are most likely to be persuaded by the bank?

6. Switchers versus Non-Switchers

- 22% of DM customers switched products
- Results indicate that more financially sophisticated customers are more likely to switch.
  - Higher FICO scores
    - A 50 point increase in FICO score increases odds of switching by 24 percent.
  - Higher Income
  - Younger
    - A 56-year old is 33 percent less likely to switch than a 46-year old.
  - Customers using funds for consumption do not respond to economic incentives – significantly less likely to switch away from product advertised.

7. Robustness Checks

1. Matched Sample Analysis:
   - Customers who receive a line of credit solicitation are 44.7 percent more likely to select a variable rate line of credit.
2. Did Switchers ignore the bank's direct market cue?
   - DM switchers are similar to WI customers
3. Compare predicted choice with actual choice.

Table 10: **Analysis of Persuaded versus Informed Consumers**

	Number Mailed	Predicted FRM		Predicted ARM	
		Selected FRM	Selected ARM	Selected FRM	Selected ARM
Mailed ARM	15,877	· · ·	**12,336**	· · ·	*3,541*
			50%		*14%*
Mailed FRM	8,874	*2,918*	· · ·	**5,956**	· · ·
		12%		**24%**	

Notes: This table reports the frequency of customers identified as either persuaded or informed. For all direct mail borrowers who did not switch products, we estimated the predicted product that they should select based on the coefficients from the walk-in mortgage choice model (Table 7). We then compare the predicted choice to the actual choice based on whether the borrower received an adjustable-rate (ARM) or fixed-rate (FRM) solicitation. The persuaded borrowers selected the product opposite to the one predicted and are noted in bold. Informed borrowers selected the product that is consistent with the one predicted and are noted in italics. Borrowers following into the (· · ·) cells selected the predicted product and thus ignored the bank's advertising.

7.2 Robustness Checks

- Can prediction error (Type II) explain results?
  - Use hold-out sample of WI customers

Actual Selection	Predicted Selection ARM	FRM	Total
ARM	48,345	8,167	56,512
	85.5%	14.5%	
FRM	3,056	16,800	19,856
	15.4%	84.6%	
Total	51,401	24,967	76,386

  - Type II error rate is 15%
  - DM error rate is 74%

7.2 Robustness Checks

- Now focus on *ex post* performance of booked loans.
- Did the "persuaded" customers recognize their mistake?
  - Examine 3-month "unconditional" prepayment rates.
    - Persuaded customers == 4.3%
    - Complimented customers == 2.9%
    - Walk-in customers == 1.7%

7.2 Robustness Checks

- One concern: borrower's may not care about selecting the "right" product.
  - That is, costs associated with incorrect decision might be trivial.
- Thus, we examined the takedown (utilization) rates.
  - Rates are very similar for WI and DM customers.
  - This is not consistent with hypothesis that decision costs are trivial.

Conclusions

- The results suggest that financial variables underlying the relative pricing of debt contracts are the leading factors explaining consumer debt choice.
  - Confirms previous research
- The intended use of the funds significantly impacts that choice.
  - A new finding.
- Advertising appears to have persuasive properties for a subset of consumers.
  - A new finding.