Competition and Price Discrimination in the Market for Mailing Lists

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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 sellers are more likely to segregate consumers by offering a menu of quality choices (second-degree price discrimination) and/or offering different prices to readily identifiable groups of consumers (third-degree price discrimination) in more competitive markets. We also examine how the fineness with which consumers are divided corresponds to the level of competition in the market.

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 lists facing more competition are more likely to implement second-degree and third-degree price discrimination, and when implementing second-degree price discrimination, to offer menus with more choices.

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1   Introduction

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

The mail order catalog industry proves to be an ideal 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. Moreover, pure information goods are likely to exhibit price discrimination because 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. This is a direct consequence of the fact that information goods can almost costlessly be passed to another party without relinquishing ownership (Arrow 1962).

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).[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." (See Stigler (1987), Tirole (1988), Varian (1989), Stole (2003), and Clerides (2004) for more detailed discussions.) Our paper uses this modern definition of price discrimination.

The literature has also classified price discrimination by type. Sellers charging different customers different prices based on the consumers' observable characteristics is classified as third-degree

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[1]While Tirole offers this definition, he very quickly goes on to discuss its shortcomings.

price discrimination. Price discrimination through self-selection mechanisms is classified as second-degree price discrimination and may involve nonlinear-pricing tariffs/quantity discounts, quality discrimination, and bundling.[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 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.

List owners also offer different prices to identifiable groups of 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 verified this fact, showing that that variations in the prices of differently-graded 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

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[2]While quality discounting fits the modern, but not the traditional, definition of price discrimination, Maskin and Riley (1984) proves that quality discrimination is identical to quantity discrimination at a formal (mathematical) level. It has also been noted that some forms of second-degree price discrimination are dual to the question of optimal product line for a firm (see Johnson and Myatt (2003), for example). Thus, our paper can shed light on the optimal product line literature to the extent this analogy holds in our context.

market.

Having established these facts, subsequent research began focusing on the question of how competition affects incentives to price discriminate. The theoretical literature shows that competition can either increase or decrease the incentives to price discriminate. For example, Stole (1995) and Rochet and Stole (2002) collectively demonstrate that competition can either flatten or steepen the price discrimination price schedule depending on whether the consumers who have the highest willingness-to-pay are the the same as those who have the greatest loyalty to a particular company. Seim and Viard (2004) also present a model of price discrimination and competition that yields ambiguous predictions about competition's effect on a firm's tariff schedule, depending on how much it costs to provide another choice for consumers. Similarly, the product line literature, which studies what is in many ways a dual problem, has found ambiguous results. For example, Johnson and Myatt (2003) show that competition will cause firms to expand their product lines under some conditions and to contract their product lines under other conditions. 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.[3]

Several empirical papers have examined the relationship between price schedules and competition, including Stavins (2001), Busse and Rysman (n.d.), and Miravete and Röller (2004). Stavins studies the airline industry, and finds that the gap between the price for unrestricted seats and the price for restricted seats increases as competition increases. Busse and Rysman find a similar result in the yellow pages advertising market: prices of large ads fall by a greater percentage than small ads under increased competition. Miravete and Röller study the early US cellular market and find that low-usage consumers face higher price-cost margins than high-usage customers - an effect that is exaggerated by competition. In all three cases, competition is associated with an increased curvature in the price schedule. 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.

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[3]We discuss the intuition of why these models can predict a positive relationship between competition and price discrimination, along with a discussion about why the conditions needed for this are likely to be satisfied in a wide range of industries, in Section 3.4

In contrast to these papers, we use a different empirical strategy. Intead of measuring the curvature of pricing schedules, we focus on the firm's decision *whether* to price discriminate, 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 clean way to measure whether the prevalence of price discrimination is higher or lower in more competitive markets.

The papers with which we are most similar are Seim and Viard (2004) for second-degree price discrimination and Asplund, Eriksson and Strand (2002) for third-degree price discrimination. However, there are important distinctions between these papers and ours.

Seim and Viard 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. While our paper and Seim and Viard both study the impact of competition on second-degree price discrimination, the papers differ along two dimensions. First, the papers examine different types of price discrimination. Seim and Viard examine second-degree price discrimination through the lens of different tariff structures: some consumers may want to use their cell phones more or less, but all consumers who make a call are buying a good of the same quality (albeit at different prices). In contrast, the second-degree price discrimination we examine is discrimination of the form of either quality discrimination or mixed bundling.[4] Second, only a fraction of the firms 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.

Asplund et al. (2002) study the newspaper industry and examine whether more competitive markets have a higher incidence of third-degree price discrimination, finding that newspapers often give discounts to consumers who purchase their paper in a geographic location that is more-strongly covered by a competitor. However, one key element of their market is that consumer tastes for

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[4]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 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.

the competing products are negatively correlated. By contrast, we observe third degree price discrimination on at least one dimension where there is no reason to believe that the willingness-to-pay of consumers would be negatively correlated across the products.[5] Thus, our paper studies the link between competition and third-degree price discrimination that is not in the form of poaching.

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.

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, while Section 4 concludes.

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.[6] 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).

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

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[5]While such a correlation structure may exist in the case of competitor pricing, it seems unlikely that this explains the reason for fundraiser discounts.

[6]See Burnett (1988) for history and details of the list industry.

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.

List owners can price discriminate in a number of ways. 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.[7] 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.

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.[8] Recency selects work very similarly. For example, a list with two recency selects might offer the names of consumers who made a purchase from the catalog within the last six months at one price, and the names of consumers who made a purchase between 6-12 months prior at a lower

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[7]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.

[8]Of course, one of the cutoffs for the two groups could be the same as the cutoff for the one group.

price.

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. 47% of catalog lists offer this type of discount. These fundraiser discounts can be substantial, but the fundraiser rate often involves the additional perk of not having to pay any 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. 9% 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. More importantly, list owners put in a few fake addresses, or "seeds," so they can confirm that their lists are being used only once and that mailings only include materials that the parties have agreed to. 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 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 or in other technologies that could be used to classify the list's names. 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 investments.[9] By 2002 these fixed costs had decreased, although the industry was still

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[9]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, leading to enough of an investment that a firm would not want to incur these costs unless they believed that doing so would bring in enough benefits.

not near the forefront of technology.

Lastly we note that, when purchasing names from a list owner, the mailer is charged for any additional costs besides the costs of the names themselves. For example, this includes a fee for any media, such as magnetic tape, on which the names are delivered. As a result, the mailing lists are truly a zero marginal-cost product.

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 with the primary intent of using the resulting list of consumers to enter a particular segment of the list market. As such, our competition measures should be exogenous to the demand conditions for these mailing lists.

The data for this project consists of the datacards for every 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. This data was graciously provided 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.[10]

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

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[10]One other firm, SRDS, offers a similar directory, however at the time of the first sample, only mIn offered an on-line database.

same list; we aggregated all datacards based on the same 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 1b also 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 decision as a separate test of the link between competition and price discrimination.

2.3 Measures of Competition

Our measures of the degree of competition that a list faces are derived from the 47 different categories into which the lists are classified.[11] mIn classifies these lists based upon descriptions provided by the list managers. Most of the lists are classified into one or two categories (see Figure 1). Indeed, a careful inspection of the data suggests that cases where the lists are classified in

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[11]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.

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 would input industry codes and then choose lists from the results of those queries.

We use three different measures of competition in order to ensure that 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 with partial overlap are given a weight between zero and one. The variation in our three competition measures lies in how they calculate the weight for partially-overlapping lists.[12]

To calculate the measures, we first create a vector of ones and zeros to indicate whether a particular list is classified as being in each industry. Our main competition measure is then constructed by calculating the cosine of the angle formed between this vector and a similar vector for each other list and then summing over all lists:

$$CompCos_i = \sum_{\text{lists } j \neq i} \cos(i, j) \tag{1}$$

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

$$CompMatch_i = \sum_{\text{lists } j \neq i} \frac{\text{Number of codes listed by both } i \text{ and } j}{\text{Number of codes listed by } i \text{ or } j} \tag{2}$$

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[12]These measures are related to distance metrics frequently used in cluster analysis involving binary variables. See Anderberg (1973) for a discussion of these metrics.

$$CompAve_i = \sum_{\text{lists } j \neq i} \frac{\text{Number of codes listed by both } i \text{ and } j}{\text{Number of codes listed by list } i} \qquad (3)$$

CompMatch has the advantage of being symmetric and utilizing the information of non-matching codes from both lists. CompAve is more 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. The summary statistics for these competition variables appears in Table 1a and Table 1b. A histogram of CompCos appears in Figure 2 to give the reader a broader understanding of the distribution of cometition. Table 3 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.

A shortcoming of these competition measures, and of our data, is that we have no way to control for the degree of heterogeneity among the lists within a particular code. Unfortunately, there is no information in our data that allows us to derive a measure of competition that can control for this differentiation. However, CompCos and the other competition measures attempt to capture the information we have about how closely the different lists within a particular code compete by accounting for the degree to which the lists classify themselves in the same way. One consequence of not being able to fully capture product differentiation is that our measures of competition appear to be too high. Our assumption is that these measures are correlated enough, or even proportional, to the "true" amount of competition, as could be derived from many models of product differentiation.[13]

Finally, all of the results presented in this paper focus on the impact of the natural log of competition. 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

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[13]These models include those of global product differentiation and those of local product differentiation. For example, under the multinomial logit model (highly global), the market share of N identical firms converges to $1/N$ when N is large. The distance to the closest competitor on a Salop circle (highly local) with N equidistant firms is $1/N$. In both cases, N gives a measure of the level of competition.

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. Secondly, 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 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). As a robustness check, the number of establishments or employees in the industry (using the same NAICS match) are also used in the alternate specifications. Summary statistics for these variables

are in Tables 1a and 1b.

Finally, mIn datacards include a gender breakdown of the base list. We include variables derived from the gender distribution in the probit estimates for gender select availability as a control variable. In particular, we include the fraction of names that are female, the absolute deviation of this value from .5, and the absolute deviation from .5 squared. We include the deviation of the gender distribution to account for the possibility that demand for gender selects differs if the list is gender balanced compared to demand if the list consists mostly of men or mostly of women. For example, a list comprised almost exclusively of female names may be less likely to offer gender selects since the resulting list will differ little from the base list. We include the square of this term to allow that this relationship may not be linear, and we include the fraction of names that are female in case this relationship is asymmetric in gender.

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. 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 inquirers in 1997 and gender select availability and inquirers

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in 2002.[14]

The consistency of the positive, statistically significant coefficients on competition demonstrates that markets with high levels of competition exhibit greater degrees of second-degree price discrimination. The first several columns - those for gender selects, dollar selects, recency selects and multi-buyer selects - are all easily interpreted as quality discrimination or mixed bundling. The next two columns, those for vintage names and inquirers, are examples of quality degradation - deliberately offering a degraded quality product in order to siphon off the low valuation buyers. In this case, the results are mixed - competition is positively correlated with offering vintage names, but not with offering names of inquirers.

To gauge the approximate magnitude of the effects, the first line of each panel in Table 5 reports the increase in the probability of price discriminating that would be associated with moving from the 10th percentile of the competition measure to the 90th percentile, holding the other variables fixed at their respective means. These numbers are given merely as descriptive statistics rather than as predictive relationships, since our estimates can only be used to describe the relationships inherent in the data and not to predict out-of-sample relationships. 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 gender, 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

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[14]Note that estimating a regression where the number of types of price discrimination is the dependent variable, or jointly estimating the probits as a mulitvariate system, yields similar results.

on our competition measure. The results of these regressions are reported in columns 7 and 8 of Tables 4a and 4b. Here, too, the coefficients on competition are positive and significant, indicating that greater competition is correlated with a greater partition of the product space.[15] 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 names - it appears that the size of the list is no longer much of a factor in 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,

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[15]Regressions of the number of different dollar or recency selects including observations where no such selects are offered yield similar results.

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.

The first line in Table 5 reports this statistic for the estimated models reported in Table 4a. 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 CompMatch or CompAve, we see that, in general, the results are similar in magnitude and significance to the CompCos results.

In the histograms of our competition measure presented in Figure 2, there is a spike in competition at the high end of the spectrum, 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 fourth 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 5th and 6th lines of Table 5 consider how our results would change if we measured market size differently. We find that including either the number of employees or firms in the industry instead of using the dollar amount of value added associated with the industry yields estimates that are positive, and generally of similar magnitude as in our base model.

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 managers[16] and find that for most of the cases competition still increases the probability that a mailing list owner will price discriminate by a similar amount as we found when we did not include these manager dummies. This means that competition is associated with greater price discrimination even within the set of lists managed by the same manager. The fact that most of these effects are still statistically significant even when such a large number of additional regressors are added to the probits/regressions indicates 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.

3.4 Synthesis

The uniformity with which we find a positive relationship between competition and price discrimination complements the results of those papers that have either looked at other measures of price discrimination - such as the curvature of the price schedule or the degree of price dispersion present in a market - or at other forms of price discrimination. Despite the theoretical ambiguity in the relationship between competition and price discrimination, the empirical literature demonstrates a consistent, positive relationship.

Thus, it appears that the empirical literature is revealing that the assumptions necessary for competition to lead to increased price discrimination are more valid than the assumptions needed to support the opposite (or a neutral) relationship. We discuss, at an intuitive level, two closely related reasons for a positive relationship and note that the conditions that are necessary for them to apply hold in a wide variety of industries.

The first reason why competition can lead to increased price discrimination is that competition

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[16]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 lists, and assign this indicator for all managers that manage one or two lists.

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.[17] Such a situation could arise if consumers obtained similar utilities from each of the products offered by a given firm.[18] In this case, a firm without much competition has low incentives to pay the costs of offering more choices to consumers since any new products simply canabalize existing sales. However, when there is more competition, firms may find that that they are better off offering more menu choices regardless of their competitor's menu size. If their competitors offer fewer choices then they can steal consumers who prefer one of the additional options. If their competitors offer larger menus then the firm needs to offer additional menu choices or risk losing customers.

Seim and Viard (2004) demonstrate that this prisoner's dilemma will only persist when the costs of offering consumers more choices is not too expensive; if the costs of offering consumers more options are high then firms will offer fewer choices as competition increases because the dilution of market share makes it too hard to recover the fixed costs. Thus, one possible reason why the empirical literature finds that price discrimination is more prevalent in more competitive markets is that the costs of offering additional choices may generally be low enough. This seems plausible in the mailing list industry.

The second reason for a positive relationship between competition and price discrimination is that competition can increase the dispersion of willingness-to-pay that any particular firm faces. This can occur 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 hesitant to consume from anyone except their ideal firm, while other consumers are relatively indifferent to the product differentiation. When there is limited competition, both types of consumers will generally buy from the incumbent firm, leaving the incumbent firm with little incentive to price discriminate unless the consumers' outside options are somehow

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[17]Such a prisoner's dilemma is at the heart of the model by Corts (1989). In his model, the equilibrium of the prisoner's dilemma exhibits such intense price competition that firms have an incentive to seek stratgic committment mechanisms to avoid this outcome.

[18]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.

correlated with the consumers' sensitivity to product differentiation.[19] 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 to charge low prices to consumers who are not sensitive to product differentiation and therefore treat the firms' goods as undifferentiated commodities.

This heterogeneity in sensitivity to product differentiation is likely to be a factor in the mailing list industry. 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 the multi-buyer select. This logic may also apply to recency selects to the extent that people's purchasing patterns may change more quickly than their underlying interests and that it may be possible to target customers with specific interests through a broader set of lists than one could use to target purchasing patterns.[20] In the cases of third-degree price discrimination, it seems likely that 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 the product differentiation between lists.

Finally, we note that there are reasons to believe that this price discrimination based on heterogeneity in customer willingness to switch between companies holds for many of the industries that have been studied by others. In the cell phone industry, this theory would suggest that greater competition leads to relatively greater discounts being given to high volume consumers, who have the most money at stake when considering which cell phone company to patronize. In the airline industry, business consumers who buy unrestricted fares generally have the lowest willingness to

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[19]The value of consumers' outside options is independent of their sensitivity to product differentiation in Rochet and Stole (2002),while it is correlated with consumers' sensitivity to product differentiation in Stole (1995).

[20]While it is possible to tell a similar story about the gender select - that marketers selling similar products also care most about matching gender - it also seems reasonable that the willingness to pay for gender may be independent of the marketer's valuation of the underlying list. Perhaps this is why the results for the gender select in 2002 are not statistically significant.

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, the lower subscription rate for consumers in geographic areas that are better covered by another paper picks off those consumers who do not care as much about the locality of their paper. Finally, it seems possible that the merchants who buy the large yellow pages advertisements are the ones most likely to reallocate their advertising strategy (or size) in the face of competition, given the size of their expenditures.

4 Conclusion

The theoretical ambiguity as to whether more-intense competition should lead to more or less price discrimination leaves the net impact as an empirical question. The mailing list industry is an ideal industry to use 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. Rather than examining the curvature of the price schedule, we study the link between competition and the probability that firms will implement second-degree and/or third-degree price discrimination. Our main result is that greater competition is associated with more second- and third-degree price discrimination. Further, we find that firms implementing second-degree price discrimination in more competitive industries offer consumers menus with more choices.

There are at least two reasons why competition might generally 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.

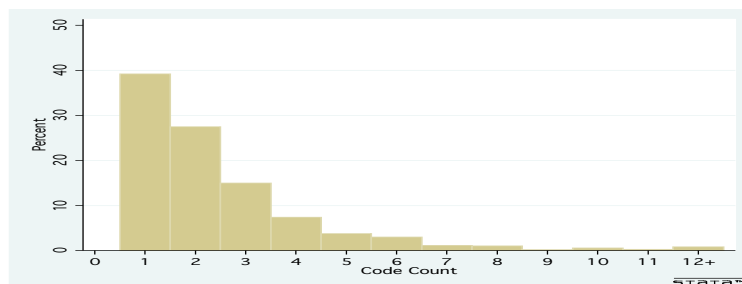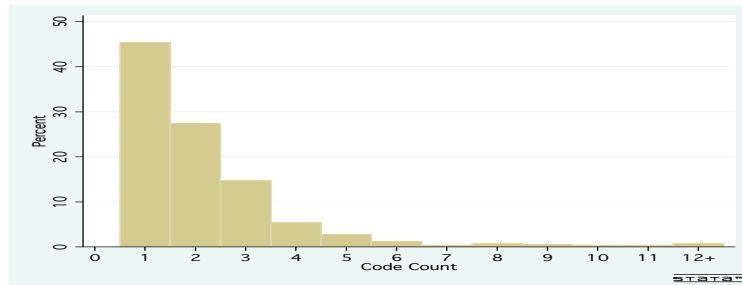Figure 1: Distribution of Number of Codes Describing Lists - 1997, 2002

Figure 2: Distribution of Competition Measure - CompCos - 1997, 2002
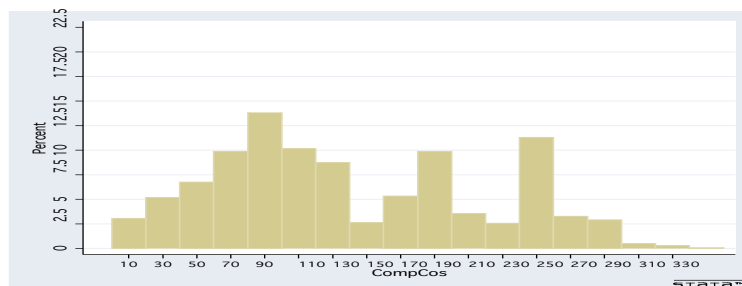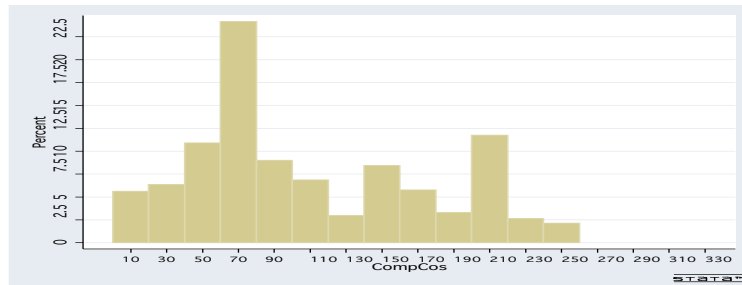
Table 1a: Summary Statistics 1997

Variable	N	Mean	Std. Dev.	Min	Max
List Size					
0-49 Names	1209	0.40	0.49	0	1
50-99 Names	1209	0.23	0.42	0	1
100-199 Names	1209	0.15	0.36	0	1
200-299 Names	1209	0.07	0.25	0	1
300-399 Names	1209	0.04	0.19	0	1
400-499 Names	1209	0.03	0.17	0	1
500-999 Names	1209	0.05	0.21	0	1
1,000+ 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
CompCos	1209	108.49	64.25	3.12	257.10
CompAve	1209	120.12	71.83	4	281
CompMatch	1209	74.80	44.86	2.21	167.79
Control Variables					
Apparel Indicator	1209	0.23	0.42	0	1
Mkt Size: Dollar ($bil)	1094	63.26	88.80	2.25	560.30
Mkt Size: Empl. ('000s)	1066	475.71	544.38	17.51	2507.54
Mkt Size: Est. ('000s)	1066	36.60	26.10	2.10	94.74
Fraction Female	1209	0.40	0.38	0	1
$|\text{Fraction Female} - .5|$	1209	0.36	0.17	0	0.50
$(\text{Fraction Female} - .5)^2$	1209	0.16	0.10	0	0.25

Table 1b: Summary Statistics 2002

Variable	N	Mean	Std. Dev.	Min	Max
List Size					
0-49 Names	1405	0.37	0.48	0	1
50-99 Names	1405	0.20	0.40	0	1
100-199 Names	1405	0.17	0.37	0	1
200-299 Names	1405	0.08	0.27	0	1
300-399 Names	1405	0.04	0.20	0	1
400-499 Names	1405	0.03	0.16	0	1
500-999 Names	1405	0.05	0.22	0	1
1,000+ 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
CompCos	1405	138.85	77.69	2.01	340.24
CompAve	1405	155.34	86.07	4	358
CompMatch	1405	90.26	50.55	1.38	191.01
Control Variables					
Apparel Indicator	1405	0.26	0.44	0	1
Mkt Size: Dollar ($bil)	1268	91.50	128.	3.11	725.60
Mkt Size: Empl. ('000s)	1252	536.56	568.75	19.42	2544.94
Mkt Size: Est. ('000s)	1252	36.57	24.50	2.20	90.82
Fraction Female	1405	0.42	0.37	0	1
$|\text{Fraction Female} - .5|$	1405	0.34	0.18	0	0.50
$(\text{Fraction Female} - .5)^2$	1405	0.15	0.10	0	0.25

Table 2: Correlation Among Selects Offered

	Dollar Select Available	Gender Select Available	Recency Select Available	Multi-Buyers Available	Vintage Names Available	Inquirers Available	Fundraiser 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

	1997		
	CompCos	*CompAve*	*CompMatch*
CompCos	1.00	0.85	0.94
CompAve	0.85	1.00	0.95
CompMatch	0.94	0.95	1.00
	2002		
CompCos	1.00	0.80	0.95
CompAve	0.80	1.00	0.93
CompMatch	0.95	0.93	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 Select Count	Fundraiser Rate Available	Competitor Rate Available
	Probit	Probit	Probit	Probit	Probit	Probit	OLS	OLS	Probit	Probit
Constant	-4.475***	-0.819	-1.268*	-2.702***	-1.647	0.578	-0.047	1.055*	-3.285***	-2.677***
	(0.705)	(0.715)	(0.703)	(0.830)	(0.640)	(0.632)	(0.993)	(0.614)	(0.672)	(0.975)
ln(*CompCos*)	0.410***	0.150**	0.130**	0.209***	0.232***	0.041	0.197**	0.210***	0.508***	0.182**
	(0.061)	(0.060)	(0.060)	(0.073)	(0.055)	(0.054)	(0.083)	(0.053)	(0.060)	(0.087)
Size: 50-99	0.678***	0.567***	0.671***	0.548***	0.401***	0.077	0.407**	0.589***	0.352***	0.166
	(0.114)	(0.109)	(0.106)	(0.150)	(0.103)	(0.102)	(0.189)	(0.101)	(0.107)	(0.174)
Size: 100-199	1.169***	0.626***	1.211***	0.622***	0.345***	0.056	0.565***	0.657***	0.694***	0.474***
	(0.123)	(0.123)	(0.138)	(0.159)	(0.115)	(0.114)	(0.183)	(0.104)	(0.118)	(0.171)
Size: 200-299	1.350***	0.695***	1.085***	0.980***	0.503***	0.308**	0.559	1.102***	0.750***	0.598***
	(0.165)	(0.169)	(0.183)	(0.188)	(0.155)	(0.153)	(0.216)	(0.138)	(0.160)	(0.212)
Size: 300-399	1.773***	0.960***	2.056***	1.293***	0.478**	0.365*	1.055***	1.285***	0.980***	0.978***
	(0.232)	(0.237)	(0.437)	(0.229)	(0.210)	(0.206)	(0.249)	(0.171)	(0.215)	(0.247)
Size: 400-499	1.785***	1.156***	1.518***	1.924***	0.483**	0.085	0.829***	1.278***	1.011***	0.686**
	(0.283)	(0.287)	(0.361)	(0.256)	(0.240)	(0.237)	(0.276)	(0.197)	(0.259)	(0.298)
Size: 500-999	1.655***	1.201***	1.238***	1.526***	0.853***	0.356*	0.715***	1.482***	1.198***	0.782***
	(0.205)	(0.224)	(0.235)	(0.205)	(0.190)	(0.184)	(0.233)	(0.159)	(0.204)	(0.235)
Size: 1,000+	1.613***	1.250***	1.518***	1.821***	0.552***	0.594***	0.834***	1.824***	1.195***	0.743***
	(0.225)	(0.230)	(0.296)	(0.219)	(0.199)	(0.198)	(0.242)	(0.164)	(0.222)	(0.247)
ln(Mkt Size: Dollar)	0.092**	0.058	0.037	0.003	0.009	-0.060	0.081	-0.017	0.023	0.005
	(0.041)	(0.041)	(0.042)	(0.049)	(0.038)	(0.038)	(0.059)	(0.038)	(0.040)	(0.059)
Fraction Female		-0.789***								
		(0.139)								
|Fraction Female − .5|		1.904								
		(1.418)								
(Fraction Female − .5)²		-9.442***								
		(2.436)								
Correctly Predicted / R^2	0.741	0.675	0.698	0.866	0.625	0.599	0.092	0.264	0.675	0.908
N	1094	1094	1094	1094	1094	1094	428	760	1094	1094

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Table 4b: Main Results - 2002

	Dollar Select Available	Gender Select Available	Recency Select Available	Multi-Buyers Available	Vintage Names Available	Inquirers Available	Dollar Select Count	Recency Select Count	Fundraiser Rate Available	Competitor Rate Available
	Probit	Probit	Probit	Probit	Probit	Probit	OLS	OLS	Probit	Probit
Constant	-3.480***	-0.897	-2.318***	-3.140***	-1.709***	-0.825	0.468	-0.494	-2.410***	-2.101***
	(0.621)	(0.645)	(0.603)	(0.752)	(0.594)	(0.589)	(0.872)	(0.666)	(0.595)	(0.776)
ln(CompCos)	0.513***	0.090	0.209***	0.246***	0.214***	0.048	0.177**	0.253***	0.443***	0.192***
	(0.062)	(0.060)	(0.056)	(0.073)	(0.055)	(0.055)	(0.088)	(0.062)	(0.057)	(0.073)
Size: 50-99	0.586***	0.368***	0.580***	0.475***	0.178*	0.002	0.341**	0.480***	0.278***	0.137
	(0.104)	(0.108)	(0.102)	(0.143)	(0.101)	(0.102)	(0.155)	(0.111)	(0.100)	(0.138)
Size: 100-199	0.651***	0.544***	0.728***	0.766***	0.117	0.094	0.593***	0.597***	0.455***	0.307**
	(0.110)	(0.118)	(0.111)	(0.140)	(0.107)	(0.106)	(0.156)	(0.115)	(0.106)	(0.138)
Size: 200-299	1.090***	0.964***	0.853***	1.171***	0.257*	0.247*	0.818***	1.034***	0.887***	0.725**
	(0.149)	(0.173)	(0.158)	(0.165)	(0.143)	(0.142)	(0.179)	(0.147)	(0.150)	(0.163)
Size: 300-399	0.959***	0.745***	1.164***	1.212***	0.016	0.006	0.458**	0.897***	0.797***	0.512**
	(0.182)	(0.213)	(0.224)	(0.198)	(0.182)	(0.182)	(0.221)	(0.172)	(0.185)	(0.209)
Size: 400-499	1.020***	0.519**	0.854***	1.044***	0.213	0.298	0.897***	1.011***	1.039***	0.552**
	(0.237)	(0.257)	(0.261)	(0.251)	(0.229)	(0.225)	(0.266)	(0.223)	(0.249)	(0.261)
Size: 500-999	1.026***	0.942***	0.809***	1.180***	0.027	0.162	0.664***	1.217***	0.764***	0.325
	(0.174)	(0.206)	(0.187)	(0.188)	(0.171)	(0.168)	(0.203)	(0.169)	(0.174)	(0.208)
Size: 1,000+	0.804***	0.812***	0.790***	1.527***	0.277*	0.576***	0.749***	1.232***	0.294*	0.307
	(0.167)	(0.187)	(0.181)	(0.180)	(0.161)	(0.161)	(0.206)	(0.165)	(0.162)	(0.201)
ln(Mkt Size: Dollar)	0.016	0.095***	0.075**	0.017	0.011	0.008	0.060	0.065*	-0.005	-0.013
	(0.035)	(0.037)	(0.034)	(0.042)	(0.033)	(0.033)	(0.048)	(0.036)	(0.033)	(0.043)
Fraction Female		-0.758***								
		(0.130)								
|Fraction Female − .5|		2.067								
		(1.295)								
(Fraction Female − .5)²		-9.719***								
		(2.241)								
Correctly Predicted	0.704	0.699	0.654	0.848	0.643	0.656			0.652	0.868
R²							0.085	0.169		
N	1268	1268	1268	1268	1268	1268	527	847	1268	1268

Table 5: Alternate Specifications

	Dollar Select Available	Gender Select Available	Recency Select Available	Multi-Buyers Available	Vintage Names Available	Inquirers Available	Dollar Select Count	Recency Select Count	Fundraiser Rate Available	Competitor Rate Available
	Probit	Probit	Probit	Probit	Probit	Probit	OLS	OLS	Probit	Probit
1997										
Base	0.262***	0.059**	0.077***	0.072***	0.159***	0.029	0.346**	0.368***	0.336***	0.042**
CompMatch	0.281***	0.057***	0.091**	0.071**	0.156***	0.045	0.283*	0.417***	0.364***	0.055**
CompAve	0.272***	0.048*	0.086***	0.055*	0.149***	0.022	0.367**	0.382***	0.383***	0.046**
Apparel Controls	0.202***	0.053*	0.007	0.060*	0.103**	0.012	0.395**	0.244**	0.274***	0.029
Mkt Size: Employ.	0.239***	0.035	0.089**	0.073	0.250***	0.050	0.338**	0.398***	0.327***	0.033
Mkt Size: Estab.	0.156***	0.044	0.024	0.093***	0.248***	0.021	0.178	0.390***	0.278***	0.016
Manager Indicators	0.179***	0.031	0.016	0.052**	0.125***	0.007	0.280*	0.347***	0.260***	0.029*
2002										
Base	0.316***	0.023	0.126***	0.085***	0.130***	0.030	0.296**	0.424***	0.287***	0.060***
CompMatch	0.335***	0.007	0.140***	0.079***	0.118***	0.021	0.236	0.349***	0.299***	0.078***
CompAve	0.294***	-0.007	0.123***	0.064**	0.085**	-0.021	0.208	0.299***	0.307***	0.073***
Apparel Controls	0.300***	0.035*	0.067*	0.055*	0.038	-0.021	0.351*	0.323**	0.228***	0.012
Mkt Size: Employ.	0.294***	0.019	0.125***	0.081***	0.147***	0.039	0.279*	0.392***	0.279***	0.055**
Mkt Size: Estab.	0.249***	0.017	0.044	0.074**	0.115***	0.034	0.244	0.357***	0.227***	0.030
Manager Indicators	0.177***	0.014	0.061	0.071***	0.107***	0.055	0.005	0.300***	0.173***	0.056***

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