The Failure of Price Competition in Settings with Marketing Costs: The Case of Credit Cards

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Abstract: There is an ongoing debate about the credit card industry regarding how effective competition has been at reducing prices. Some experts argue that intense competition is clearly evident and leads to low prices that contain no excess profit. However, other experts find evidence both in price data and in market concentration that competition has failed. A model is presented here showing that if there are temporarily excess profits in a competitive market with a structure resembling that of the credit card market, firms seeking to increase demand for their particular product may lead to costs that rise to meet prices rather than prices that fall to match costs.

The intuition of the model is that firms can either reduce prices or increase mail solicitations while holding prices constant to expand market share. It is entirely possible under reasonable conditions for market share expansion through increased solicitation to be the most profitable option. If the market were perfect except for this information cost, then it would still be socially optimal for issuers to spend money on marketing rather than reducing prices because when it is the most profitable course of action, marketing also informs consumers of products that are beneficial to them leading to net gains for issuers and consumers combined that are larger than for price reductions.

However, in the market for credit cards, there are other potential imperfections. For example, there may be systematic errors caused by known behavioral biases in borrower sensitivity to various pricing attributes. Furthermore, it is shown here statistically using historical response rate and mail volume data that an externality exists when an individual issuer decides to increase mail volume. These factors combine can lead to a situation where competition for market share does not lead to meaningful price reduction and does not create a significant benefit for consumers.

In addition to exploring a theoretical model, actual historical data from the credit card industry in pricing, mail volume, and costs are used to demonstrate that the industry is consistent with the scenario shown in the model. More specifically, the credit card industry does indeed appear to have had excess profits, and while the profits have made the market subject to intense competition among the leading issuers, the competition has been focused on expansion through marketing rather than expansion through true price reductions (though some price "signals" have declined). While the focus here is on the credit card industry, it is likely that analogous situations can arise in other industries with some structural similarities.

INTRODUCTION

There is an ongoing debate about the credit card industry regarding how effective competition has been at reducing prices. Some researchers argue that intense competition is clearly evident and leads to low prices that contain no excess profit.[1] However, other experts find evidence both in price data and in market concentration that competition has failed.[2]

If there is excess profit among supplying firms and intense competition, standard economic models predict that prices will drop benefitting consumers. The model presented here shows that costs could rise in a competitive market rather than prices falling under certain conditions. The conditions presented in this model are intended to mimic credit card market, but can apply to other markets as well. In general, the model is applicable to situations where there are information costs. More specifically, it applies when there are deadweight losses to industry from excessive product marketing yet individual firms still have an incentive to engage in this marketing. If there are temporarily excess profits in a market with a structure resembling that of the credit card market, firms seeking to increase demand for their particular product may lead to costs that rise to meet prices rather than prices that fall to match costs.[3] This can occur even if there is intense competition for customers.

The intuition behind the model begins with the premise that there is a marketing cost to providing information regarding products. In the case of credit cards, the cost is partially through mailing and material costs of new solicitations. There is also an externality where information regarding competing products crowd each other out. In the case of credit cards, response rate drops when mail volume rises. This results in a situation where marketing costs rise to absorb excess profit rather than costs falling.

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[1] For example, Cargill & Wendel, Bank Credit Cards: Consumer Irrationality versus Market Forces, Journal of Consumer Affairs, 30(2), (Winter 1996); and Competition and Pricing in the Credit Card Market, Victor Stango, The Review of Economics and Statistics, Vol. 82, No. 3, (Aug., 2000), pp. 499-508

[2] For example, Frank, Joshua M. "What Does the Credit Card Market Have In Common with a Peacock?" The Lydian Payments Journal 1, 1 (2009):24-40; Oren Bar-Gill, Seduction by Plastic, 98 Nw. U. L. Rev. 1373 (2004); and Lawrence M. Ausubel , 1991 The Failure of Competition in the Credit Card Market, The American Economic Review, Vol. 81, No. 1, pp. 50-81.

[3] Ausubel (1991) also raises the possibility of rising credit card industry costs following a period of excess profit. However, this is due to expanding into higher charge-off markets which increases losses. (Lawrence M. Ausubel , 1991. The Failure of Competition in the Credit Card Market, The American Economic Review, Vol. 81, No. 1, pp. 50-81.) However in reality high risk cardholder such as those in the subprime market are often charged a higher price than prime market consumers. To the extent that revenue rises along with losses when expanding into these markets, profits need not decline.

STRUCTURE OF THE CREDIT CARD INDUSTRY

As shown in Table 1, the credit card industry has an oligopoly structure. While there are a large number of small issuers, 86% of balances are held by the top 8 issuers, and 90% are held by the top 10. Oligopoly is not a necessary assumption for the model presented. In fact, the smaller each typical issuer's market share, the less the individual firm feels the impact of the marketing cost externality caused by their actions. However, for purposes of realism, in the later stages of this analysis, an oligopoly of ten issuers is assumed.

Table 1: Oligopoly in the credit card market

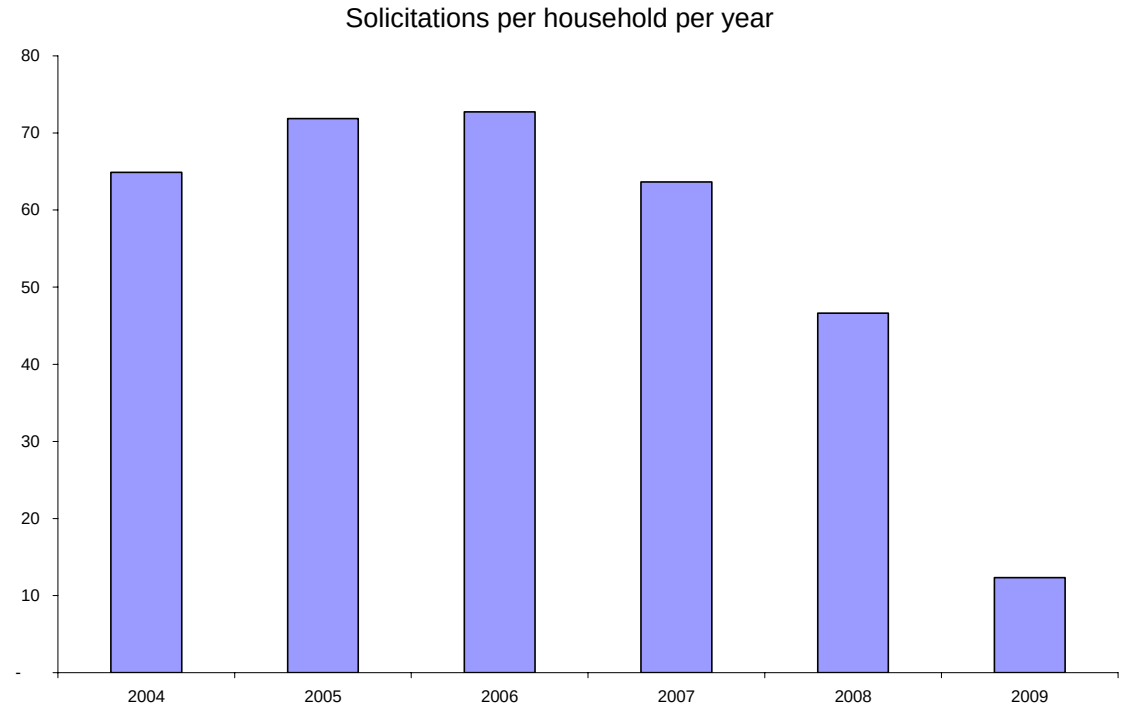
	Top 10 Issuers (Q1 2009)	Mngd Receivables	Market Share
1	Citigroup Inc.	$174,795,000,000	19.9%
2	Bank of America Corp.	$173,352,159,000	19.8%
3	JPMorgan Chase & Co.	$165,720,000,000	18.9%
4	American Express Co.	$64,201,878,000	7.3%
5	Capital One Financial Corp.	$60,842,316,000	6.9%
6	Discover Bank	$48,165,777,000	5.5%
7	HSBC North America Holdings	$43,841,058,000	5.0%
8	Wells Fargo & Co.	$23,150,000,000	2.6%
9	USAA	$18,769,050,000	2.1%
10	GE Money Bank	$13,804,859,000	1.6%
Top 8	Market Share		85.9%
Top 10	Market Share		89.6%

Despite the oligopoly structure of the market, competition remains intense. Issuers do compete intensely in some dimensions of price, such as through the proliferation of 0% teaser rates. However at the same time other dimensions of price remain highly shrouded and do not face intense competition.[4] Price competition can also be seen in the intensive mailing of solicitations (see Figure 1). While solicitation levels have dropped off dramatically since the economic downturn, the average household still receives over 10 offers per year.

Despite competition, the average price for a loan is high. While 0% teasers give an illusion of low prices, the average price paid by consumers is high. Using data from Cards and Payments,[5] in 2008 the average interest revenue generated was 12.15% of

[4] Frank, Joshua M. 2009. "What Does the Credit Card Market Have In Common with a Peacock?" The Lydian Payments Journal 1, 1:24-40.
[5] Kate Fitzgerald, 2009. "2009 Bankcard Profitability Study," Cards & Payments, May: 22-24.

balances. When non-revolving balances are factored in, this implies that the average price charged to people who borrow money on their credit card is closer to 14-15% Fees charged directly to consumers (i.e. excluding interchange fees charged to merchants) add another 2.67%. Therefore, combined credit card prices for borrowers average about 17-18% as a percentage of assets.



Source: Mintel Comperemedia, Center for Responsible Lending Calculations

Figure 1

There are other reasons price competition may fail in credit card markets beyond what is covered here. Frank[6] defines credit cards as a "peacock market" were extravagant signals that exploit both behavioral biases and information limits/complexity dominate the market. Ausubel[7] has found evidence of excess profit in industry and provides some potential explanations for why this might occur. The model presented here does not assume excess profit. In the scenario presented, costs rise to squeeze profit margins rather than prices falling. While there has been regulatory activity recently in the credit card industry both by the Federal Reserve in December 2008 and in May 2009 through passage of the Credit CARD Act, these regulations do not address the topic of this model. Recent regulation was focused on unfair and deceptive practices rather than high general average prices. The Act does not generally limit how high an interest rate issuers can charge.

[6] Frank, Joshua M. 2009. "What Does the Credit Card Market Have In Common with a Peacock?" The Lydian Payments Journal 1, 1:24-40.
[7] Lawrence M. Ausubel , 1991 The Failure of Competition in the Credit Card Market, The American Economic Review, Vol. 81, No. 1, pp. 50-81.

There is evidence that the response rate in the credit card industry is inversely proportional to the mail volume. As shown in Figure 2, a simple regression of yearly data suggests a significant inverse relationship. When both series are converted to natural log values, the result is a statistically significant relationship with an elasticity close to 1 ((beta = -1.04, t=-10.67, p<0.0001, R-square=.877). However, part of this relationship may be due to a decrease in response rates and unrelated increase in mail volume over time throughout most of the data period. When a year variable is added to the regression to account for trends over time, a similar pattern is evident, but the statistical significance of mail volume becomes marginal (p=0.068 with 2-tail test, beta=-0.44). However, it is a short series with only 17 data points and strong time trends, making it difficult to distinguish the distinct impact of mail volume on response rate.

Some of the difficulty with using an aggregated national data series can be eliminated by utilizing recent Mintel Comperemedia data that analyzes response rate at the household level. As shown in Figure 2, there is strong evidence that response rate is lower for households that receive more offers. This is based on aggregated quarterly data divided into categories based on the number of offers a household received. Each data point is for a particular quarter over the 7-quarter period ending in the third quarter of 2009. The differences between the mean values for these categories was statistically significant (t=5.63, p<0.001)

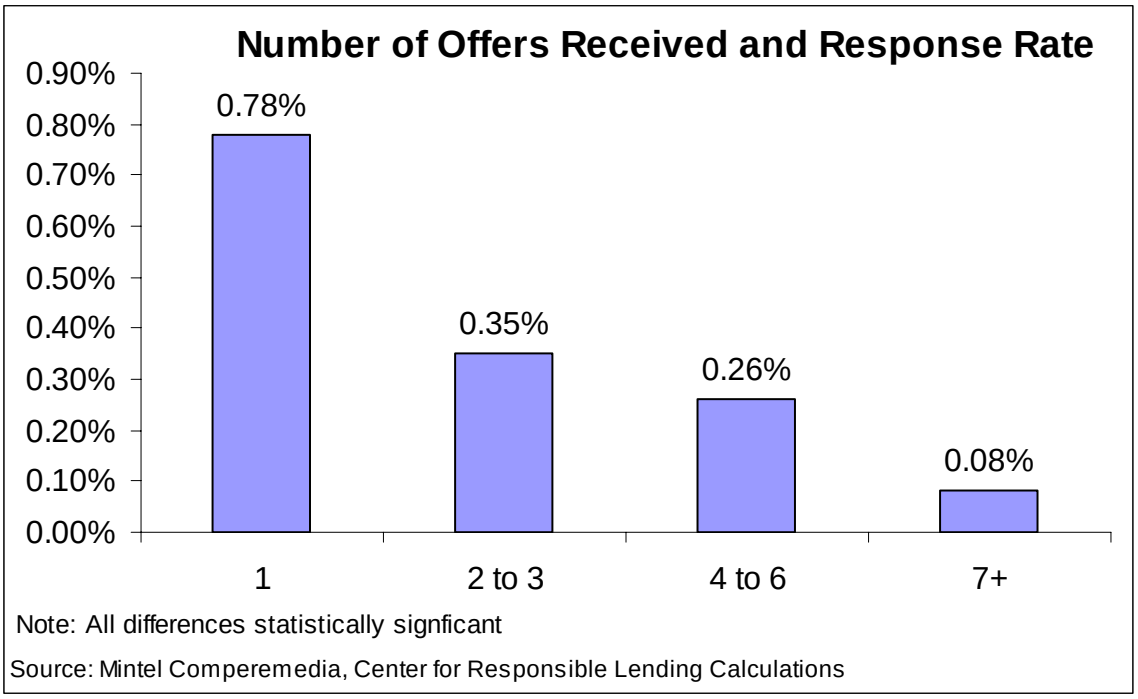


Figure 2

THEORETICAL MODEL

A model was created that mimicked the structure of the credit card market. As described in the introduction, the scenario model starts with an initial condition of excess profit in terms of rate of return on assets, and then models credit card issuer incremental action. The model is incremental rather than assuming issuers move immediately to the optimal price and mail levels for multiple reasons. The first is to match the initial scenario as described above. In this scenario, issuers temporarily have excess profits (economic rents) and the question is how the market will respond to this situation. The fact that there is an initial condition of excess profit suggests the market is not in its final equilibrium state.[8] The second reason for using an incremental model is to match the actual behavior of issuers. The full impact of a price or mail volume change is uncertain to issuers, and they typically will only have a reasonable estimate of the impact within a limited scope of change in price or mail volume. Therefore, they typically test new products and market expansions and roll them out incrementally. Ultimately, however, the conclusions of this exercise do not depend on the incremental approach. The externality on response rate would still occur and lead to wasteful spending if the approach were not incremental.

In the initial stages of this analysis, oligopoly is not assumed. In particular, each issuer's response rate is assumed to not change when they increase mail volume. Later that assumption is relaxed. To isolate analysis of the issue in question from other pricing practices in credit cards, pricing is assumed to be simple rather than multidimensional and straightforward rather than potentially deceptive, even though these assumptions are unrealistic.

A high profit margin issuer is likely to wish to expand the size of their market. In doing so, they are faced with two options.[9] They can increase their market size by reducing prices and therefore raising response rates. Or they can increase their market size by raising the mail volume.

The choice faced by issuers is defined by two equations. The first defines the "cost equality condition".

[8] There are reasons that excess profits could exist for the credit card industry even in equilibrium, but this is beyond the scope of this paper. One possible reason this could occur is explored in Frank, Joshua M. 2009. "What Does the Credit Card Market Have In Common with a Peacock?" The Lydian Payments Journal 1, 1:24-40.

[9] A third option would be to increase the balances of existing accounts, but that possibility is ignored for this analysis. Increasing existing balances by marketing to current customers can lead to the same externalities discussed here since it typically involves intense marketing of cash advances checks, balance transfers, and other offers by mail.

(1) $\Delta MV * Cm = MV_0 * RR_0 * Bal * \Delta P * t$

Where MV=mail volume; Cm=Cost per piece mailed; RR=Response Rate; Bal=Avg Balance (over account life); t=Avg account life; P=price (defined as APR)

On the left side of the equation is the cost of increased mail volume. On the right is the cost of a price decrease. The mail cost primarily consists of a cost for materials and delivery per piece of mail. The cost of a price decrease is defined by the reduced revenue from the new accounts booked due to the price change. Issuers have the power to price discriminate by giving different offers to different consumers. Therefore it is assumed that the price change only effects the next mailing, and leaves existing customer prices unchanged.

The two sides are defined as equal simply to create an equivalent cost increment for analysis of the revenue impact.

On the revenue side the impact is:

(2) $\Delta MV * RR_0 (P_0\text{-}OC) * Bal * t$
$= (<) (>)$
$MV_0 * \Delta RR * Bal * t * (P_0 - \Delta P - OC)$

where OC=Operating Cost (defined like P as % of assets)

The first line of the second equation is the incremental revenue from an increased mail volume while the second line gives the incremental revenue from a price decrease. In both cases, the incremental revenue comes from an increase in the customer base. If the first line in equation 2 is greater than the second, the optimal choice is an incremental mail volume increase while if the last line is larger, the optimal choice is a price decrease.

The most useful way to see what these equations imply is to simply incorporate some realistic values for the parameters based on the current credit card industry as shown in Table 2

Table 2: Parameter assumptions

Mail cost	Cm	$1.50
Response Rate (initial)	RRo	0.60%
Initial Mail Volume (issuer-monthly)	MV	50,000,000
Change in MV	ΔMV	5,000,000
Price (Interest Rate + fees as ROA)	P	18%
Average balance	B	$3,000
Average life of account	t	5
Operating Cost (ROA basis)	OC	12%
Margin before marketing (P-OC)		6%

Using the above parameters in the cost equality condition implies that a price decrease of 0.167 percentage points is equivalent in cost for an issuer to an increase in volume of 5 million.

Turning to the revenue equation, the impact of a mail volume increase of 5 million (or 10%) on revenue is $27 million. Setting equation 2 to the equality condition, the response rate increase needed to get the same revenue impact from a 0.167 percentage point (0.9 percent) price cut is 0.062%. This is about a 10.3% increase in response rate and would imply a price-response rate elasticity of 11.109. It is unlikely that a price decrease of about a sixth of a percentage point would provide nearly this lift in response rate. This conclusion is reinforced by conversations with credit card industry executives, who indicate that the typical elasticity of response rates to price changes has historically been much less than this. Prior research on the also suggests a lower elasticity of loan response rates to interest rates.[10] While the parameters in Table 2 could be somewhat off, they are close enough that any realistic scenario would likely lead to the same conclusion: In most realistic circumstances, increasing mail volume makes more sense for the issuer than decreasing prices. This conclusion is consistent with what we have seen happen in the industry before the economic downturn. But increasing mail volume in a traditional model with limited information would not necessarily present a problem. That is because the increased mail volume provides consumers with information they value, and the value of that information is greater than the cost.

More specifically, the benefit to a rational, informed consumer of having a card is at least equal to the price they pay which is P*Bal*t.

Therefore, the aggregate benefit to rational, informed consumers of a mail expansion must be greater than the price each pays who takes the offer times the number of consumers who respond or:

(3) Benefit of expansion to consumer > $\Delta MV * RR_0 * P_0 * Bal * t$

The revenue to the issuer is:

(4) Revenue from expansion to issuer = $\Delta MV * RR_0 (P_0\text{-}OC) * Bal * t$

Since (3) must be greater than (4) (long as operating costs are greater than zero), the benefit to consumers is larger than the revenue the issuer receives from a mail volume increase. Therefore, if it is profitable for a rational issuer to expand mail volume, there is a net benefit to consumers.

[10] Marianne Bertrand, Dean S. Karlan, Sendhil Mullainathan, Eldar Shafir, and Jonathan Zinman (2005). "What's Psychology Worth? A Field Experiment in the Consumer Credit Market," Yale University Economic Growth Center, Discussion Paper #918, July.

However, this changes when we alter the scenario by adding an externality due to increased mailing. Excessive mailing causes "information overload". The above equations depend on rational, optimizing consumers who weigh all information they receive. In reality, it is likely that consumers simply do not attend to all offers presented and that their likelihood of attending to each offer decreases as mail volume rises. From the perspective of the other issuer's who did not send that particular piece of mail, this causes an externality where their response rate declines due to a competitor's increase in mail volume.

It is important to note that this increase in volume often takes the form of the same product/offer being mailed to the same consumer multiple times. In other words, it cannot be justified as simply an increase in product variety to consumers.

It should also be noted that there is an additional negative externality that is not even included here. That is the hassle from "junk mail" which creates a cost directly to consumers. This cost would magnify the intensity of the results here, but it is not included to simplify the analysis and to avoid focusing on psychological costs that are difficult to substantiate.

If we assume the issuer mails more rather than changing prices, the issuer now faces a different decision, which is whether to increase mail volume or stop increasing mail volume. For the issuer, the impact of an increase in mail volume is:

(5) $\Delta MV * RR_0 (P_0\text{-}OC) * Bal * t - \Delta MV * Cm$
$- \Delta RR * (MV_0+\Delta MV) * (P_0\text{-}OC) * Bal * t$

The first line in this equation is simply the mail volume portions of the revenue minus cost equations provided earlier. The second line is a relaxation of constant response rate assumption. In other words, it gives the impact of reduced response rate due to mail volume on the issuer.

Assume the market is a 10-firm oligopoly, with each firm having an equal size. The true cost to the industry from the reduced response rate due to one firm's expansion is:

(6) $\Delta RR * (10*MV_0+\Delta MV) * (Po\text{-}OC) * Bal * t$

This is simply the second line from (5) with the initial mail volume multiplied by 10.

Using the same assumptions for parameters from Table 2, we can estimate the impact on the issuer and industry of the expansion. This is shown in Figure 3. As indicated, the impact depends on the elasticity of the response rate to the mail volume. However, the individual issuer has an incentive to continue mailing even at high elasticities that negatively impact the industry as a whole. The difference between the two is an externality.

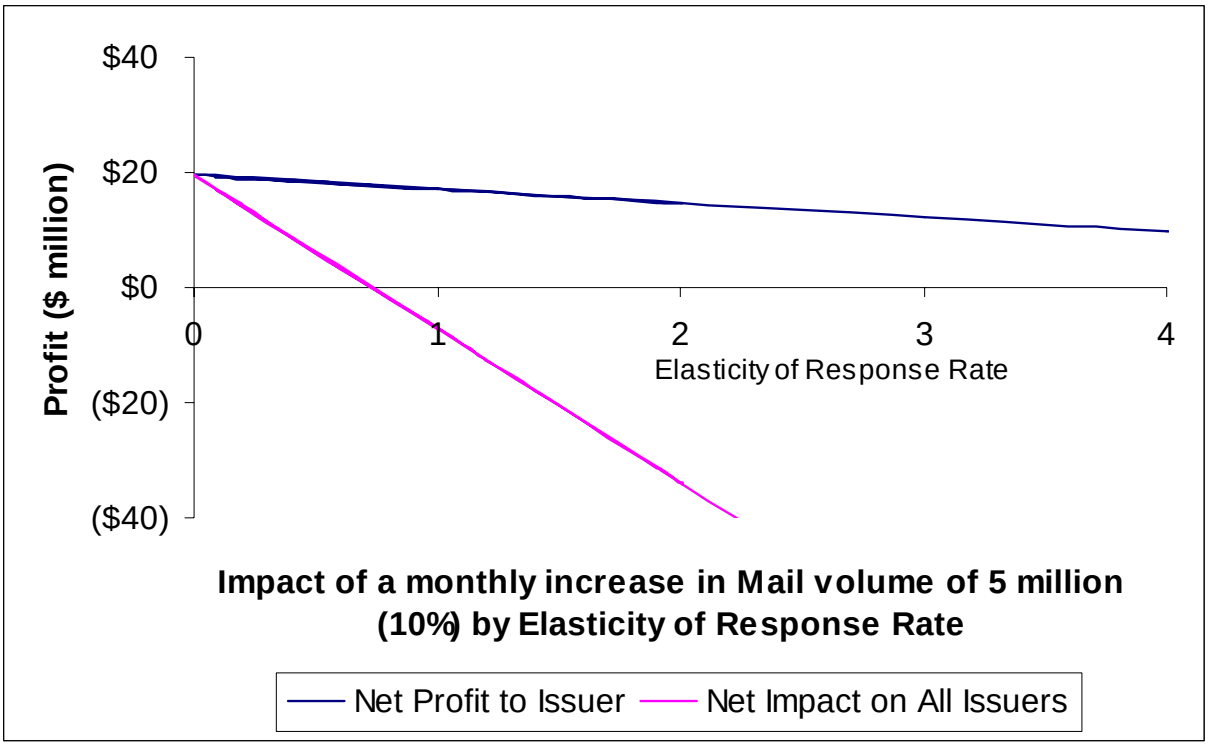


Figure 3

This externality results in a situation where the industry could have made more profit at a much lower mail volume, as shown in Figure 4. The reduced profit from the heightened volume is a deadweight loss due to the externality

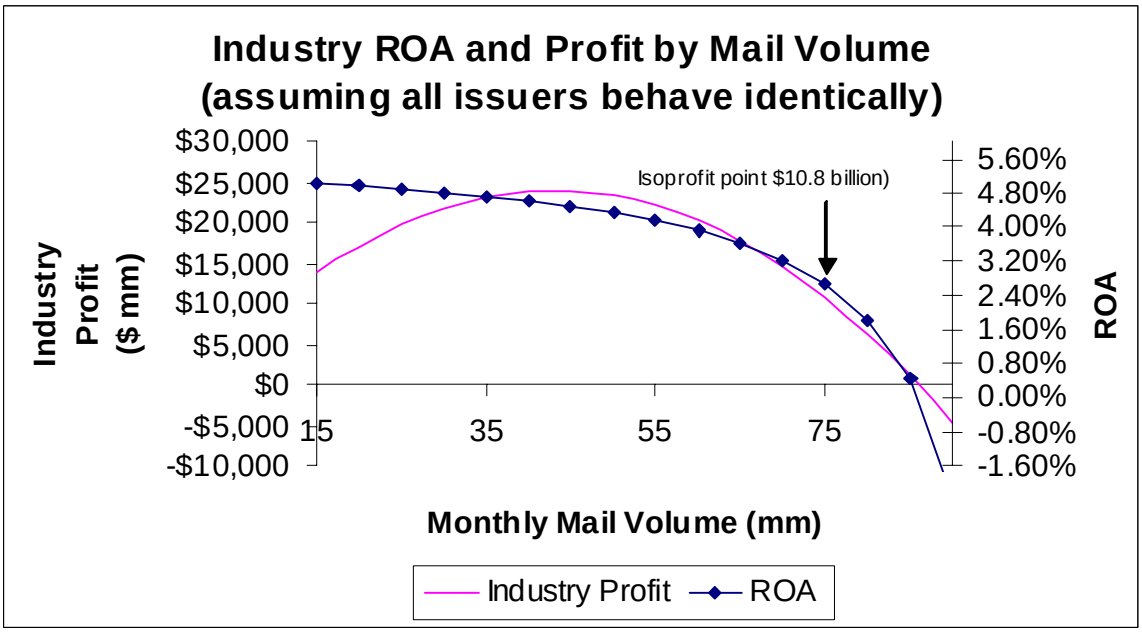


Figure 4

Alternatively, from the consumer's perspective the industry could have maintained the same profit level at a reduced mail volume while providing a reduced cost to consumers (see Figure 5). The figure shows an "isoprofit curve" indicating the APR that could have been charged while maintaining the same profit level. In this case the profit level is defined as $10.8 billion, the level seen at a mail volume of 75 million per issuer per month. Consumers could have received interest rates almost 3 percentage points lower while maintaining the same industry profit level.

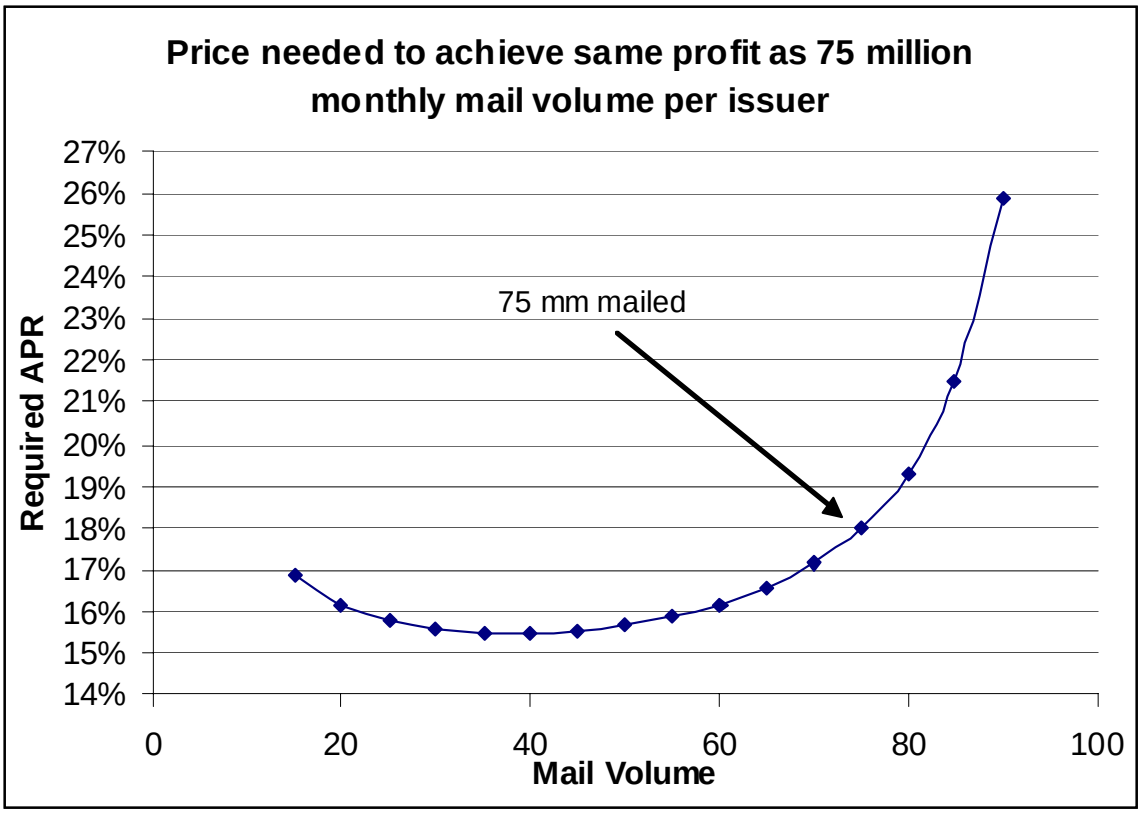


Figure 5