# Competition and Price Discrimination in the Market for Mailing Lists|* 

Ron Borzekowski<br>Federal Reserve Board

Raphael Thomadsen<br>UCLA

Charles Taragin
University of Michigan
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#### Abstract

This paper examines the relationship between competition and price discrimination in the market for mailing lists. More specifically, we examine whether list sellers are more likely to segment consumers by offering a menu of choices (second-degree price discrimination) and/or offering different prices to readily identifiable groups of consumers (third-degree price discrimination) in more competitive markets.

The dataset includes information about all consumer response lists derived from mail order buyers (i.e. lists derived from catalogs) available for rental in 1997 and 2002. Using industry classifications, we create measures of competition for each list. We then use these measures to predict whether given lists utilize discriminatory pricing strategies.

Our results indicate that increased competition is generally associated with an increased propensity to price discriminate. These results hold for both second-degree and third-degree price discrimination. Further, list owners offer menus with more choices in more competitive markets. These results, taken together with results from other empirical studies, suggest that the connection between competition and increased price discrimination is a result that applies broadly.


Keywords: Price Discrimination, Competition, Direct Marketing, Segmentation

## 1 Introduction

This paper examines the relationship between competition and price discrimination in the market for mailing lists. More specifically, we examine whether list sellers have a higher propensity to segment consumers by offering a menu of choices (second-degree price discrimination) and/or to offer targeted prices to readily identifiable groups of consumers (third-degree price discrimination) in more competitive markets.

While the textbook definition of price discrimination states that price discrimination occurs when "two units of the same physical good are sold at different prices," practitioners have found this definition unsatisfactory (Tirole 1988) ${ }_{\square}^{1}$ Instead, they have defined price discrimination as selling similar goods at different prices in order to extract consumer surplus. In his book, Stigler (1987) states that a firm price discriminates when the ratio of prices is different from the ratio of marginal costs for two goods offered by a firm. More recently, Stole (2003) has advanced a broader definition that "price discrimination exists when prices vary across customer segments [in a way] that cannot be entirely explained by variations in marginal cost." ${ }^{2}$ Our paper uses this definition of price discrimination.

The mail order catalog industry proves to be a useful setting in which to assess the relationship between price discrimination and competition. Because mailing lists are pure information goods, they have zero marginal costs. Hence, any price variation cannot be attributed to cost differences and must therefore be attributed to variations in demand. Furthermore, we posit that pure information goods are likely to exhibit price discrimination: Since one of the necessary conditions for price discrimination - that resale or transfer of the good be limited - is also a necessary condition for a functioning information market, any seller of information goods already has the capacity to discriminate (Arrow 1962). We discuss how this resale is prevented in the mailing list industry in Section 2.

In the mailing list industry, buyers often have the option of purchasing names from the complete list or selecting names from a subset of the list, called a "select," at a premium for each name. For

[^1]instance, if a marketer chose to rent only names of female consumers from a given catalog list we would say that they chose a gender select, or if they chose to rent only names of consumers who have purchased over $\$ 100$ from that same list then we would say that they chose a dollar select. Typical pricing might have the base list renting for $\$ 70$ per thousand names, the gender select for $\$ 75$ per thousand and dollar select for $\$ 100$ per thousand names. Marketers might choose both a gender select and a dollar select, for example ordering the names of female customers who spent more than $\$ 100$; in our example, the marketer would then pay $\$ 105$ per thousand names for such a list. Given that all of these products have zero marginal cost for the list owner, the price differences cannot be attributed to cost differences. Thus, this pricing strategy amounts to second-degree price discrimination.

Offering additional selects is similar to expanding the number of products that are offered. As authors including Moorthy (1984) and Johnson and Myatt (2003) have noted, there exists a duality between some forms of second-degree price discrimination and product-line expansion. For example, the decision of how many package sizes to offer can be viewed as either a product line decision or as a price discrimination decision if the purpose of offering the different sizes is to extract consumer willingness-to-pay (Cohen 2005). However, Draganska and Jain (2006) demonstrate that not all product-line expansions constitute price discrimination. They find that in the yogurt industry, only vertically-differentiated product line variation can be used for price discrimination, while horizontal product-line expansion generally cannot. Thus, our paper can shed light on how the optimal product line differs with the level of competition to the extent that product lines are being chosen for the purpose of price discrimination.

List owners also offer different prices to identifiable groups of list renters. Most notably, fundraising organizations and charitable organizations are offered lower prices, while marketers selling similar products to those offered by the list owner are charged higher prices. Both of these actions constitute third-degree price discrimination.

Initially, much of the price discrimination literature focused only on price discrimination by a monopolist. However, Katz (1984) and Borenstein (1985) present models that demonstrate that price discrimination can occur in free-entry markets. Shepard (1991) empirically verifies that
price discrimination is consistent with competition by showing that that variations in the prices of different grades of gasoline can not be attributed to cost, and thus constitute price discrimination in a fairly competitive market. Similarly, Graddy (1995) finds that third-degree price discrimination occurs even in the very competitive Fulton fish market.

Having established these facts, subsequent research began focusing on the question of how competition affects incentives to price discriminate. The ensuing theoretical literature shows that competition can either increase or decrease the incentives to price discriminate.

One reason why competition can decrease the incentives to price discriminate is that if competition is intense enough then there is little room for firms to price above marginal cost ${ }_{3}^{3}$ Further, if there are fixed costs associated with price discrimination - as exist in the mailing list industry - then competition can reduce price discrimination because the number of consumers allocated to each pricing level can become too small to support the fixed costs. This latter effect is modeled by Seim and Viard (2004). These two effects both imply that increased competition makes it more difficult for firms to price discriminate.

However, competition can also lead to increased price discrimination. The first reason is that competition can trigger a prisoner's dilemma where each list pays the sunk costs required for price discrimination, but where all lists would be better off if no lists price discriminated ${ }_{4}^{4}$ Such a situation could arise if consumers obtained similar value from each of the products offered by a given firm 5 In this case, a firm without much competition has low incentives to pay the fixed costs of offering more choices to consumers since any new products simply cannibalize existing sales. However, when there is more competition, firms now have to focus on attracting consumers from competitors rather than focus on cannibalization. Seim and Viard (2004) demonstrate that this prisoner's dilemma will persist for second-degree price discrimination when the costs of offering consumers more choices is not too expensive.

Competition can also increase the dispersion of willingness-to-pay that any particular firm faces,

[^2]and thereby increase the incentives to price discriminate. This occurs when there is heterogeneity in the degree to which consumers care about cross-firm product differentiation. Imagine that some consumers are quite sensitive to cross-firm product differentiation, and thus are hesitant to consume from anyone except their ideal firm, while other consumers are relatively indifferent about which firm they patronize. Both types of consumers will generally buy from the local monopolist when there is limited competition, leaving the firm with little incentive to price discriminate. However, when the level of competition increases, firms then have incentives to charge high prices to those consumers who have strong preferences for their product, but low prices to consumers who are not sensitive to product differentiation and therefore treat the firms' goods as undifferentiated commodities. Chen, Narasimhan and Zhang (2001) use a model where some consumers are loyal and some consumers switch between firms to demonstrate this effect for the case of targeted discounts (third-degree price discrimination). Similarly, Dogan, Haruvy and Rao (2005) use a model where consumers have different sensitivities to product differentiation to show that rebating (second-degree price discrimination) can become profitable with increased competition.

Because theory alone cannot predict whether price discrimination should increase or decrease with higher competition, we treat the relationship between competition and price discrimination as an empirical question.

Several empirical papers examine the link between competition and price discrimination. For example, Stavins (2001), Busse and Rysman (2005), and Miravete and Röller (2004) all examine how the curvature of price schedules vary with the level of competition. In all three cases, competition is associated with an increased curvature in the price schedule. While this seems to suggest that there is more price discrimination in more-competitive markets, deeper consideration reveals that it is often hard to tell whether increased curvature should be interpreted as more or less price discrimination. For example, Busse and Rysman's study of the yellow pages advertising market reveals that prices of large ads fall by a greater percentage than those of small ads under increased competition. However, it is unclear whether this should be viewed as increased quantity discounting (more price discrimination) or a move towards marginal cost pricing (less price discrimination). Because of this difficulty in interpretation of the results, these papers are careful not to draw
conclusions about whether price discrimination increases with competition.
In a paper that looks at a similar question - the link between competition and price dispersion - Borenstein and Rose (1994) find that airline routes with greater competition exhibit a greater level of price dispersion. Similarly, Asplund, Eriksson and Strand (2002) study the newspaper industry and find that newspapers in duopoly markets offer a discount to a greater fraction of their consumers than newspapers in monopoly markets. However, Chintagunta (2002) examines the effect of retail competition on optimal pricing in the analgesics (pain reliever) category and finds that competition leads to lower prices on Tylenol's price, while increasing the store-brand's price. This implies that competition is reducing the amount of price dispersion in that category.

In contrast to these papers, we use a different empirical strategy. Since the marginal cost of all products is zero, we can interpret firms' offering of additional selects at prices different than the price of the base list as price discrimination. We therefore focus on the firm's decision whether to price discriminate (by offering selects), and if so, the firm's choice of the number of options presented to consumers. Examining this decision of whether to price discriminate provides a direct way to measure whether the prevalence of price discrimination is higher or lower in competitive markets.

We know of only one paper that has taken a similar approach. Seim and Viard (2004) study the US cellular telecommunications industry and examine how entry affects the number of pricing tariffs that the firms offer, finding that increased competition leads to a proliferation of calling plans. Our paper differs in a number of important ways. First, we examine both second and third degree price discrimination, while Seim and Viard only examine second degree price discrimination. Further, the type of second degree price discrimination is different in the two papers. Seim and Viard examine second-degree price discrimination in the form of different tariff structures: some consumers may pay different prices, but all consumers who make a call are buying a good of the same quality. In contrast, the second-degree price discrimination that we examine is discrimination of the form of either quality discrimination or mixed bundling. $\sqrt{6}$ Finally, only a fraction of the firms

[^3]in our data engage in each of the different types of price discrimination that we observe. Thus, we are able to examine how competition influences a firm's decision whether to price discriminate at all in addition to how competition affects the number of choices offered.

The results indicate that increased competition is generally associated with an increased propensity to price discriminate. These results hold for both second-degree and third-degree price discrimination. Further, list owners offer menus with more choices in more competitive markets. That is, not only are lists in more competitive segments more likely to price discriminate, they will also partition their consumers into finer subsets. These results, taken together with the many empirical studies summarized above, suggest that the connection between competition and increased price discrimination is a result that applies more broadly. We speculate in the conclusion why this may be the case.

The remainder of this article proceeds as follows. In Section 2, we describe the mailing list industry and the data. We also describe our measures of price discrimination and competition. The results are discussed in Section 3. Section 4 summarizes and discusses the broader implications of our findings.

## 2 Mailing Lists

### 2.1 Industry Capsule: The Mailing List Industry

For over eighty years, businesses have been compiling and trading lists of customers, forming the core of an ever-expanding direct marketing industry $]$ Marketers purchase these lists in order to contact potential customers by mail with information, advertisements, special offers, etc. regarding their products and services. In 1996, the last date for which the authors have been able to find such data, the mailing list industry had sales of roughly $\$ 1.7$ billion and over 31 billion names were exchanged (Borzekowski 1999).

Despite the importance of the direct mail industry, relatively little academic research has been

[^4]conducted on the industry. Bult and Wansbeek (1995) demonstrates how to optimally target a direct mail campaign. Anderson and Simester (2004) and Simester, Sun and Tsitsiklis (2006) examine dynamic issues in mail-order catalogs, studying how current mailings affect future purchase behavior. Finally, Steenburgh, Ainslie and Engebretson (2003) and Füsun and Ter Hofstede (2006) both discuss statistical issues with direct mail data.

Before describing how mailing lists price discriminate, we note that list owners are represented by list managers who handle the sales and marketing of the owner's list. In 1997 there were 150 such managers who advised owners of the catalog lists. Most of these managed a relatively small number of lists - only 25 managed more than 10 lists. List managers generally receive a $10 \%$ commission, and work with the list owners to set prices and decide about the selects to be offered. As a result, we treat the decision to price discriminate as a profit-maximizing decision by well informed agents: even small list owners who rent their lists solely for some extra income will price strategically with the help of the list manager.

Second-degree price discrimination is implemented through the use of 'selects,' or subsets of the list. For example, if a mailing list offers a multi-buyer select then the marketer can choose either to rent names belonging to the base list, or to pay a premium and rent only names of consumers who made multiple purchases from the catalog that generated the mailing list. The most common forms of selects that we study include multi-buyer selects, gender selects, dollar selects, recency selects and inquirers-only selects .8 Recency selects are based upon the timing of the last purchase that the rented name made from the underlying catalog, while the inquirers-only selects provide names of people who have asked for a catalog but never made a purchase. Because the timing of recency selects vary across the different lists, we created a tag of 'Vintage Names Available' which we applied to all catalogs that offered names of consumers who had last made a purchase from their catalog more than 24 months prior. While the decision to offer vintage names is clearly a type of recency select, we include the vintage variable to set a uniform standard of quality degradation across the lists.

[^5]List owners that offer dollar selects or recency selects also have to decide how many choices to offer. For instance, list owners can offer names of consumers who bought over $\$ 75$ worth of items from the catalog at a premium from the price for names off the base list. The same manager could instead choose to offer two different dollar select options: names of those who bought over $\$ 50$ worth of items at a low premium, or names of those who bought over $\$ 100$ worth of items at a high premium . Recency selects work very similarly: in addition to his or her base list, one list owner may choose to offer one recency select with names of consumers who made a purchase from the catalog within the last six months, while another owner may offer three selects; names of consumers who made a purchases in the last three months, the last six months or the last 12 months.

List owners can also engage in third-degree price discrimination. The most common form of third degree price discrimination involves offering a discount to fundraisers or not-for-profits. roughly $45 \%$ of catalog lists offer this type of discount. These fundraiser discounts can be substantial and often involve the additional perk of not having to pay an additional premium for any requested selects. The other type of third degree price discrimination we examine is whether the mailing list owners charge a premium to marketers from businesses that compete directly against the underlying catalog; approximately $10 \%$ of lists have such a surcharge.

When a marketer rents a list from a list owner, the list owner sends the names directly to a third party printshop/mailing house that processes the mailing. If the mailer wishes to send out a second mailing to the same consumers then they must pay for the access to the mailing list twice. The use of the third party is one way to ensure that the mailers are not able to resell the mailing list. Additionally, list owners include a few fake addresses ("seeds") among the actual names, so they can confirm that their lists are being used only once and that mailings only include authorized materials. Preventing the resale of the access to the lists is what makes price discrimination possible.

The mailing list industry was not as technologically advanced in 1997 as some readers might anticipate. While the technology had advanced beyond the stage of storing data on physical cards, the 1997 technology primarily used magnetic tape to transfer data between the parties. Data files maintained by the list manager were often extracts of data used for the catalogs operations. To

[^6]offer selects, these extracts needed to include the extra fields on which to separate the data. Thus, if a firm wanted to offer a gender select then the firm had to invest in extracting gender data from its main files. To offer very recent names the firm had to invest in technology to make rapid updating easy and efficient. The main point is that, counter to our intuition today, choosing to price discriminate did involve significant fixed-cost investments $\frac{10}{10}$ By 2002 these fixed costs had decreased, although the industry was still not near the forefront of technology. Note, though, that the marginal cost of price discriminating is zero once the fixed cost of price discriminating along a certain dimension has been made. That is, once the database has been adjusted to allow price discrimination along a given dimension there are no additional costs based on the number of times that particular field in the database is utilized.

The degree to which marginal costs are truly zero is underscored by the fact that the mailer is charged for any additional costs besides the costs of the names themselves when purchasing names from a list owner. For example, this includes a fee for any media, such as magnetic tape, on which the names are delivered.

### 2.2 Data

This paper focuses on catalog-based response lists, which include the names of people who have either ordered from, or in some cases inquired about, a mail-order catalog. One reason we choose to study this industry is that this market is a byproduct of the list owner's primary business, namely selling merchandise through catalogs. That is, firms are not establishing new mail order catalogs for the purpose of renting a mailing list. As such, the firms' entry decisions, and by extension our competition measures, can be treated as exogenous in the analysis of the decision to price discriminate.

The data for this project consists of datacards for catalog-based consumer response list as of June 1997 and May 2002. The sample restrictions imply that the names on each list are consumers (rather than businesses) who have inquired about or purchased from a given catalog. The data

[^7]include every datacard in the database maintained by Marketing Information Network (mIn), a company that supplies this directory to market participants looking to rent a list. Mailers, or their marketing agents, pay for a subscription to the mIn directory service and are then able to search the database for lists to rent ${ }^{11}$

Each datacard includes the catalog name and the quantity of names available (in discrete categories) along with the price per thousand names. The datacard also lists the availability, name counts, and prices for all selects.

Tables 1a and 1b describe the data. In 1997, there were roughly 1,800 datacards for lists distilled from mail-order catalogs. From this, we excluded international lists, as well as lists that were no longer adding new names. Also, some firms used multiple datacards to represent names from the same list. In these cases, we aggregated all datacards that we judged to be segments of the same base list into a single observation. This leaves a sample of 1,209 lists in 1997, and 1,405 lists in 2002. These values however, mask substantial entry and exit: of the original 1,200 lists available in the first period, roughly 500 exited by 2002. Most lists are relatively small, containing under 100,000 names, although a few have over 1 million names.

Tables 1a and 1balso show the fraction of lists offering the different selects in each year. Gender selects are offered by between just over half to two-thirds of the lists, depending on the sample year. Dollar selects are offered by about $40 \%$ of lists, while recency selects are offered by about $67 \%$ of lists. Multi-buyer selects are much less common: only about $15 \%$ of lists offer a multi-buyer select. The offering of vintage and inquirers only names both drop from about $43 \%$ of lists in 1997 to about $35 \%$ of lists in 2002. The lines labeled "Differential Rates" in these tables show the fraction of lists engaging in third-degree price discrimination. Approximately $45 \%$ of lists offered special reduced rates to fundraisers or not-for-profit organizations, while a much smaller number charge higher prices to firms that compete in the same underlying business.

Table 2 presents the correlations between the different price discrimination variables. In general, the correlations tend to be positive, suggesting that lists that price discriminate tend do so in a number of ways. However, the correlations are generally low, allowing us to treat each pricing

[^8]decision as a separate test of the link between competition and price discrimination.

### 2.3 Measures of Competition

Our competition measures are derived from the 47 different categories into which mIn classifies lists ${ }^{12}$ Most of the lists are classified into one or two categories (see Figure 1) and a careful inspection of the data suggests that cases where the lists are classified in multiple categories are legitimate.

Using this classification, our basic approach to calculating competition measures is to add the number of lists that are classified in the same categories as the given list. However, this approach is complicated by the fact that lists often only partial overlap in their industry classifications. In these cases, we use measures where lists that partially overlap in their classifications count as providing some competition, but less than those lists that have exact matches. Note that this is justified not only in terms of the underlying characteristics of the list, but also in the institutional way that many of the marketers used to decide which mailing list to purchase: Using the mIn software, mailers can search by inputting industry codes and then choosing lists from the results of those queries.

We use three different measures of competition in order to ensure that the exact way that we calculate our competition measure is not driving our results. All three measures are based on the same principle: lists that have no overlapping classification codes are given a competitor weight of zero, lists that have exactly the same classification codes are given a weight of one, and lists that partially overlap are given a weight between zero and one. The competition measure is then the sum of these weights. The variation in our three competition measures lies in how they calculate the weight for partially-overlapping lists ${ }^{13}$

[^9]Our main competition measure, CompMatch, is constructed by calculating pairwise the fraction of codes present for two lists that are common between them, and then summing this value for all pairs of lists. Specifically,

$$
\begin{equation*}
\text { CompMatch }_{i}=\sum_{\text {lists } j \neq i} \frac{\text { Number of codes listed by both } i \text { and } j}{\text { Number of codes listed by } i \text { or } j} \tag{1}
\end{equation*}
$$

CompMatch has the advantage of being intuitive, symmetric and utilizing the information of nonmatching codes from both lists.

We also examine whether we get similar results when we use two other measures of competition; CompAve and CompCos. CompAve is calculated as:

$$
\begin{equation*}
\text { CompAve }_{i}=\sum_{\text {lists } j \neq i} \frac{\text { Number of codes listed by both } i \text { and } j}{\text { Number of codes listed by list } i} \tag{2}
\end{equation*}
$$

CompAve is similar to CompMatch, except that the denominator includes only those codes on the list list for which competition is being calculated. This measure is a bit awkward because it is asymmetric and because it throws away some information about the degree of proximity of lists. However, it is the average number of competitors that will appear in any query that would include the featured list, so it has some intuitive appeal.

To calculate the last measure, we first create a vector of ones and zeros to indicate whether a particular list is classified as being in each industry. CompCos is then constructed by calculating the cosine of the angle formed between the code vector and a similar vector for each other list and then summing over all lists. The cosine between two lists with exactly the same industry codes is one while the cosine for lists with no overlap is zero, and, because all vectors are non-negative, any partial overlap will lead to a cosine between zero and one. More formally,

Anderberg (1973) for a discussion of these metrics.

$$
\begin{align*}
& \operatorname{Comp~}_{\operatorname{Cos}}^{i}= \\
& \sum_{\text {lists }}^{j \neq i}  \tag{3}\\
& \cos (i, j) \\
&=\sum_{\text {lists } j \neq i} \frac{\text { Number of codes listed by both } i \text { and } j}{\sqrt{\text { Number of codes listed by list } i * \text { Number of codes listed by list } j}}
\end{align*}
$$

The summary statistics for these competition variables appear in Table 1a and Table 1b, A histogram of CompMatch appears in Figure 2 to give the reader a broader understanding of the distribution of competition. Table 3 then presents the correlations between these different measures. The correlations between these measures are high, largely because of the number of lists that are classified in only one or two industries.

CompMatch and the other competition measures attempt to capture the similarity between the different lists by accounting for the degree to which the lists are classified in the same way. However, one shortcoming of these competition measures, and of our data, is that we have limited ways to control for the degree of heterogeneity among the lists within a particular code. One consequence of not being able to fully capture product differentiation is that our measures of competition appear to be high. For example, while many lists have few competitors, the mean number of competitors for each list was near 90 . In interpreting our main results, our assumption is that these measures are correlated enough, or even proportional, to the 'true' amount of competition.

However, to control for some of the unobserved heterogeneity, we also conduct an additional analysis using just lists with over 50,000 names. This is a reasonable approach to take if these lists form their own 'markets,' different from the smaller, more specialized lists. In these regressions, the primary competition measure is recalculated assuming that only the larger lists compete with each other, and restricting the regression sample to the larger lists as well. The subsample includes about $60 \%$ of the original sample. Here, the mean number of competitors drops to 48 . As we report later, the main results generally become stronger when we do this ${ }^{14}$

Finally, all of the results presented in this paper focus on the impact of the natural log of com-

[^10]petition. We focus on the log of competition because, consistent with many theories of competition, we expect that the impact of each marginal competitor becomes smaller as the total number of competitors increases. That is, we expect that the differences between having 10 vs. 20 competitors is substantially larger than the difference between having 130 vs. 140 competitors. We have also confirmed that this functional form is reasonable by using other flexible forms, such as including linear and squared terms, which give similar curvature.

### 2.4 Other Variables

In addition to the competition measure, the estimation controls for the size of each mailing list. There are two reasons we include the size of the list in the regression. First, smaller lists may find it harder to recover any fixed costs that are necessary to engage in price discrimination because their revenues will generally be lower ${ }^{15}$ Second, there is an inherent tradeoff when offering selects: While offering a select can increase the total number of customers that rent the list and increase the price per name, some direct mailers who choose a select may have chosen to rent the entire base list if the select were not available. Generally, prices observed in the data dictate that revenues from selling an entire list are greater than revenues from selling an entire select. Smaller lists will find that the probability of selling their full list are higher than they are for larger lists, where orders are constrained by the size of the marketer's budget or campaign. For both of these reasons, we hypothesize that price discrimination will increase with list size.

The focus of this study is on the relationship between market structure and the incentives to price discriminate. To control for the possibility that the decision to price discriminate depends on the size of demand for a mailing list instead of the the number of competitors, the empirical specifications include measures of market size. We do not observe direct quantity data, nor do we know how many mailers may be interested in a given list. Instead we proxy market size with the average total sales in the industries with the NAICS codes that best match the mIn categories. These data are collected from the Economic Census. When mailing lists classify themselves in multiple industries, we average over all of the mIn categories for which we were able to match

[^11]NAICS codes. Because the industry size information is missing for some observations, the number of observations used in the estimation is reduced from $1,209(1,405)$ to $1,094(1,268)$ in $1997(2002){ }^{16}$

## 3 Results

Our findings broadly demonstrate that mailing list owners in more competitive industries are more likely to price discriminate. We find that this is true for both second- and third-degree price discrimination. Further, among those mailing lists that choose to implement second-degree price discrimination, those in more competitive markets tend to offer menus with more options than those in less competitive markets.

### 3.1 Second-Degree Price Discrimination

We estimate the choice of whether to use each of the different types of price discrimination strategies (selects) as separate probit regressions ${ }^{[17}$ We also run two OLS regressions where the dependent variables are the number of dollar selects and recency selects offered. Table 4a presents results from 1997, while Table 4b presents results from 2002. The coefficients on competition are positive across all specifications and across all years. All of the competition coefficients are also statistically significant at the $5 \%$ level, except for gender select and inquirers only availability.

The positive, statistically significant coefficients on competition demonstrate that mailing lists in markets with high levels of competition are more likely to exhibit second-degree price discrimination. The first several columns - those for gender selects, dollar selects, recency selects and multi-buyer selects - can be interpreted as examples of offering products of higher quality in order to price discriminate. The next two columns, those for vintage names and inquirers only, are examples of quality degradation - deliberately offering a degraded quality product in order to siphon off the low valuation buyers.

To gauge the approximate magnitude of the effects, the first line of each panel in Table 5 reports

[^12]the increase in the probability of price discriminating that would be associated with moving from the 10th percentile of the competition measure to the 90 th percentile, holding the other variables fixed at their respective means. The largest effect is for dollar selects, where the increase in competition is associated with a $26 \%$ ( $32 \%$ ) increase in the probability of price discriminating in 1997 (2002). In the data, roughly $40 \%$ of lists offer this select, indicating that competition seems to have a substantial effect. Similarly, moving between these two levels of competition is associated with an $16 \%$ increase in the probability of offering vintage names, compared to the $36 \%$ of lists that offer the select in 1997. The magnitudes of the effects for recency and multi-buyer selects are smaller, although the $7.2 \%$ change in probability associated with the multi-buyer select may seem more significant given that only $16 \%$ of all lists offer a multi-buyer select.

List owners offering dollar and recency selects also need to decide how many different dollar amounts or time horizon cutoffs they should offer. Thus, in addition to running probit regressions on whether mailing list owners offer these selects, we also sum the number of dollar selects or recency selects offered among those list owners who price discriminate and regress these counts on our competition measure ${ }^{18}$ The results of these regressions are reported in columns 7 and 8 of Tables 4a and 4b, The coefficients on competition are positive and significant, indicating that greater competition is correlated with a greater partition of the product space. The two columns for counts in Table 5 show the difference in the expected number of dollar and recency selects offered at the 10th and 90th percentiles of competition, evaluating all other variables at their respective means. The change of roughly .35 dollar select counts represents an increase of $12.5 \%$ relative to the mean of roughly 2.8 in the sample. The results for recency are quite similar.

The results also show that owners of large mailing lists are more likely to price discriminate than owners of small mailing lists. To see this note that, except in the case of inquirers, lists with over 50,000 names on them are always statistically more likely to price discriminate than those lists with less than 50,000 names. It is also true that lists with over 100,000 names are more likely to price discriminate than lists with between 50,000 and 100,000 names, although the statistical significance and uniformity of this result is smaller. However, once lists are large enough - perhaps 200,000

[^13]names - it appears that additional names no longer factor into the decision to price discriminate. There is also evidence that larger lists offer menus with more choices to consumers. These results are consistent with the hypotheses advanced in Section 2.4- that owners of small lists have a harder time recovering fixed costs of price discrimination, and that small lists may forgo selling their full list by offering selects.

### 3.2 Third-degree Price Discrimination

We examine the link between competition and third-degree price discrimination by considering two types of third-degree price discrimination observed in the data: fundraiser rates and competitor rates. As was the case for second-degree price discrimination, probit regressions reveal that greater competition is associated with a greater propensity to price discriminate, although the effect is stronger for the fundraising channel. The changes in the probability of offering a fundraiser rate corresponding to the difference between the 90th and 10th percentiles of the competition measures is $33 \%(29 \%)$ in 1997 (2002). This probability is only $4.2 \%$ ( $6.0 \%$ ) for charging competitor rates, although only $9 \%(13 \%)$ of all lists have a competitor surcharge in 1997 (2002).

We also still find that larger lists are more likely to third degree price discriminate than smaller lists.

### 3.3 Alternate Specifications

Table 5 demonstrates that our results are robust to the precise specification that we use. As described above, this table reports the descriptive (not causal) differences in probabilities of price discriminating associated with the 90th percentile of competition compared to those associated with the 10th percentile.

As referenced in Section 2.3, one potential issue is the degree to which heterogeneity within industry codes is left uncaptured by our competition measures. As one possibilty, small lists might be specialty lists that appeal to different direct mailers than large lists do. To examine this issue, we reran our analysis using only lists that have more than 50,000 names. The second line in Table 5 reports these results. Generally, both the magnitude and statistical significance of the results are
increased. In 1997, the coefficient on competition in the inquirers-only probit becomes significant while the effect of competition in the competitor surcharge probit becomes insignificant; neither of these changes are observed in 2002, suggesting that these changes are probably random noise.

In a similar vein, the histograms of our competition measure presented in Figure 2 show a spike in competition at the high end of the distribution, which is due to the presence of many lists in the apparel industry. A skeptical reader might suspect that our results are mostly driven by the probability that mailing lists in the apparel industry choose to price discriminate. The third line in Table 5 reports results from a model that includes an indicator variable for whether the list is in the apparel industry. We find that the results are generally of a similar magnitude and significance, even controlling for this effect.

The next two lines show that the results are generally robust to the way that we measure competition. If we construct the competition measures using either CompAve or CompCos, we see that, in general, the results are similar in magnitude and significance to the CompMatch results.

Lastly, the final line in Table 5 presents the way that our results would change if we included fixed effects for the different list managers. One might hypothesize that the results presented above are the result of the fact that a few large managers who happen to be in more competitive industries tend to be more likely to price discriminate. One response would be to note that this would not invalidate the robustness of our results. It is possible that those lists in very competitive industries choose to go to large, sophisticated managers in order to compete more effectively. In spite of this argument, we include indicator variables for each of the manager $\$^{19}$ and find that the results are, for the most part, qualitatively similar, underscoring the strength of our results.

The second panel of Table 5 reports the results from the 2002 data. Taken together, along with the fairly high levels of entry and exit, the two panels of Table 5 demonstrate the robustness of our results to the precise specification of the estimated model.

[^14]
## 4 Conclusion

Theoretical ambiguity as to whether more-intense competition should lead to more or less price discrimination leaves the net impact as an empirical question. Mailing lists provide a good context in which to study this question because mailing lists are zero-marginal cost goods, meaning that differences in prices must be the result of demand, not cost. We find that greater competition is associated with more second- and third-degree price discrimination and that firms that implement second-degree price discrimination in more-competitive industries offer consumers menus with more choices.

There are at least two reasons why competition might lead to increased price discrimination. First, the increased probability of losing customers to competitors may trigger a prisoner's dilemma where firms pay the sunk costs required for price discrimination. Second, increased competition can lead firms to price discriminate in order to extract surplus from those consumers who care a lot about cross-firm product differentiation while retaining those consumers who view products from different firms as close substitutes.

While we cannot test which of the theories leads to our conclusion, it is interesting to note that our results are consistent with this last hypothesis. For example, it is likely that the marketers who gain the most value from a multi-buyer select are those marketers who are promoting products that are similar to those offered in the catalog from which the mailing list was derived. These marketers are also the marketers who are most sensitive to product differentiation: The value they obtain from purchasing names from a list derived from a catalog selling very similar products compared to a list derived from a more distant product is high, while those marketers who are selling products that are only somewhat related to the underlying product do not care as strongly which list they purchase and are unlikely to pay for a multi-buyer select. The argument for dollar selects is the same. The logic would apply to recency and vintage selects to the extent that people's purchasing patterns change more quickly than their underlying interests and that it is possible to target consumers with specific interests through a broader set of lists than one could use to target purchasing patterns. For third degree price discrimination, fundraisers probably see the various mailing lists as relative
commodities, while marketers care about the catalog from which the mailing list was derived; Marketers representing direct competitors are the most sensitive to product differentiation between lists. In contrast, it is harder to fit this reasoning on the gender and inquirers only selects - the two selects where our results are statistically insignificant.

There are reasons to believe that these results generalize outside of the mailing list industry. In particular, many observed practices conform to the idea that competition increases price discrimination which segments consumers by their sensitivity to product differentiation. For example, in the airline industry the gap between unrestricted and restricted fares increases with competition (Stavins (2001)), consistent with business consumers who buy unrestricted fares generally having the lowest willingness to take another airline due to their desire for direct flights at their optimal time and/or from benefits of a rewards program. In the newspaper industry, greater poaching is observed in more-competitive markets (Asplund et al. (2002)), and the lower subscription rates offered to consumers in geographic areas better covered by another paper picks off those consumers who do not care as much about the locality of their paper. Finally, it is possible that the merchants who buy large yellow page advertisements in the market studied by Busse and Rysman (2005) are the ones most likely to reallocate their advertising strategy (or size) when competitors offer them more outlets in which to advertise. Our results, taken together with these other empirical studies, suggest that the connection between competition and increased price discrimination is a result that applies broadly.

Figure 1: Distribution of Number of Codes Describing Lists - 1997, 2002



Figure 2: Distribution of Competition Measure - CompMatch - 1997, 2002


Table 1a: Summary Statistics 1997

| Variable | N | Mean | Std. Dev. | Min | Max |
| :--- | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  |
| List Size |  |  |  |  |  |
| $0-49,999$ Names | 1209 | 0.40 | 0.49 | 0 | 1 |
| $50,000-99,999$ Names | 1209 | 0.23 | 0.42 | 0 | 1 |
| 100,000-199,999 Names | 1209 | 0.15 | 0.36 | 0 | 1 |
| 200,000-299,999 Names | 1209 | 0.07 | 0.25 | 0 | 1 |
| 300,000-399,999 Names | 1209 | 0.04 | 0.19 | 0 | 1 |
| $400,000-499,999$ Names | 1209 | 0.03 | 0.17 | 0 | 1 |
| $500,000-999,999$ Names | 1209 | 0.05 | 0.21 | 0 | 1 |
| $1,000,000+$ Names | 1209 | 0.04 | 0.20 | 0 | 1 |
|  |  |  |  |  |  |
| Selects Available |  |  |  |  |  |
| Gender Select Available | 1209 | 0.55 | 0.50 | 0 | 1 |
| Dollar Select Available | 1209 | 0.38 | 0.49 | 0 | 1 |
| Recency Select Available | 1209 | 0.68 | 0.47 | 0 | 1 |
| Multi-Buyers Available | 1209 | 0.15 | 0.36 | 0 | 1 |
| Vintage Names Available | 1209 | 0.43 | 0.49 | 0 | 1 |
| Inquirers Available | 1209 | 0.43 | 0.49 | 0 | 1 |
|  |  |  |  |  |  |
| Select Counts |  |  |  |  |  |
| Dollar Select Count | 461 | 2.83 | 1.19 | 1 | 7 |
| Recency Select Count | 824 | 2.35 | 1.11 | 1 | 7 |
| Differential Rates |  |  |  |  |  |
| Fundraiser Rate Available | 1209 | 0.43 | 0.50 | 0 | 1 |
| Competitor Rate Available | 1209 | 0.09 | 0.29 | 0 | 1 |
| CompMatch | 1209 | 74.80 | 44.86 | 2.21 | 167.79 |
| CompAve | 1209 | 120.12 | 71.83 | 4 | 281 |
| CompCos | 1209 | 108.49 | 64.25 | 3.12 | 257.10 |
| Control Variables |  |  |  |  |  |
| Apparel Indicator | 1209 | 0.23 | 0.42 | 0 | 1 |
| Mkt Size: Dollar (\$bil) | 1094 | 63.26 | 88.80 | 2.25 | 560.30 |

Table 1b: Summary Statistics 2002

| Variable | N | Mean | Std. Dev. | Min | Max |
| :--- | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  |
| List Size |  |  |  |  |  |
| $0-49,999$ Names | 1405 | 0.37 | 0.48 | 0 | 1 |
| $50,000-99,999$ Names | 1405 | 0.20 | 0.40 | 0 | 1 |
| 100,000-199,999 Names | 1405 | 0.17 | 0.37 | 0 | 1 |
| 200,000-299,999 Names | 1405 | 0.08 | 0.27 | 0 | 1 |
| 300,000-399,999 Names | 1405 | 0.04 | 0.20 | 0 | 1 |
| $400,000-499,999$ Names | 1405 | 0.03 | 0.16 | 0 | 1 |
| $500,000-999,999$ Names | 1405 | 0.05 | 0.22 | 0 | 1 |
| $1,000,000+$ Names | 1405 | 0.05 | 0.23 | 0 | 1 |
| Selects Available |  |  |  |  |  |
| Gender Select Available | 1405 | 0.67 | 0.47 | 0 | 1 |
| Dollar Select Available | 1405 | 0.40 | 0.49 | 0 | 1 |
| Recency Select Available | 1405 | 0.66 | 0.47 | 0 | 1 |
| Multi-Buyers Available | 1405 | 0.16 | 0.37 | 0 | 1 |
| Vintage Names Available | 1405 | 0.36 | 0.48 | 0 | 1 |
| Inquirers Available | 1405 | 0.35 | 0.48 | 0 | 1 |
|  |  |  |  |  |  |
| Select Counts |  |  |  |  |  |
| Dollar Select Count | 566 | 2.89 | 1.18 | 1 | 8 |
| Recency Select Count | 933 | 2.41 | 1.20 | 1 | 12 |
|  |  |  |  |  |  |
| Differential Rates |  |  |  |  |  |
| Fundraiser Rate Available | 1405 | 0.47 | 0.50 | 0 | 1 |
| Competitor Rate Available | 1405 | 0.13 | 0.34 | 0 | 1 |
| CompMatch | 1405 | 90.26 | 50.55 | 1.38 | 191.01 |
| CompAve | 1405 | 155.34 | 86.07 | 4 | 358 |
| CompCos | 1405 | 138.85 | 77.69 | 2.01 | 340.24 |
| Control Variables |  |  |  |  |  |
| Apparel Indicator | 1405 | 0.26 | 0.44 | 0 | 1 |
| Mkt Size: Dollar (\$bil) | 1268 | 91.50 | 128. | 3.11 | 725.60 |

Table 2: Correlation Among Price Discrimination Variables

|  | $\begin{gathered} \text { Dollar } \\ \text { Select } \\ \text { Available } \end{gathered}$ | Gender <br> Select <br> Available | Recency Select Available | Multi-Buyers Available | Vintage <br> Names <br> Available | Inquirers <br> Available | Fundraiser <br> Rate Available | Competitor Rate Available |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | 1997 |  |  |  |  |  |  |  |
| Dollar Select | 1.00 | 0.19 | 0.50 | 0.36 | 0.24 | 0.05 | 0.59 | 0.09 |
| Gender Select | 0.19 | 1.00 | 0.14 | 0.15 | 0.06 | -0.00 | 0.15 | 0.04 |
| Recency Select | 0.50 | 0.14 | 1.00 | 0.26 | 0.36 | 0.10 | 0.38 | 0.12 |
| Multi-Buyers | 0.36 | 0.15 | 0.26 | 1.00 | 0.10 | 0.14 | 0.29 | 0.06 |
| Vintage Names | 0.24 | 0.06 | 0.36 | 0.10 | 1.00 | 0.09 | 0.23 | 0.07 |
| Inquirers | 0.05 | -0.00 | 0.10 | 0.14 | 0.09 | 1.00 | 0.03 | 0.02 |
| Fundraiser Rate | 0.59 | 0.15 | 0.38 | 0.29 | 0.23 | 0.03 | 1.00 | 0.07 |
| Competitor Rate | 0.09 | 0.04 | 0.12 | 0.06 | 0.07 | 0.02 | 0.07 | 1.00 |
|  | 2002 |  |  |  |  |  |  |  |
| Dollar Select | 1.00 | 0.16 | 0.50 | 0.31 | 0.24 | 0.05 | 0.55 | 0.15 |
| Gender Select | 0.16 | 1.00 | 0.12 | 0.11 | -0.01 | -0.02 | 0.15 | -0.01 |
| Recency Select | 0.50 | 0.12 | 1.00 | 0.20 | 0.42 | 0.10 | 0.40 | 0.14 |
| Multi-Buyers | 0.31 | 0.11 | 0.20 | 1.00 | 0.08 | 0.12 | 0.24 | 0.03 |
| Vintage Names | 0.24 | -0.01 | 0.42 | 0.08 | 1.00 | 0.09 | 0.25 | 0.16 |
| Inquirers | 0.05 | -0.02 | 0.10 | 0.12 | 0.09 | 1.00 | 0.06 | 0.08 |
| Fundraiser Rate | 0.55 | 0.15 | 0.40 | 0.24 | 0.25 | 0.06 | 1.00 | 0.22 |
| Competitor Rate | 0.15 | -0.01 | 0.14 | 0.03 | 0.16 | 0.08 | 0.22 | 1.00 |

Table 3: Correlation Among Competition Measures

|  | $\mathbf{1 9 9 7}$ |  |  |
| ---: | :---: | :---: | :---: |
|  | CompMatch | CompAve | CompCos |
| CompMatch | 1.00 | 0.95 | 0.94 |
| CompAve |  | 1.00 | 0.85 |
| CompCos |  |  | 1.00 |
|  |  | $\mathbf{2 0 0 2}$ |  |
|  |  |  |  |
| CompMatch | 1.00 | 0.93 | 0.95 |
| CompAve |  | 1.00 | 0.80 |
| CompCos |  |  | 1.00 |

Table 4a: Main Results - 1997

|  | Dollar Select Available | Gender Select Available | Recency Select Available | Multi-Buyers Available | Vintage Names Available | Inquirers Available | Dollar Select Count | Recency <br> Select Count | Fundraiser Rate Available | Competitor Rate Available |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Probit | Probit | Probit | Probit | Probit | Probit | OLS | OLS | Probit | Probit |
| Constant | $\begin{gathered} -\mathbf{4 . 3 0 0}{ }^{* * *} \\ (0.702) \end{gathered}$ | $\begin{gathered} -\mathbf{2 . 4 6 6} \mathbf{6}^{* * *} \\ (0.640) \end{gathered}$ | $\begin{gathered} -\mathbf{1 . 2 4 1}{ }^{*} \\ (0.701) \end{gathered}$ | $\begin{gathered} -\mathbf{2 . 6 0 9} \mathbf{9}^{* * *} \\ (0.824) \end{gathered}$ | $-\mathbf{1 . 5 3 6}^{* *}$ $(0.636)$ | $\begin{gathered} \hline 0.573 \\ (0.631) \end{gathered}$ | $\begin{gathered} 0.079 \\ (0.994) \end{gathered}$ | $\begin{aligned} & 1.137^{*} \\ & (0.613) \end{aligned}$ | $\begin{gathered} -\mathbf{3 . 0 8 5} 5^{* * *} \\ (0.668) \end{gathered}$ | $\begin{gathered} -\mathbf{2 . 6 2 0}{ }^{* * *} \\ (0.977) \end{gathered}$ |
| $\ln$ (CompMatch) | $\begin{gathered} \mathbf{0 . 3 9 8}^{* * *} \\ (0.062) \end{gathered}$ | $\begin{gathered} 0.068 \\ (0.056) \end{gathered}$ | $\begin{gathered} \mathbf{0 . 1 4 3}^{* *} \\ (0.060) \end{gathered}$ | $\begin{gathered} \mathbf{0 . 1 8 4} \mathbf{N}^{* *} \\ (0.074) \end{gathered}$ | $\begin{gathered} \mathbf{0 . 2 0 8} \\ (0.055) \end{gathered}$ | $\begin{gathered} 0.060 \\ (0.055) \end{gathered}$ | $\begin{aligned} & 0.147^{*} \\ & (0.087) \end{aligned}$ | $\begin{gathered} \mathbf{0 . 2 1 7}^{* * *} \\ (0.054) \end{gathered}$ | $\begin{gathered} \mathbf{0 . 5 0 3}^{* * *} \\ (0.061) \end{gathered}$ | $\begin{gathered} \mathbf{0 . 2 1 6}^{* *} \\ (0.090) \end{gathered}$ |
| Size: 50-99 | $\begin{gathered} \mathbf{0 . 6 7 8}^{* * *} \\ (0.114) \end{gathered}$ | $\begin{gathered} 0.525^{* * *} \\ (0.103) \end{gathered}$ | $\begin{gathered} \mathbf{0 . 6 7 3}^{* * *} \\ (0.106) \end{gathered}$ | $\begin{gathered} \mathbf{0 . 5 4 6} \mathbf{c}^{* * *} \\ (0.150) \end{gathered}$ | $\begin{gathered} 0.399^{* * *} \\ (0.103) \end{gathered}$ | $\begin{gathered} 0.078 \\ (0.102) \end{gathered}$ | $\begin{gathered} \mathbf{0 . 4 0 7 * *} \\ (0.190) \end{gathered}$ | $\begin{gathered} \mathbf{0 . 5 8 8 * * *} \\ (0.101) \end{gathered}$ | $\begin{gathered} \mathbf{0 . 3 5 1 * * *} \\ (0.107) \end{gathered}$ | $\begin{gathered} 0.168 \\ (0.174) \end{gathered}$ |
| Size: 100-199 | $\begin{gathered} \mathbf{1 . 1 6 8 * * *} \\ (0.123) \end{gathered}$ | $\begin{gathered} \mathbf{0 . 5 4 4}^{* * *} \\ (0.115) \end{gathered}$ | $\begin{gathered} 1.209^{* * *} \\ (0.138) \end{gathered}$ | $\begin{gathered} \mathbf{0 . 6 2 1}^{* * *} \\ (0.159) \end{gathered}$ | $\begin{gathered} \mathbf{0 . 3 4 5}^{* * *} \\ (0.115) \end{gathered}$ | $\begin{gathered} 0.055 \\ (0.114) \end{gathered}$ | $\begin{gathered} 0.569^{* * *} \\ (0.183) \end{gathered}$ | $\begin{gathered} \mathbf{0 . 6 5 8} \\ (0.104) \end{gathered}$ | $\begin{gathered} \mathbf{0 . 6 9 2}^{* * *} \\ (0.118) \end{gathered}$ | $\begin{gathered} 0.473^{* * *} \\ (0.171) \end{gathered}$ |
| Size: 200-299 | $\begin{gathered} 1.349^{* * *} \\ (0.165) \end{gathered}$ | $\begin{gathered} 0.627^{* * *} \\ (0.158) \end{gathered}$ | $\begin{gathered} \mathbf{1 . 0 8 6}^{* * *} \\ (0.183) \end{gathered}$ | $\begin{gathered} 0.980^{* * *} \\ (0.188) \end{gathered}$ | $\begin{gathered} \mathbf{0 . 5 0 4}^{* * *} \\ (0.155) \end{gathered}$ | $\begin{gathered} \mathbf{0 . 3 0 8 * *} \\ (0.154) \end{gathered}$ | $\begin{gathered} \mathbf{0 . 5 6 6 * * *} \\ (0.217) \end{gathered}$ | $\begin{gathered} 1.105^{* * *} \\ (0.138) \end{gathered}$ | $\begin{gathered} \mathbf{0 . 7 5 0 * * *} \\ (0.159) \end{gathered}$ | $\begin{gathered} \mathbf{0 . 6 0 0} 0^{* * *} \\ (0.213) \end{gathered}$ |
| Size: 300-399 | $\begin{gathered} 1.776^{* * *} \\ (0.231) \end{gathered}$ | $\begin{gathered} \mathbf{0 . 7 3 1 * * *} \\ (0.215) \end{gathered}$ | $\begin{gathered} \mathbf{2 . 0 6 1}^{* * *} \\ (0.437) \end{gathered}$ | $\begin{gathered} 1.297^{* * *} \\ (0.229) \end{gathered}$ | $\begin{gathered} \mathbf{0 . 4 8 4} \mathbf{4}^{* *} \\ (0.209) \end{gathered}$ | $\begin{aligned} & \mathbf{o . 3 6 7}^{*} \\ & (0.206) \end{aligned}$ | $\begin{gathered} 1.060^{* * *} \\ (0.250) \end{gathered}$ | $\begin{gathered} \mathbf{1 . 2 9 4}^{* * *} \\ (0.171) \end{gathered}$ | $\begin{gathered} 0.991^{* * *} \\ (0.215) \end{gathered}$ | $\begin{gathered} 0.986^{* * *} \\ (0.247) \end{gathered}$ |
| Size: 400-499 | $\begin{gathered} 1.802^{* * *} \\ (0.281) \end{gathered}$ | $\begin{gathered} \mathbf{0 . 9 2 8 * *} \\ (0.260) \end{gathered}$ | $\begin{gathered} 1.521^{* * *} \\ (0.360) \end{gathered}$ | $\begin{gathered} 1.938^{* * *} \\ (0.255) \end{gathered}$ | $\begin{gathered} \mathbf{0 . 5 0 1} \\ (0.238) \end{gathered}$ | $\begin{gathered} 0.083 \\ (0.237) \end{gathered}$ | $\begin{gathered} \mathbf{0 . 8 5 8} 8^{* * *} \\ (0.277) \end{gathered}$ | $\begin{gathered} 1.294^{* * *} \\ (0.196) \end{gathered}$ | $\begin{gathered} 1.034^{* * *} \\ (0.257) \end{gathered}$ | $\begin{gathered} \mathbf{0 . 6 9 4}^{* *} \\ (0.298) \end{gathered}$ |
| Size: 500-999 | $\begin{gathered} \text { 1.687*** } \\ (0.205) \end{gathered}$ | $\begin{gathered} \mathbf{0 . 8 5 9 * * *} \\ (0.197) \end{gathered}$ | $\begin{gathered} \mathbf{1 . 2 5 1}^{* * *} \\ (0.235) \end{gathered}$ | $\begin{gathered} \mathbf{1 . 5 4 1 * * *} \\ (0.205) \end{gathered}$ | $\begin{gathered} \mathbf{0 . 8 7 0 * * *} \\ (0.190) \end{gathered}$ | $\begin{gathered} \mathbf{0 . 3 6 1 * *} \\ (0.184) \end{gathered}$ | $\begin{gathered} \mathbf{0 . 7 2 4}^{* * *} \\ (0.234) \end{gathered}$ | $\begin{gathered} \mathbf{1 . 5 0 5}^{* * *} \\ (0.159) \end{gathered}$ | $\begin{gathered} 1.234^{* * *} \\ (0.203) \end{gathered}$ | $\begin{gathered} \mathbf{0 . 8 0 8 * * *} \\ (0.236) \end{gathered}$ |
| Size: 1,000+ | $\begin{gathered} \mathbf{1 . 6 8 0} \mathbf{0}^{* * *} \\ (0.224) \end{gathered}$ | $\begin{gathered} \mathbf{0 . 7 5 5}^{* * *} \\ (0.206) \end{gathered}$ | $\begin{gathered} \mathbf{1 . 5 4 2}^{* * *} \\ (0.296) \end{gathered}$ | $\begin{gathered} 1.858^{* * *} \\ (0.218) \end{gathered}$ | $\begin{gathered} \mathbf{0 . 5 9 4}^{* * *} \\ (0.198) \end{gathered}$ | $\begin{gathered} 0.600^{* * *} \\ (0.198) \end{gathered}$ | $\begin{gathered} \mathbf{0 . 8 7 7 ^ { * * * }} \\ (0.242) \end{gathered}$ | $\begin{gathered} \mathbf{1 . 8 6 4}^{* * *} \\ (0.164) \end{gathered}$ | $\begin{gathered} \mathbf{1 . 2 9 4 * * *} \\ (0.223) \end{gathered}$ | $\begin{gathered} \mathbf{0 . 7 7 4}^{* * *} \\ (0.247) \end{gathered}$ |
| $\ln$ (Mkt Size: Dollar) | $\begin{gathered} \mathbf{0 . 0 9 3}{ }^{* *} \\ (0.041) \end{gathered}$ | $\begin{gathered} \mathbf{0 . 1 1 2}^{* * *} \\ (0.038) \end{gathered}$ | $\begin{gathered} 0.035 \\ (0.042) \end{gathered}$ | $\begin{gathered} 0.008 \\ (0.049) \end{gathered}$ | $\begin{gathered} 0.013 \\ (0.038) \end{gathered}$ | $\begin{gathered} -\mathbf{0 . 0 6 3}{ }^{*} \\ (0.038) \end{gathered}$ | $\begin{gathered} 0.090 \\ (0.060) \end{gathered}$ | $\begin{gathered} -0.020 \\ (0.038) \end{gathered}$ | $\begin{gathered} 0.023 \\ (0.040) \end{gathered}$ | $\begin{gathered} -0.003 \\ (0.060) \end{gathered}$ |
| Correctly Predicted $R^{2}$ | 0.736 | 0.615 | 0.694 | 0.863 | 0.617 | 0.598 | 0.086 | 0.264 | 0.674 | 0.908 |
| $N$ | 1094 | 1094 | 1094 | 1094 | 1094 | 1094 | 428 | 760 | 1094 | 1094 |

Table 4b: Main Results - 2002
$\left.\begin{array}{|l|ccccccc|ccc|cc|}\hline & \begin{array}{c}\text { Dollar } \\ \text { Select } \\ \text { Available }\end{array} & \begin{array}{c}\text { Gender } \\ \text { Select } \\ \text { Available }\end{array} & \begin{array}{c}\text { Recency } \\ \text { Select } \\ \text { Available }\end{array} & \begin{array}{c}\text { Multi-Buyers } \\ \text { Available }\end{array} & \begin{array}{c}\text { Vintage } \\ \text { Names } \\ \text { Available }\end{array} & \begin{array}{c}\text { Inquirers } \\ \text { Available }\end{array} & \begin{array}{c}\text { Dollar } \\ \text { Select } \\ \text { Count }\end{array} & \begin{array}{c}\text { Recency } \\ \text { Select } \\ \text { Count }\end{array} & \begin{array}{c}\text { Fundraiser } \\ \text { Rate }\end{array} & \begin{array}{c}\text { Competitor } \\ \text { Rate }\end{array} \\ \text { Available }\end{array}\right\}$
Table 5: Alternate Specifications

|  | $\begin{gathered} \text { Dollar } \\ \text { Select } \\ \text { Available } \end{gathered}$ | $\begin{gathered} \text { Gender } \\ \text { Select } \end{gathered}$ Available | $\begin{aligned} & \text { Recency } \\ & \text { Select } \\ & \text { Available } \end{aligned}$ | Multi-Buyers Available | Vintage <br> Names <br> Available | Inquirers Available | Dollar Select Count | Recency Select Count | Fundraiser <br> Rate <br> Available | Competitor Rate Available |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Probit | Probit | Probit | Probit | Probit | Probit | OLS | OLS | Probit | Probit |
|  | 1997 |  |  |  |  |  |  |  |  |  |
| Base | $0.281^{* * *}$ | 0.051 | 0.091** | 0.071** | 0.156 ${ }^{* * *}$ | 0.045 | 0.283* | $0.417^{* * *}$ | 0.364*** | 0.055** |
| Larger Lists | 0.382*** | 0.009 | $0.138{ }^{* * *}$ | $0.134^{* * *}$ | 0.223*** | 0.107** | 0.265 | $0.498{ }^{* * *}$ | 0.426*** | 0.049 |
| Apparel Controls | 0.206*** | 0.087* | 0.019 | 0.049 | 0.085* | 0.033 | 0.266 | $0.282^{* *}$ | $0.289^{* * *}$ | 0.045 |
| CompAve | 0.272*** | 0.026 | 0.086** | 0.055* | $0.149^{* * *}$ | 0.022 | 0.367 ** | $0.382^{* * *}$ | 0.383*** | 0.046** |
| CompCos | 0.262*** | 0.063* | 0.077** | $0.072^{* * *}$ | 0.159*** | 0.029 | 0.346** | $0.368^{* * *}$ | $0.336^{* * *}$ | 0.042** |
| Manager Indicators | 0.195*** | -0.007 | 0.026 | 0.055** | 0.113** | 0.019 | 0.197 | 0.409*** | $0.288{ }^{* *}$ | $0.039^{* *}$ |
|  | 2002 |  |  |  |  |  |  |  |  |  |
| Base | 0.335*** | 0.006 | 0.140*** | 0.079*** | 0.118*** | 0.021 | 0.236 | 0.349*** | 0.299*** | 0.078*** |
| Larger Lists | $0.423^{* * *}$ | 0.001 | $0.192^{* * *}$ | 0.096** | 0.214*** | 0.056 | .351* | 0.579*** | 0.390*** | $0.137^{* * *}$ |
| Apparel Controls | 0.318*** | 0.061 | 0.085** | 0.040 | 0.015 | -0.034 | 0.247 | 0.185 | $0.238{ }^{* * *}$ | 0.035 |
| CompAve | 0.294*** | -0.020 | $0.123^{* * *}$ | 0.064** | 0.085** | -0.021 | 0.208 | 0.299*** | $0.307^{* *}$ | $0.073^{* * *}$ |
| CompCos | 0.316*** | 0.039 | $0.126^{* * *}$ | $0.085^{* * *}$ | $0.130^{* * *}$ | 0.030 | 0.296** | 0.424*** | $0.287^{* * *}$ | $0.060^{* * *}$ |
| Manager Indicators | 0.198*** | -0.020 | 0.080** | 0.071*** | $0.094^{* *}$ | 0.048 | -0.030 | 0.220* | 0.188*** | $0.072 * * *$ |

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[^0]:    ${ }^{*}$ The views expressed in this paper are those of the authors and do not necessarily reflect those of the Board of Governors or the staff of the Federal Reserve System. Corresponding author: Raphael Thomadsen, The Anderson School at UCLA, 110 Westwood Plaza, Suite B411, Los Angeles, CA 90095-1481, P:310-794-2100, F:310-206-7422, raphael.thomadsen@anderson.ucla.edu.

[^1]:    ${ }^{1}$ While Tirole offers this definition, he very quickly goes on to discuss its shortcomings.
    ${ }^{2}$ See Stigler (1987), Tirole (1988), Varian (1989), Stole (2003), and Clerides (2004) for more detailed discussions.

[^2]:    ${ }^{3}$ Similarly, Stole (1995), Desai (2001), and Rochet and Stole (2002) show that the quality distortion associated with price discrimination can diminish as the level of competition increases.
    ${ }^{4}$ Such a prisoner's dilemma is at the heart of models by Corts (1989) and Shaffer and Zhang (1995).
    ${ }^{5}$ While the example in this paragraph uses the language of second-degree price discrimination, similar logic applies for third-degree price discrimination. Instead of offering more menu choices, the firm would target prices for more groups of customers.

[^3]:    ${ }^{6}$ The similarity to quality discrimination comes from the fact that selects can be viewed as different quality levels: more selective lists allow direct mailers to better target their advertising and should therefore be more valuable relative to the base list. For example, a mailer may be willing to pay more for names of more recent buyers or of buyers who have large purchase amounts, since the prospects may be more likely to respond to the mailer's offer or

[^4]:    to spend more, conditional on responding. On the other hand, one could also view this as bundling: purchasing a base list could be viewed as buying a bundled product, at a discount, that includes the male and female buyers from the list owner's catalog.
    ${ }^{7}$ See Burnett (1988) for history and details of the list industry.

[^5]:    ${ }^{8}$ Almost all lists offer geographic selects based upon the consumer's state or zip code. Since this information is part of the address itself, these selects can be offered with no additional investment by the list owner. Because they are so widely offered, we do not include these in our analyses.

[^6]:    ${ }^{9}$ Of course, one of the cutoffs for the two groups could be the same as the cutoff for the one group.

[^7]:    ${ }^{10}$ For lists maintained on paper cards, an owner wishing to discriminate had to keep three sets of names: a master list with all of the names, a list with all of the names of the men, and a list with all of the names of the women. Such a division would be required for any select that the mailing list offered.

[^8]:    ${ }^{11}$ One other firm, SRDS, offers a similar directory. However, only mIn offered an online database at the time of the first sample.

[^9]:    ${ }^{12}$ The categories used are Animals/Pets/Wildlife, Apparel, Areas Of Interest, Arts Cultural/Musical, Attendees, Beauty \& Cosmetics, Boats/Boating, Books, Children, Children's Apparel, Children's Books/Pubs, Children's Merchandise, Collectibles, Computers, Diet \& Fitness, Electronics, Environment, Fishing, Food/Kitchen Equipment, Furniture, Games/Contests/Puzzles, Gardening/Horticulture, General Merchandise, Gifts, GunsWeapons, Health, History, Hobbies Or Crafts, Home Decor/Accessories, Home Improvement, Hunting, Jewelry, Leisure/Recreation, Lotteries/Gambling, Mens Publications/Books, Motor Vehicles, Music, Photography, Record/Cassette/CD, Sexually Oriented, Sports, Sports Merchandise, Tools/Equipment, Travel, Video Tapes, Womens Publications/Books, Woodworking.
    ${ }^{13}$ These measures are related to distance metrics frequently used in cluster analysis involving binary variables. See

[^10]:    ${ }^{14}$ We have also conducted the analysis further restricting the sample to only those lists with over 100,000 names without altering the results.

[^11]:    ${ }^{15}$ These fixed costs are discussed earlier in section 2

[^12]:    ${ }^{16}$ In prior versions of the paper, we also report results using the number of establishments or employees in the industry (using the same NAICS match) as alternate specifications. These other measures do not change the results.
    ${ }^{17}$ Estimating a regression where the number of types of price discrimination is the dependent variable or jointly estimating the probits as a mulitvariate system both yield similar results.

[^13]:    ${ }^{18}$ Similar results are obtained when the observations where these selects are not offered are included in the regressions.

[^14]:    ${ }^{19}$ Because indicator variables for managers who have only one list would perfectly predict whether the client list price discriminates, we create an indicator variable for small managers, and assign this indicator for all managers that manage one or two lists.

