

Does cheap talk affect market outcomes? Evidence from eBay¹

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Abstract: We study the use of cheap talk by firms, focusing on unverifiable promises of charitable donations on eBay. For transactions during March 2005 – May 2006, cheap talk listings have lower sales probabilities but no effect on price conditional on sales. The negative impact of cheap talk is concentrated in the months following Hurricane Katrina, a time when both verifiable and unverifiable charity-related listings increased dramatically. Finally, we show that cheap talk sellers have significantly lower quality ratings than sellers who make verifiable donations. Collectively, our results suggest that when credible quality signals are available, most buyers may take cheap talk as a negative signal, and may be justified in doing so.

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1. Introduction

Unverifiable claims are ubiquitous in the marketplace, despite the fact that in most settings, they convey little or no information. The firm's cost of such cheap talk may be low, but it is non-zero, given that it potentially crowds out other information that a seller may wish to communicate. Its persistence raises a number of questions on whether and how cheap talk has an impact on the market: To what extent does cheap talk affect consumers' choices? Are there observable differences between sellers who choose to engage in cheap talk from those who do not? And if alternatives with verifiable quality attributes exist, do they crowd out cheap talk, or vice-versa? This latter question is central to discussions dating back to Beales, Craswell, and Salop (1981) of the role of legal regulation intended to protect consumers from misleading advertising, as well as more recent explorations of the design of two-sided platforms that compete, at least in part, by attracting sellers that meet buyers' expectations (Nosko and Tadelis 2015, Tadelis 2016).

We explore these questions in the context of cheap talk on an attribute that is valued by consumers but potentially hard to verify directly: charitable giving. Charity may be directly valuable to consumers, either from direct utility (warm glow) or as a signal of trust or reliability (Elfenbein and McManus, 2010; Elfenbein, Fisman, and McManus, 2012). But seller claims about charity or other good deeds are notoriously difficult to monitor by individuals, giving rise to concerns about selective or deceptive reporting of these actions by firms. (In the popular press the term "greenwashing" is used to describe seller claims about good deeds that are not backed up by the associated costly actions.) While researchers have studied the impact of verifiable charity ties or pro-social production on consumer decisions (e.g., Hainsmuller, Hiscox, and Sequiera 2015; Canals Cerda 2014; Andrews, Luo, Fang, and Aspara 2014; Dube, Luo and Fang 2015), we know

of only a single study – conducted in a lab setting – that examines the impact of credibility of donations on market outcomes (Feicht, Grimm, and Seebauer 2016).

The eBay platform, our setting for this paper, has several features that make it well-suited to studying charity cheap talk. In the period we study, verifiable and non-verifiable charity tie-ins co-existed on eBay. Sellers’ unverifiable charity claims were straightforward to identify across a variety of products via a short list of keywords sellers used in the title field of product listings.² At the same time, eBay’s charity program, Giving Works (GW), gave sellers an opportunity to link their listings to verified charitable contributions through a system that was easy to use and provided cost and tax advantages. This provides a clear benchmark against which to compare the outcomes of cheap talk listings. While our main interest is in buyers’ responses to cheap talk, in the discussion that follows, we refer to sellers’ unverified promises to make donations contingent on a product sale as “unverified charity claim” (UCC) listings, given our inability to discern the seller’s true intentions.

We examine data across all product categories for listings that end between March 2005 and May 2006, a period when both verified and unverifiable charity claims were prevalent on eBay. Controlling for seller identity, product category, starting price, and a host of other listing attributes, we find that, for the full sample period, UCC auction listings are 8 percentage points less likely to sell than listings that make no charity claims, whereas listings with verifiable (GW) charity-linked listings are 7 percentage points more likely to sell, relative to non-charity listings. (Comparing UCC listings to GW listings that also promise donations explicitly in their titles, the difference is even larger.) These findings are, at least *prima facie*, at odds with a model in which consumers completely disregard cheap talk.

² Examples include adding the phrases “Katrina Benefit” or “Charity Auction” to the listing title.

These average effects mask substantial variation in the impact of both cheap talk and legitimate charity listings over our sample period. In particular, during the months immediately following the landfall of Hurricane Katrina – which triggered very large increases in the quantity of both GW and UCC listings – the sale probability of UCC auction listings dropped by 20 percentage points, a roughly 50 percent decline. Despite this decline in sales probability, consumers who purchased UCC items following Katrina paid significantly higher prices. Over the same period, GW listings’ sales probability increased, along with sale price. Outside the post-Katrina increase in charity-linked listings, cheap talk had no effect (or a weak positive effect) on a listing’s sale probability or price.

We conclude by exploring the attributes of sellers in the market for UCC listings. UCC sellers are of lower quality relative to GW sellers across a variety of measures. This raises the intriguing possibility that cheap talk – even if unrelated to the product’s main attributes – may be broadly construed as a negative signal of seller quality.³

While our results do not allow for a definitive interpretation, the very modest increase in the level of trade in UCC listings post-Katrina – despite the large increase in UCC listings – is consistent with the presence of a limited number of consumers who are willing to buy products with unverified claims even when a legitimate alternative is available. This interpretation further suggests that the availability of products with verified quality may be enough to curtail cheap talk. In such cases, optimal public policy or platform design may tilt toward supporting verification institutions instead of emphasizing regulation or oversight to police fraud and deception. To some degree, the availability of verified alternatives effectively allows the market to police itself.

³ This is evident in the advice of eBay advice-givers, many of whom suggest that it is best to stay away from listings that use terms like “authentic” or “genuine” in their product descriptions. As one eBay expert put it, “the more [100% genuine] is mentioned in the listing the less likely I am to believe it.” Quote from <http://www.ebay.com/gds/HOW-TO-TELL-IF-AN-ITEM-IS-A-FAKE-/10000000002765872/g.html>.

Despite the academic and policy importance of cheap talk and potentially fraudulent statements, practical difficulties in collecting appropriate field data have resulted in little prior empirical research outside of the lab.⁴ The most direct precedent for our paper is Jin and Kato (2006), who study baseball card sellers on eBay in 2001 – 2002. They find that sellers who make unverifiable claims receive much higher prices, but do not provide cards of higher quality. Cawley, Eisenberg, and Avery (2013) investigate whether advertisements for (largely worthless) weight loss medication influences drug sales and health, and find no demand response to the ads. Zinman and Zitzewitz (2016) analyze ski resorts' self-reported snowfall, and find that it is consistently higher than comparable government figures, a gap that widens during weekends and other periods when demand would be expected to be higher. Whereas these earlier papers focus on highly specific individual markets, and tend to emphasize only the demand or supply side of the market, our analysis considers the activity and characteristics of large and varied populations of buyers and sellers.

Our paper also contributes to the emerging body of research that considers how poorly informed or naïve agents affect seller decisions and the functioning of markets. Prominent contributions include Nagler (1993), DellaVigna and Malmendier (2006), Gabaix and Laibson (2006), Malmendier and Lee (2011), Woodward and Hall (2012), and Akerlof and Shiller (2015). Our conclusions are tentatively optimistic: in our setting (in which a verified alternative is available) most buyers avoid sellers that make unverifiable claims, a heuristic that may serve them well given the lower average quality of UCC sellers.

⁴ The marketing literature offers many examples of laboratory experiments on deceptive advertising, e.g. Johar (1995) and Darke and Richie (2007). In the economics literature, lab experiments have focused on cheap talk and deception in more stylized game theoretic settings, e.g. Croson, Boles and Murnighan (2003) and Gneezy (2005).

Insofar as we examine unverifiable claims of altruistic or other-regarding behavior, our paper also relates to studies of greenwashing, generally defined as the use of disinformation by an organization to present a positive public image (Laufer, 2003; Lyon and Maxwell, 2011). While Delmas and Burbano (2011) discuss the potential impact of greenwashing on consumer behavior, we are aware of no studies that document it empirically.⁵

2. eBay, Giving Works, and Unverified Charity Claims

Founded in 1995, eBay has become one of the world's largest facilitators of e-commerce, claiming more than 162 million active buyers and 800 million annual product listings globally.⁶ Online markets, and eBay in particular, have increasingly become an object of study for economists, who have examined them to address a variety of questions.⁷ On the eBay platform, sellers offer an item for sale by providing a description of it, disclosing a small amount of personal information, and specifying an ending time and method for the sale. Buyers on the platform generally cannot inspect the item prior to purchase, nor do they engage in face-to-face communication with sellers. It is critical, therefore, that buyers trust sellers to deliver the product as described. eBay's public filings acknowledge that "[f]ailure to deal effectively with fraudulent activities on our websites would increase our loss rate and harm our business, and could severely diminish consumer confidence in and use of our services." eBay has promoted several mechanisms to limit opportunistic behavior by sellers, including reputation scores, money-back guarantees, and seller certification (see Cabral

⁵ Empirical studies of greenwashing have focused, to our knowledge, on the correlation between firms' claims of environmental performance and their actual track records. See Cho and Patten (2007) and Clarkson et al. (2008) for examples.

⁶ Source: eBay 10K - 2015.

⁷ Bajari and Hortascu (2004) describe many of the institutional features of eBay in a review of the early empirical literature on internet auctions. Einav et al. (2013) describe changes in the eBay platform and in seller behavior from 2003 to 2009.

and Hortascu (2010), Hui, Saeedi, Shen, and Sundaresan (2013), and Elfenbein, Fisman, and McManus (2015), respectively, for empirical evidence of the impact of these mechanisms).

2.A. Giving Works

A parallel feature of the eBay platform, originally called Giving Works, was launched in 2003 to enable sellers to raise money for charitable causes through their product sales.⁸ When listing an item for sale, a seller can use the Giving Works (GW) program to link her product to a specific charitable cause. The seller chooses a donation rate between 10 and 100 percent of the final sale price in 5 percent increments, which eBay collects directly if the listing results in a sale. Benefits for the seller include higher sale prices and/or higher probability of sale (Elfenbein and McManus 2010, Elfenbein, Fisman, and McManus 2012), a rebate of listing fees proportional to the donation rate, and tax account records documenting the seller's donation. A significant number of sellers engage in both GW listings and "standard" listings with no charity connection; generally these sellers list a minority of their items via GW. A buyer can be confident that the promised donation will be made to a GW listing's associated charity, as eBay makes clear that the platform itself receives the buyer's payments and disburses the appropriate funds to the charity and seller.

2.B. Unverifiable charity claims

Independent of the fraction of total sale price donated, GW represents the most efficient way for sellers to engage in charity-linked sales. eBay provides 100 percent of the donated amount to charity and improves the seller's net revenue by rebating listing fees by the same fraction the seller pledges to donate. Nonetheless, in the early years of the Giving Works program, eBay allowed

⁸ In 2015, this program was re-labeled, "eBay for Charity."

sellers to include claims about charitable donations in a listing’s title, subtitle, or description. For example, a September 2005 listing for a toy train set included the subtitle “Hurricane Katrina Relief Red Cross Donation W/ Purchase.” However, around the end of our selected sample period, eBay placed restrictions on non-GW charity listings and threatened non-compliant listings with removal.⁹ Current policy requires that non-GW listings that make charity claims must include an image of a letter of support from a recognized 501(c)(3) charity. Consistent with this policy having a material impact on unverified charity claims, the ratio of UCC items available (identified by the method described in Section 3) to total items listed on eBay dropped by 90 percent between March 2006 and March 2016, while the ratio of GW items increased by over 400 percent.¹⁰

Why would sellers make unverifiable charity claims when GW is available? One possibility is that these sellers were motivated by altruistic considerations, but were unaware of or inexperienced in using GW and therefore avoided it. We believe this is unlikely to be the case for most UCC sellers given that, as we discuss below, UCC sellers tend to be very experienced with the eBay platform, especially relative to sellers who post GW listings. Alternatively, these sellers may have sought the benefits of charity linkages, i.e., increases in sale price and or sale probability, without the cost of making the donation itself. A final possibility is that sellers simply wished to experiment with alternative selling strategies, in order to learn the most effective ways to promote their goods.¹¹ Regardless of sellers’ (unobservable) motivation, consumers taking a cautious view of UCC would have no reason to believe the donations would be made.

⁹ Private communication between the authors and eBay personnel.

¹⁰ We see further evidence of eBay’s policing of UCC listings in the months following the 2010 earthquake in Haiti, with a mass cancellation of listings we identify as containing unverified charity claims.

¹¹ Einav, Kuchler, Levin, and Sundaresan (2015) document extensive seller experimentation on the eBay platform.

3. Data

3.A. Sample period and data extract

We draw data from eBay’s U.S. platform, and focus on listings that ended between March 1, 2005 and May 31, 2006. This centers our analysis on a period when GW and UCC listings were relatively common on the site. (During the 12 months prior to our sample period, for example, GW volume was very low, with an average of 800 listings concluding each week.) It also focuses our analysis around the spike in charitable activity following Hurricane Katrina, which is an important aspect of our analysis. We identify the interval from August 29, 2005, when Katrina made landfall, until November 15, 2005 as the “Katrina period” or simply “post-Katrina.” All other dates constitute the “non-Katrina” portions of the sample.¹²

We collect data on three broad types of eBay listings, with some potential overlap across types. First, we search for all listings that contain strong language about charitable donations in the listing title or subtitle. (See the Data Appendix for the search terms we use regarding donations.) Each identified listing is associated with a seller and an eBay “leaf category,” which is eBay’s finest product category designation.¹³ We identify 10,206 seller-category combinations in this step. We then download all U.S.-based auction and fixed-price listings by the same seller and in the same product category as any UCC listing. Second, we repeat this procedure for Giving Works listings, and collect all listings by sellers in product categories in which the seller posts a GW listing during the sample period. During this step we identify 91,757 seller-category combinations, about 5,000 of which are also captured in the UCC-focused step. Between UCC and

¹² See Figures 1-3 below for the strong drop-off in charitable activity in mid-November 2005. Our results are robust to alternative definitions of the Katrina period. See below for a discussion of the impact of ending the Katrina period on October 15, and Online Appendix Table OA1 for results using alternative definitions of the Katrina window.

¹³ We use the terms “leaf category” and “product category” interchangeably in this paper. Our full data extract contains listings from over 14,000 leaf categories.

GW listings, we assemble about 34 million listings that are associated with the collected seller-category combinations. The vast majority of these listings are neither UCC nor GW. Third, we take the set of product categories that are identified in the previous steps for UCC and GW listings, and we draw a 0.1 percent sample that captures 1.2 million listings.

Once we have identified the listings described above, we obtain information on each listing's format (true auction or fixed price), its starting auction price or fixed price, the number of units offered if fixed price, the number of units sold and the sale price, the listing title and subtitle, the percentage donated via the GW system, the number of photos, the starting date and the scheduled and actual end dates, the shipping fee, the associated seller ID, and the leaf category ID. For listings that end in a sale, we collect the buyer ID for each unit purchased.

We use the seller and buyer IDs to obtain background information on each eBay user. We download each user's eBay creation date in order to calculate user age (in days) at the time of each listing captured within our sample. We collect information on users' accumulated positive feedback as of the first day of each month in the sample period. Because provided feedback is almost always positive, the feedback level is effectively a measure of seller experience rather than customer satisfaction. We link the seller's feedback score to the month and year of each listing in the data sample. In addition, we follow Nosko and Tadelis (2016) to compute for each seller the share of transactions on which she received positive feedback from a buyer, i.e. an "effective percent positive" feedback (EPP) measure. For each month in the sample period, we compute each seller's EPP over the previous two years and then link it to listings using the same procedure as for total feedback. The EPP measure may do a better job of capturing consumers' satisfaction than direct feedback measures given that, as Nosko and Tadelis observe, dissatisfied customers are

more apt to leave no feedback rather than negative comments. Finally, we calculate each seller's share of positive feedback over the same rolling two-year window that we use for EPP.

3.B. Data preparation steps and sample characteristics

We prepare the listing and user data in several steps. We begin by constructing a “descriptive sample” that we use to characterize overall UCC and GW activity, and for this sample we use nearly the full pool of listings described in the preceding section. Exceptions include listings with non-standard conclusions (which might indicate that the seller posted a UCC listing rather than a GW one by accident, and closed the auction early); those with starting prices, ending prices, or shipping fees above \$1,000; and those with more than 1,000 individual units for sale in a single fixed-price listing. In total, these exceptions lead to the removal of about 3.4M listings, primarily due to abnormal endings for listings with no GW or UCC connection.

We perform regression analysis on a subset of listings that we call the “analysis sample,” for which we employ three additional filters. First, to reduce computation costs we retain a maximum of 1,000 non-GW, non-UCC listings for each seller-category combination.¹⁴ This step removes over 90 percent (27M) of listings from the descriptive sample. Second, we identify all seller-category combinations in which the seller's listing outcomes have non-zero variance in the number of units sold. If a seller is successful (or unsuccessful) in all listings within a leaf category, the seller-category fixed effects we introduce below will lead to biased estimates of the impact of a listing characteristic (such as UCC status) on listing outcomes in a linear model with a binary dependent variable. See Elfenbein, Fisman, and McManus (2012, 2015) for additional discussion

¹⁴ For sellers with fewer than 1,000 non-GW and non-UCC listings in a product category, we retain all listings in the category. For sellers with more listings, we select 1,000 at random. In our empirical analysis these observations mainly serve to recover the values of seller-category fixed effects, and we conjecture that we can do this adequately with 1,000 observations per seller-category despite some opportunities to use more.

of this issue. This step eliminates about 20 percent of listings from the remaining descriptive sample in forming the analysis sample, mostly due to sellers with a single listing in a product category. Third, in the analysis sample we focus on listings with a starting (or fixed) price greater than \$2. This affects about 15 percent of the listings in the remaining descriptive sample.

In Table 1 we report summary statistics for the analysis sample. About 60 percent of the listings are true auctions (compared to only 20 percent in the descriptive sample), and about 40 percent ended in a sale of one or more units. The median (mean) start price for an item is \$11.50 (\$36.79). The median sales price for listings that end in a sale is about 50 percent greater than the median start price, and the mean sales price is a third greater than the mean start price. (We do not present summary statistics on sale probabilities or prices to preserve confidentiality of eBay's data.) The median listing has a shipping fee of \$4 and lasts for 7 days, which is also the modal duration for true auctions. GW listings account for 8 percent of the sample, a level that is much higher than for eBay overall – this is a natural result of the sample construction. There are 7,919 UCC listings in the analysis sample, or about 0.3 percent of total observations.

In Table 2 we focus on listings that are either GW or UCC in the analysis sample. (By definition, a listing cannot be both GW and UCC.) GW listings are about 30 times as common as UCC listings, which make up only 3 percent of the group summarized in Table 2. Among GW listings, donation pledges of 100 percent are most common during the sample period. The remaining GW listings are split evenly between revenue pledges of 10 percent and values in 15 - 95 percent. We include as a distinct category, GW listings with charity-related text, for listings with the same words or phrases in their titles as we used to identify UCC listings. These are about as common as UCC listings. In our analysis below, these listings serve as a second comparison

group for UCC listings: they implicitly same syntactic structure in their titles, but offer verifiable, rather than unverifiable donations.

In Figures 1 – 3 we explore the temporal patterns in UCC listings over the sample period. Figure 1 displays the (smoothed) number of descriptive-sample listings per day that are GW, GW with charity-related text, and UCC. We use a log scale on the vertical axis, given the vastly different daily flows of GW and UCC listings. Both GW and UCC listings increased substantially when hurricane Katrina struck, and then diminished over the next six weeks. UCC listings had other periods when they increased in frequency, in particular the 2005 holiday season and each spring. Figure 1 shows that GW listings with charity text were generally less common than UCC listings on eBay, with the exception of the Katrina period. Despite the sizable increase in UCC listings during the Katrina period, in Figure 2 we show that total sales per day did not increase by nearly as much.¹⁵ Instead, the Katrina-period UCC sales per day is on the same scale as other periodic up-ticks in UCC purchases during the sample period. In Figure 3 we provide a clearer representation of patterns in sales rates by plotting the analysis sample's smoothed daily sales percentages for UCC listings (in blue), all GW listings (red), and non-UCC non-GW listings (green) in the analysis sample.¹⁶ While UCC and GW listings are often noticeably different from each other, the Katrina period stands out for the depth of decline in UCC sale probability and the fact that the GW sale probability moves distinctly in the opposite direction.

We conclude our overview of the data by describing the sellers and buyers associated with listings in our descriptive sample. While a few sellers posted many UCC listings during our period of investigation, a much larger number engaged in this practice only once or twice. In Table 3 we

¹⁵ As may be inferred from Figure 3, there is also a large increase in GW sales during Katrina. We omit this line from Figure 2, given the very different average levels of GW and UCC listings.

¹⁶ We omit Figure 3's vertical scale for data confidentiality.

report, averaged over listings, seller effective percent positive feedback (EPP), feedback score, percentage positive feedback overall and divided into a few discrete categories, and age. We report statistics for the full set of sellers (who largely come from the platform-wide random sample) and separately for those who ever offer a UCC or GW listing. Some notable differences emerge across the groups. The mean and median EPP scores for UCC sellers are below those of the full seller population and those of the GW sellers. GW sellers have relatively low feedback scores and have been active on eBay for less time, indicating less experience for GW sellers, on average, relative to the remaining population. UCC sellers, by contrast, have higher feedback scores and have been on the site for longer than both the GW sellers and those from the platform-wide random sample, which suggests that their use of charity claims is unlikely to be due to ignorance of the verified GW system.¹⁷

The distribution of percent positive feedback is very similar between UCC sellers and the full population, while GW sellers are more likely to have 100 percent positive feedback and less likely to have a positive feedback share in the lowest category (below 98 percent). Some users received no feedback as sellers during the rolling two-year window we use for these data, so the positive feedback share categories do not sum to one. Empty records are most common for GW sellers. We explore the differences in seller characteristics in a regression framework in the next section.

In Table 4 we compare the attributes of buyers who purchase UCC items, GW items, or items with no charity association. Buyers who purchase UCC-listed items are slightly “younger” than buyers who purchase GW items, but the UCC buyers have greater mean and median feedback

¹⁷ A small number (377) of UCC sellers also use GW during the sample period. For these sellers, 40 percent of their UCC listings were posted on dates strictly after their first GW posting, while 48 percent of UCC were posted on strictly earlier dates. This suggests that exposure to the GW system had little effect in curtailing cheap talk by UCC sellers.

scores than GW buyers. (As with sellers, age and feedback measures are highly correlated with each other.) A natural explanation for these differences in experience is that UCC listings (and to a lesser degree GW listings) are relatively rare. Thus, a buyer who engages in more transactions – and hence has a higher feedback score – is more likely to have encountered a UCC listing. The final column of Table 4 does, however, indicate that buyers of UCC items during the Katrina period were somewhat less experienced than buyers of UCC items overall. That said, we see no strong evidence in the present sample that UCC buyers taken as a whole are substantially less experienced than those who purchase GW items.

4. Empirical Analysis

We estimate a series of regression models to assess the impact of UCC status and other charity-related activity on eBay listing outcomes. Throughout our analysis, we regress a collection of outcome measures (e.g. whether an item sells, the full price at which it sells, and so forth) on a large collection of listing characteristics; we use y to denote the outcome of interest. We collect listing characteristics relevant for UCC status in the vector U , and GW characteristics in G . We collect all other observable listings attributes in the matrix X . These include the log of starting price, the log of shipping fees plus 0.01, individual dummies for the number of pictures, dummies for the number of units available, indicators for the length and ending day of the week, and a quartic time trend. In our main analysis we include a separate fixed effect, a , for each combination of seller and leaf category in the analysis sample. We account for additional listing-level unobserved factors with the error term e , which we cluster at the seller level. Finally, we use i to index individual listings and j to index seller-category combinations. We thus estimate a collection of models that have the form:

$$y_i = \Upsilon U_i + \Gamma G_i + \Theta X_i + a_j + e_i. \quad (1)$$

We estimate (1) as a linear regression model. While this involves some misspecification given the discrete nature of y in some cases, the approach allows us to include a large set of controls in the model, including about 70,000 distinct values of a_j .

4.A. Baseline effects of UCC and GW status

In Table 5, we investigate the effects of UCC and GW status on auction listing sales probability and price. In the main tables, we report only the coefficients of primary interest. Results on the complete set of control variables are included in Appendix Table A1.

In specification 1 we include the full set of listing-level controls, as well as seller-category fixed effects to account for potential non-random selection of charity-related listings by seller and leaf category. Echoing previous results of Elfenbein and McManus (2010) and Elfenbein, Fisman and McManus (2012), we find a large and positive impact of GW on sales probability, increasing the sales probability by 7 percentage points.¹⁸ We find a further benefit of charity text in a listing title for GW listings: a GW listing that also includes charity text is 13 percentage points more likely to sell than a listing with no charity link. This suggests a complementarity between charity claims in the title and a mechanism that establishes the credibility of the claims.

We find a sharply contrasting effect of charity text when not accompanied by a verifiable donation: the coefficient on UCC is -0.0794 (significant at the 5 percent level), implying that UCC listings are almost 20 percent less likely to sell than listings with no link to charity at all. The results on control covariates (i.e., on the impact of X), reported in Appendix Table A1, imply that

¹⁸ For simplicity in this analysis, we do not disaggregate GW observations by their donation share. These results are provided in Appendix Table A2.

objects are more likely to sell if they have a lower start or fixed price, have more photos, or have a longer scheduled length.

In specification 2, motivated by the patterns observed in Figures 1-3, we allow the effects of GW and UCC to vary with time. In particular, we interact all three charity variables (GW without charity text, UCC, GW with charity text) with an indicator variable for listings posted during the Katrina period. We find that the lower sales probability for UCC listings is present only during the Katrina period, when UCC reduces a listing's sales probability by 20 percentage points. In non-Katrina months, the effect of UCC on sales is positive but small and not statistically significant. Turning to the effect of GW, we find that the improvement in sales probability is higher post-Katrina. We also find that the complementarity between charity text and GW certification is far stronger during the Katrina period. At other times the positive effect of GW without charity text is slightly higher than GW with charity text, though the difference is not statistically significant.

We next turn to study the impact of GW and UCC on auction prices, conditional on a sale taking place, using the logarithm of the sales price plus shipping fee conditional on a transaction occurring, $\log(\text{Price} + \text{Ship fee})$, as the outcome variable.¹⁹ In specification 3 we find a positive effect of GW on price, of a magnitude roughly in line with the results reported in Elfenbein, Fisman, and McManus (2012), which uses a larger dataset and more powerful matched-listing identification to estimate the impact of charity. Intriguingly, despite the negative effect of UCC on sales probability, we observe no impact on price – the coefficient on *UCC* is in fact positive, 0.011, though noisily measured, with a standard error of 0.04.

¹⁹ We omit the shipping fee from X when the dependent variable is $\log(\text{Price} + \text{Ship fee})$.

In specification 4 we include the interactions of the three charity variables with a Katrina period dummy. We find that sold UCC items attracted a 10 percent price premium following Katrina (significant at the 10 percent level), while outside of the Katrina period UCC sale prices were slightly below those of non-charity control items.²⁰ For GW, we find similar patterns to those we observe for sales probability: the benefits of GW are more than twice as high during the Katrina period.

In Appendix Table A3, we provide results on fixed-price listings, which are less numerous than true auctions in our analysis sample. The coefficient signs and sizes are comparable to those in specifications 1 and 2, although our estimates have less precision, particularly for GW listings.

To summarize our results thus far, the sales probabilities and prices of listings that make unverified charity claims are indistinguishable from non-charity listings throughout most of our sample. Notably, however, UCC sales probabilities decline markedly in the weeks following Hurricane Katrina – exactly the period when demand for (and supply of) legitimate charity listings increases (as evidenced by the simultaneous increase in the price, sales probability, and volume of GW listings). One plausible interpretation of this finding is that “most” consumers take cheap talk about product attributes as a negative signal. This is consistent with the relatively modest quantity of UCC listings in our sample overall, and the fact that, despite a large increase in the supply of UCC listings in the Katrina period, the number of completed transactions increased by only a small amount.

²⁰ When we estimate this model with $\log(\text{Price})$ as the dependent variable and include shipping fees in X , we find a 6 percent price premium ($p = 0.17$) for UCC items during the Katrina period.

4.B. Attributes of UCC and GW Sellers

The different sales probabilities associated with verified versus unverified charity listings raises the question of whether buyers' choices are rationalized by seller or product attributes. In earlier work (Elfenbein, Fisman, and McManus, 2012), we showed that GW-intensive sellers are less likely to generate unresolved customer disputes. While data for this outcome are unavailable in the period we study, we examine whether other measures of seller quality correlate with a seller's use of charity-linked listings. To do so, we revisit the patterns in Table 3, exploring them in a regression framework.

We perform the analysis first at the seller level, focusing on the approximately 22,000 sellers who are in the descriptive sample and offer either a UCC or GW listing. For each seller in this sample we create an indicator variable for whether the seller offered one or more UCC listings (*Ever UCC*) and a second variable for the seller's frequency of UCC (*Percent UCC*) within the full descriptive sample. By omitting the sellers who never use GW or UCC, we avoid swamping the analysis with over 400,000 sellers who have shown no interest in engaging with consumers interested in charity donations. In addition to this seller-level analysis, we examine whether seller characteristics predict whether individual listings in the analysis sample are UCC or GW. This allows us to introduce product-category fixed effects which can account for cross-category differences in GW and UCC frequency.

We report our seller-level analysis in specifications 1 and 2 of Table 6 using Probit and Tobit models respectively to estimate the correlation between seller UCC use and seller characteristics.²¹ As an additional control for differences in charity-related practices across seller sizes, we also include the log of the seller's total number of listings in the descriptive sample. Our

²¹ We can use Probit and Tobit models in this analysis because we do not include a large number of fixed effects.

results are consistent with an overall lower level of quality for UCC sellers relative to GW sellers. We find that sellers with greater EPP values are less likely to post UCC listings at all (specification 1), and also devote a smaller share of their listings to UCC (specification 2). The results in specification 1's imply that a one standard deviation (22.0) increase in a seller's EPP score reduces the probability of a UCC listing by 15 percent. Differences across UCC and GW sellers are also apparent in these users' shares of positive feedback. Relative to sellers with percent positive feedback below 98 percent (the omitted category), sellers who post UCC listings are less likely than GW sellers to have percent positive scores in any higher category. This difference is statistically significant and largest in magnitude for 100 percent positive ratings.

We conclude the seller-focused analysis by investigating whether individual listings' UCC or GW status is predicted by sellers' characteristics, while controlling for GW and UCC frequency by product category. We use the full analysis sample for these listing-level models, and in doing so allow seller frequency within the sample to provide an ad-hoc weighting on which sellers' characteristics have a greater impact on the dependent variable.

We report the results of our listing-level analysis in Table 6, specifications 3 and 4. Each specification is a linear regression of a listing's UCC or GW status on: the same seller characteristics discussed above, the same set of listing-level characteristics included in Table 5's analysis (provided in full in Table A1), a dummy variable for whether a listing is fixed-price rather than true auction, and a collection of 11,000 leaf category fixed effects. We find that sellers' EPP scores are not significantly correlated with the probability that a listing has UCC = 1. However, sellers with greater percent positive scores are significantly less likely to offer a UCC listing. (When we estimate the model with EPP as the only measure of seller quality, we do find a significant negative relationship between EPP scores and number of UCC listings as,

unsurprisingly, EPP scores and fraction positive ratings are correlated.) For example, given the overall frequency of UCC listings in the analysis sample (0.25 percent), a seller with 98-99 percent positive feedback is 32 percent less likely ($-0.000795/0.0025$) to post a UCC listing than a seller with less than 98 percent positive feedback. In specification 4 we consider the probability that a listing has GW status, and we find that verifiable charity donations are significantly more likely to come from sellers who have greater EPP scores and greater positive feedback percentages. An increase in EPP score of one standard deviation is correlated with a 7 percent increase in the likelihood of a listing including a GW donation. Sellers with 100 percent positive feedback are 35 percent more likely to offer a GW listing than those with less than 98 percent positive feedback. These findings suggest that buyer response to UCC listings are consistent with the lower quality of sellers who tend to post such listings. Similarly, GW listings may sell with greater probability at least in part because verifiable charity listings serve as a positive signal of trustworthiness, as suggested by Elfenbein, Fisman, and McManus (2012).

5. Conclusions

We provide empirical evidence on consumer responses to cheap talk claims, and the sellers that make such claims. Despite the importance of policy bodies such as the FTC's Bureau of Consumer Protection, field evidence is rare on potentially deceptive claims by firms. While we find that some consumers are drawn to products with unverified claims, in our eBay setting the evidence suggests that the number of naive consumers is largely invariant to the extent of cheap talk. On the supply side, sellers are quick to adjust to new information about consumer receptiveness to cheap talk – when consumers did not move strongly toward listings with unverified charity claims following Hurricane Katrina, sellers moved rapidly away from these listings.

One intriguing implication of our research is that in many markets the existence of a legitimate and verifiable mechanism for informing buyers of product attributes may be effective in limiting cheap talk. While eBay began policing unverifiable charity claims more rigorously in recent years, our Katrina-era findings suggest that it may not have been necessary: the existence of a verifiable charity mechanism may have severely limited the scope for charity cheap talk. Although this observation may limit the generalizability of our findings, it also highlights an important market design insight derived from our analysis.

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A. Data Appendix

To identify listings with strong language about charitable donations, we flagged all listings that satisfied one or more of the following conditions in the listing title or subtitle:

- Contains the term “charity auction” or “charity listing.”
- Contains the term “benefit auction” or “benefit listing.”
- Contains the phrase “will be donated,” “profit goes to,” “profits go to,” “revenue goes to,” “winning bid goes to,” or “proceeds to charity.”
- Contains the term “Katrina,” “hurricane,” “New Orleans,” or “Red Cross” plus one or more of the word stems “donat,” “benefit,” or “charit.”

Figure 1: Listings per day for UCC, GW, and GW with charity text

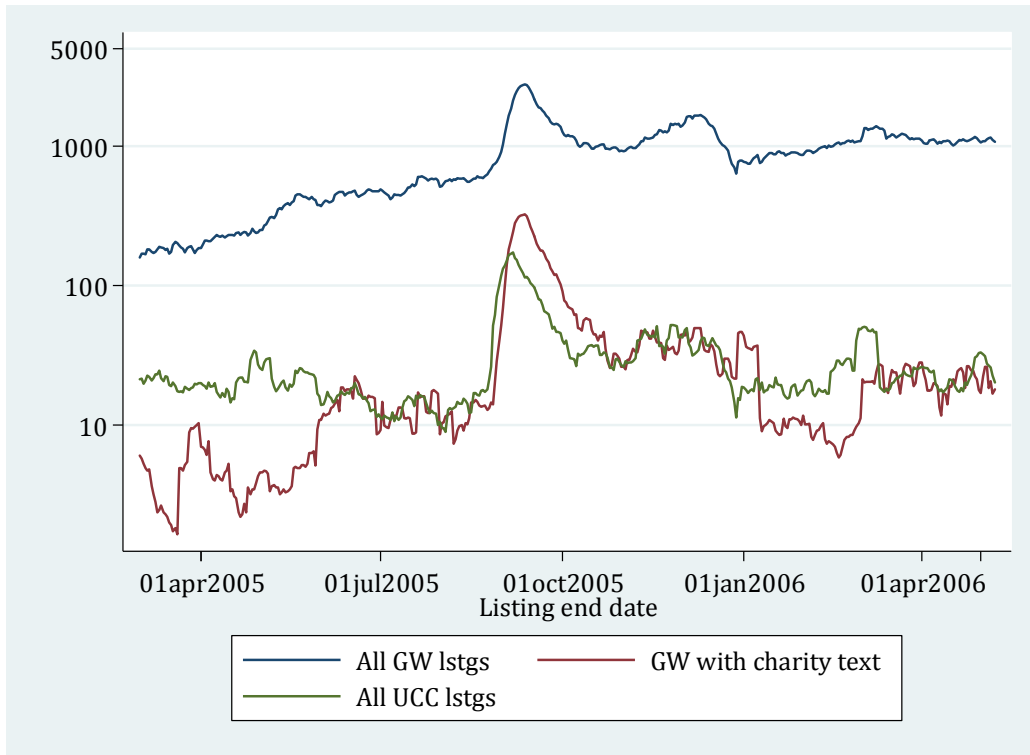


Figure 2: Total sales per day for UCC and GW with charity text

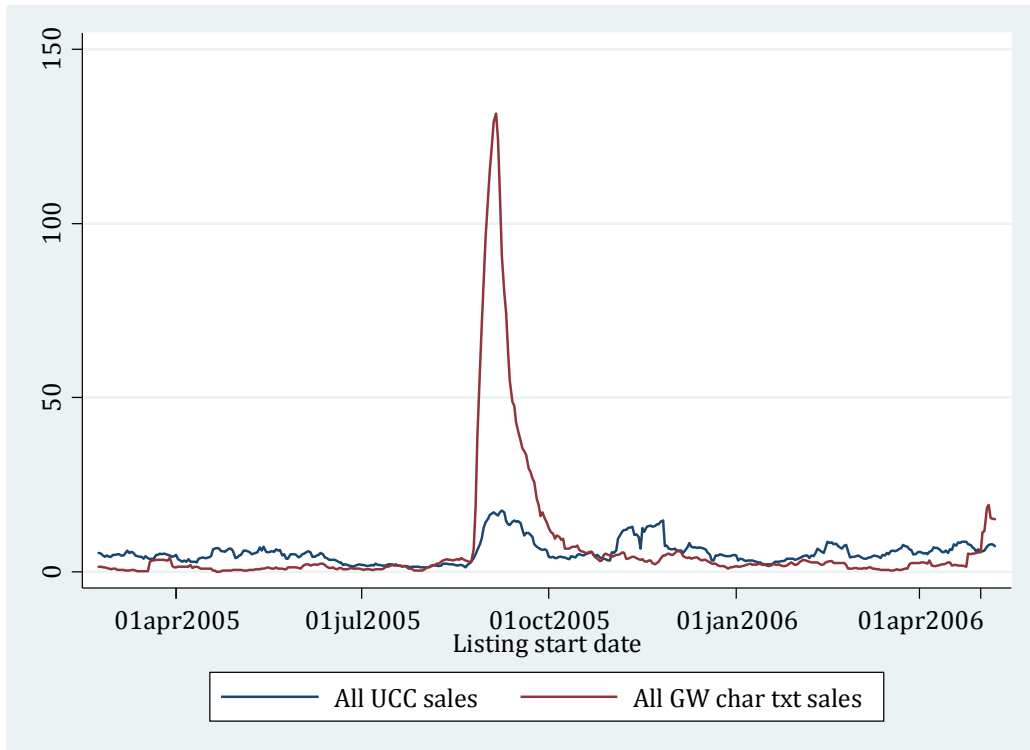


Figure 3: Sale probabilities of GW and UCC listings

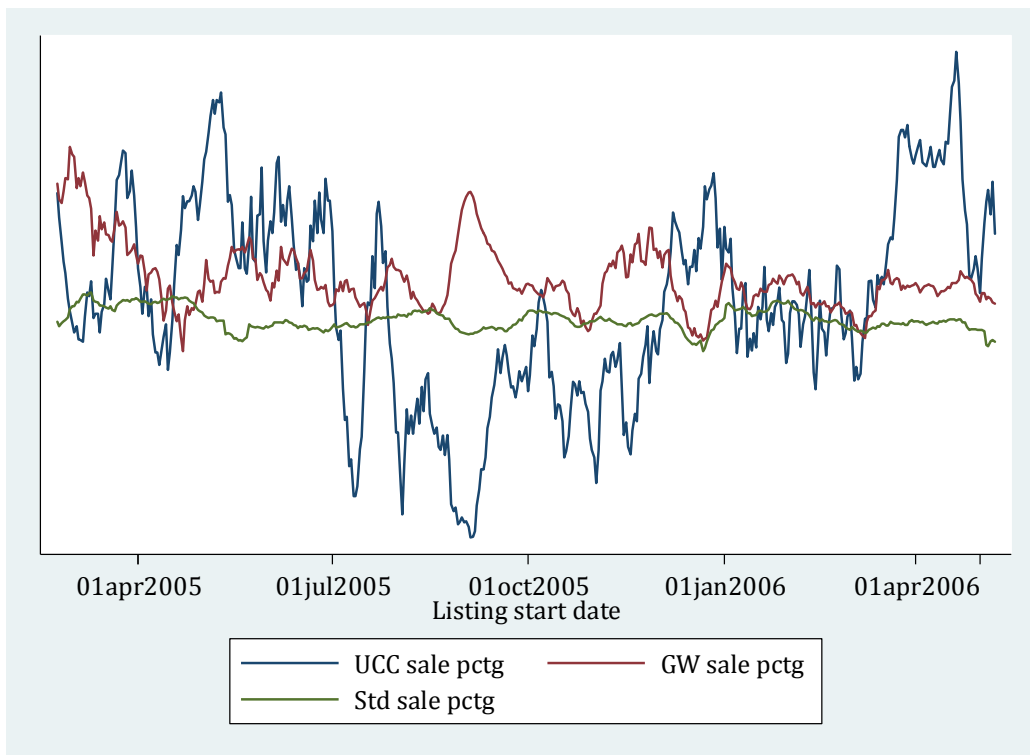


Table 1: Listing characteristics

	Mean	Median	Std Dev	Min	Max
Auction listing	0.61	1.00	0.49	0.00	1.00
Fixed price listing	0.39	0.00	0.49	0.00	1.00
Start or fixed price	36.79	11.50	87.12	2.00	1000.00
UCC listing	0.003	0.00	0.05	0.00	1.00
GW listing	0.08	0.00	0.28	0.00	1.00
GW w/ charity text	0.003	0.00	0.05	0.00	1.00
Num. photos	1.08	1.00	1.25	0.00	76.00
Shipping fee	4.98	3.99	7.44	0.00	900.00
Quantity avail.	3.87	1.00	22.68	1.00	1000.00
Scheduled length	13.50	7.00	13.52	1.00	90.00
Observations	3,143,978				

Table 2: GW or UCC listing characteristics

	Mean	Median	Std Dev	Min	Max
UCC listing	0.029	0.00	0.17	0.00	1.00
GW lstg 10% donated	0.097	0.00	0.30	0.00	1.00
GW lstg 15%-95% don.	0.096	0.00	0.30	0.00	1.00
GW lstg 100% donated	0.764	1.00	0.42	0.00	1.00
GW w/ charity text	0.034	0.00	0.18	0.00	1.00
Observations	273,966				

Table 3: Seller Characteristics

Sellers included	All	Ever UCC	Ever GW
Effective % Positive (EPP)	75.16	72.63	73.68
	78.56	77.25	78.57
Feedback Positive %	0.98	0.98	0.98
	1.00	1.00	1.00
Positive feedback 100%	0.41	0.42	0.56
	0.00	0.00	1.00
Pos. feedback [.99, 1)	0.28	0.26	0.16
	0.00	0.00	0.00
Pos. feedback [.98, .99)	0.11	0.09	0.06
	0.00	0.00	0.00
Pos feedback < .98	0.16	0.16	0.11
	0.00	0.00	0.00
Feedback Score	1137.06	2328.87	523.76
	262.00	209.10	80.60
Seller age (days)	1253.32	1326.20	1200.39
	1183.00	1275.25	1137.89
Observations	448,569	3,140	22,936

Each cell displays mean (top) and median (bottom)

Table 4: Buyer Characteristics

Buyers included	All	Ever UCC	Ever GW	UCC during Katrina pd
Age	1091.91 982.00	1143.60 1044.00	1165.08 1077.00	1118.28 1001.00
Feedback	232.99 50.00	320.94 62.50	275.56 62.00	259.04 53.75
Observations	896,860	2,975	101,939	809

Each cell displays mean (top) and median (bottom)

Table 5: Effects of UCC and GW on Auction Listing Outcomes

Specification	(1)	(2)	(3)	(4)
Dependent variable	Sold	Sold	log(Price + Ship Fee)	log(Price + Ship Fee)
UCC listing	-0.0794*** (0.0264)	0.0296 (0.0356)	0.0109 (0.0420)	-0.0219 (0.0539)
UCC listing X Katrina pd.		-0.235*** (0.0490)		0.102* (0.0568)
GW w/o charity text	0.0719*** (0.00523)	0.0563*** (0.00624)	0.0667*** (0.0113)	0.0441*** (0.0144)
GW w/o charity txt X Katrina pd.		0.0324*** (0.00673)		0.0474*** (0.0125)
GW w/ charity text	0.133*** (0.0196)	0.0384 (0.0356)	0.192*** (0.0237)	0.149*** (0.0494)
GW w/ charity txt X Katrina pd.		0.128*** (0.0345)		0.0601 (0.0472)
Observations	1,864,380	1,864,380	852,266	852,266
R-squared	0.250	0.251	0.870	0.870

Robust standard errors, clustered by seller, are in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 6: Analysis of Seller Characteristics

Specification	(1)	(2)	(3)	(4)
Sample used	Descriptive	Descriptive	Analysis	Analysis
Level of analysis	Seller	Seller	Listing	Listing
Sellers included	UCC or GW	UCC or GW	All	All
Dependent variable	Ever UCC	Percent UCC	Listing UCC?	Listing GW?
Model	Probit	Tobit	OLS	OLS
EPP avg	-0.00389*** (0.000747)	-0.00303*** (0.000559)	3.52e-06 (2.98e-06)	0.000268*** (1.40e-05)
Fdbk pos = 100%	-0.205*** (0.0350)	-0.147*** (0.0264)	-0.00185*** (0.000126)	0.0300*** (0.000590)
Fdbk pos = 99%	-0.0893** (0.0406)	-0.0751** (0.0308)	-0.00305*** (0.000111)	0.00786*** (0.000522)
Fdbk pos = 98%	-0.0673 (0.0492)	-0.0440 (0.0373)	-0.000795*** (0.000107)	0.0615*** (0.000504)
No feedback rec'd	-0.305*** (0.101)	-0.217*** (0.0740)	-0.000518 (0.00110)	0.0844*** (0.00516)
log(Fdbk)	0.161*** (0.00893)	0.110*** (0.00686)	-0.000145*** (2.07e-05)	-0.0140*** (9.72e-05)
log(Age)	-0.0948*** (0.0138)	-0.0669*** (0.0104)	4.82e-05 (4.37e-05)	-0.00967*** (0.000205)
log(lstgs desc. samp)	-0.0499*** (0.00656)	-0.0754*** (0.00502)		
Fixed price listing			-0.00191*** (0.000107)	-0.0260*** (0.000500)
Observations	22,348	22,348	3,111,084 0.089	3,111,084 0.320

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

APPENDIX

Table A1: Effects of UCC and GW on Auction Listing Outcomes, Full Set of Variables

Specification	(1)	(2)
Dependent variable	Sold	log(Price + Ship fee)
UCC listing	-0.0794*** (0.0264)	0.0109 (0.0420)
GW w/o charity text	0.0719*** (0.00523)	0.0667*** (0.0113)
GW w/ charity text	0.133*** (0.0196)	0.192*** (0.0237)
log(Start price)	-0.0575*** (0.00224)	0.672*** (0.00982)
Photos = 0	-0.0189*** (0.00606)	-0.0279** (0.0119)
Photos = 2	0.0230*** (0.00444)	0.0576*** (0.00842)
Photos = 3	0.0416*** (0.00665)	0.117*** (0.0125)
Photos = 4	0.0568*** (0.00664)	0.185*** (0.0179)
Photos = 5 to 7	0.0714*** (0.00734)	0.268*** (0.0216)
Photos = 8 to 11	0.0754*** (0.0109)	0.413*** (0.0344)
Photos = 12+	0.0917*** (0.0178)	0.559*** (0.0563)
Log(Shipping fee)	-0.000978 (0.000611)	
Sched. length 1	-0.0220*** (0.00712)	-0.0425*** (0.0114)
Sched. length 3	0.0105** (0.00520)	-0.0230*** (0.00601)
Sched. length 5	0.0108*** (0.00339)	-0.00199 (0.00426)
Sched. length 10	-0.00598 (0.00747)	0.128*** (0.0133)
Sched. length 30	-0.128 (0.126)	-0.102 (0.0861)
End Monday	-0.0220*** (0.00712)	-0.0425*** (0.0114)
End Tuesday	0.0105** (0.00520)	-0.0230*** (0.00601)
End Wednesday	0.0189*** (0.00231)	0.000471 (0.00298)

Specification	(1)	(2)
Dependent variable	Sold	log(Price + Ship fee)
End Thursday	0.0174*** (0.00234)	0.00852** (0.00334)
End Friday	0.0222*** (0.00261)	-0.000724 (0.00324)
End Saturday	0.0149*** (0.00244)	-0.00139 (0.00317)
Time	-0.000920*** (0.000116)	-0.000617*** (0.000188)
Time^2	0.0538*** (0.0106)	0.0350** (0.0176)
Time^3	-0.0129*** (0.00355)	-0.00648 (0.00596)
Time^4	0.000948** (0.000390)	0.000262 (0.000651)
Constant	0.635*** (0.00732)	1.495*** (0.0261)
Observations	1,864,380	852,266
R-squared	0.250	0.870

Table A2: Differential Effect of GW by Donation Amount

Specification	(1)	(2)
Listing format	Auction	Auction
Dependent variable	Sold	log(Price + Ship Fee)
UCC listing	-0.0786*** (0.0264)	0.0106 (0.0420)
GW lstg 10% donated	0.0458*** (0.00684)	0.103*** (0.0125)
GW lstg 15%-95% don.	0.0640*** (0.00866)	0.0750*** (0.0118)
GW lstg 100% donated	0.124*** (0.0127)	0.0495*** (0.0161)
Additional effect of charity text on GW lstg.	0.0470** (0.0194)	0.129*** (0.0252)
Observations	1,864,380	852,266
R-squared	0.251	0.870
Robust standard errors, clustered by seller, are in parentheses		
*** p<0.01, ** p<0.05, * p<0.1		

Table A3: Effects of UCC and GW on Fixed Price Listing Outcomes

Specification	(1)	(1)	(2)	(2)
Dependent variable	Sold	Sold	log(Qty sold)	log(Qty sold)
UCC listing	-0.00515 (0.0199)	0.0439** (0.0174)	-0.00638 (0.0253)	0.0446* (0.0258)
UCC listing X Katrina pd.		-0.149*** (0.0480)		-0.155*** (0.0529)
GW w/o charity text	0.0358*** (0.0132)	0.0179 (0.0181)	0.0265** (0.0126)	0.00713 (0.0174)
GW w/o charity txt X Katrina pd.		0.0417 (0.0271)		0.0450* (0.0267)
GW w/ charity text	0.123*** (0.0452)	0.0693 (0.0503)	0.179*** (0.0632)	0.0680 (0.0528)
GW w/ charity txt X Katrina pd.		0.0693 (0.0682)		0.141* (0.0795)
Observations	1,198,594	1,198,594	1,198,594	1,198,594
R-squared	0.539	0.539	0.542	0.542

Robust standard errors, clustered by seller, are in parentheses

*** p<0.01, ** p<0.05, * p<0.1

ONLINE APPENDIX: NOT FOR PUBLICATION

Table OA1: Effects of UCC and GW on Listing Outcomes by Time Period
Using Alternative Definition of Katrina Period (August 29 – October 15 2005)

Specification	(1)	(2)	(3)	(4)
Listing format	Auction	Auction	Fixed Price	Fixed Price
Dependent variable	Sold	log(Price + Ship fee)	Sold	Log(Q Sold)
UCC listing	0.0168 (0.0304)	-0.00966 (0.0501)	0.0462** (0.0182)	0.0476* (0.0265)
UCC listing X Katrina pd.	-0.239*** (0.0256)	0.0745* (0.0437)	-0.150*** (0.0482)	-0.164*** (0.0514)
GW w/o charity text	0.0512*** (0.00614)	0.0420*** (0.0140)	0.0107 (0.0168)	-0.000476 (0.0162)
GW w/o charity txt X Katrina pd.	0.103*** (0.00605)	0.101*** (0.00970)	0.0855*** (0.0236)	0.0812*** (0.0241)
GW w/ charity text	0.0270 (0.0322)	0.117** (0.0496)	0.00490 (0.0433)	0.0269 (0.0421)
GW w/ charity txt X Katrina pd.	0.181*** (0.0144)	0.228*** (0.0210)	0.174*** (0.0562)	0.240*** (0.0799)
Observations	1,864,380	852,266	1,198,594	1,202,112
R-squared	0.251	0.870	0.539	0.550

Robust standard errors, clustered by seller, are in parentheses

*** p<0.01, ** p<0.05, * p<0.1