INSEAD

The Business School
for the World®

Philanthropic Campaigns and Customer Behavior: Field Experiments in an Online Taxi Booking Company

Jasjit Singh
INSEAD, jasjit.singh@insead.edu

Nina Teng
INSEAD, nina.teng@gmail.com

Serguei Netessine
INSEAD, Serguei.netessine@insead.edu

April 11, 2016

Companies commonly use philanthropic campaigns to attract and retain customers. Such campaigns often take the form of charity-linked promotions, where a company donates money to a cause when a customer makes a purchase. However, customer-related effects of such promotions remain under-studied, an issue this study investigates using field experiments in an online taxi booking company. Customers were randomly assigned to receive either a charity-linked or discount-based promotion. Take-up rates for charity-linked promotions were smaller than for discount-based promotions, and also less sensitive to the monetary amount. This is consistent with customer decisions being driven by a "warm glow" of giving and not just their extent of social impact. Although promotion take-up did represent new bookings rather than substitution of non-promotional bookings, there is little evidence of an increase in subsequent purchase frequency. This result raises questions regarding the common practice of online platforms devoting significant investor funds for short-term promotions.

Keywords: Corporate Philanthropy; Corporate Social Responsibility; Field Experiments; Customer Behavior; Online Marketplaces

Electronic copy available at: http://ssrn.com/abstract=2752883

1. INTRODUCTION

Corporate social responsibility (CSR) initiatives often have commercial goals and not just altruistic motives (Baron, 2007; Kitzmueller and Shimshack, 2012). While a causal link between CSR and financial performance is debatable in general, several studies have documented such a link under specific conditions (Barnett and Salomon 2012; Eccles, Ioannou and Serafeim, 2014; Servaes and Tamayo, 2013; Surroca, Tribó and Waddock, 2010). On the customer side, CSR often takes the form of philanthropic campaigns seen as a means of increasing demand for a company's products or services (Du, Bhattacharya and Sen, 2011; Lev, Petrovits and Radhakrishnan, 2010; Sheikh and Beise-Zee, 2011). Our study uses field experiments and longitudinal taxi booking data from an online taxi booking company to examine customer response to one kind of philanthropic campaign: charity-linked promotions involving the company donating a certain amount to a charitable cause when a customer makes a purchase.

Classic examples of corporate philanthropic campaigns include the 1976 launch of Marriott's 'Great America' entertainment center while supporting the March of Dimes, and a 1983 American Express effort to engage its customers by donating a certain amount towards renovation of the Statue of Liberty upon every usage of its cards (Advertising Age, 2003). More recent examples include Hanes supporting The Salvation Army, Dunkin Donuts supporting the Special Olympics and Kmart supporting St. Jude Children's Research Hospital. Despite skepticism regarding the authenticity of such charity-linked corporate campaigns, their use remains widespread. In North America alone, the overall size of charitable giving involving such initiatives has grown from just $100 million in 1990 to almost $2.0 billion in 2015, with the recent growth rate of about 4% per annum indicating a continued upward trend (IEG, 2015).

The "business case" for philanthropic campaigns typically relies on an assumption that customers are keen to see companies engage more in societal issues, and that this affects their purchasing behavior. Surveys suggest that customers not only appreciate companies engaging in social initiatives but also value the opportunity to contribute to these through their buying choices (MLSGROUP, 2014). For example, when choosing between brands of similar quality and price, 90% of respondents in a US-based survey reported a strong preference for buying from a cause-related brand (Cone, 2015). Another survey found that many people prefer to give to causes through purchases via charity-linked corporate initiatives rather than giving directly, a tendency particularly strong among the millennial generation (Barkley, 2011). In another survey drawn from multiple countries, 69% of millennials again expressed a preference for companies to facilitate their involvement in social causes (MSLGROUP, 2014).

Despite popular use of charity-linked promotions as a means of engaging the customer, there remains a scarcity of academic studies examining their effectiveness – especially in increasingly relevant "new economy" contexts like online marketplaces. While several studies have examined the effectiveness of

charity-linked campaigns in general (Karlan and List, 2007; Andreoni and Payne, 2013; Gneezy, Imas and Madarasz, 2014), few have focused on *corporate* philanthropy and how it affects business-related outcomes in real companies. Influential academics have in fact questioned whether one-off philanthropic campaigns with limited relatedness to a company's core business activities can be very effective (Porter and Kramer, 2002, 2011). Nevertheless, the traditional approach of charity-linked promotions unrelated to the core business continues to be widely practiced, and is thus worthy of rigorous examination.

The focus of our study is examining customer response to philanthropic campaigns, examining in particular the effects of charity-linked promotions on purchasing behavior of customers. We also compare the effects of charity-linked promotions with those of discount-based promotions simply offering price rebates to customers (Acquisti and Varian, 2005; Barone and Roy, 2010). Both kinds of promotions are employed particularly aggressively in online marketplaces, prominent examples of which include Uber and AirBnB (Fradkin, 2015; Hall and Krueger, 2015; Snir and Hitt, 2003). As achieving favorable network effects is critical in such marketplaces, much of investor funding in this sector is spent on attempts to quickly build market share (Elfenbein, Fisman and McManus, 2012; Elfenbein and McManus, 2010). For example, a recently leaked report put Uber's marketing expenses at $246 million for 2014 and $295 million for the first half of 2015, with promotions and price rebates alone costing $57.3 million and $72 million respectively during these periods (Solomon, 2016). There remains, however, a scarcity of research on the effects of promotions in such platforms.

Our study is based on three field experiments executed with the help of a leading online taxi booking company in Asia. We used text messages (SMS) to send different promotions to randomly selected groups of customers from the company's database. The recipients could redeem the codes using the company's taxi booking app during a five-day promotion period. The experiments allowed a comparison of relative effects of charity-linked promotions involving different donation amounts, and were replicated using two different charitable causes. Two of the experiments additionally also included customers groups receiving discount-based promotions instead of charity-linked promotions, allowing us to carry out a direct comparison of the effects of these two kinds of promotions as well.

Methodologically, our research contributes to a growing body of work employing experimental approaches to examine different aspects of corporate philanthropy and CSR (Burbano, 2016; Frank and Smith, 2014; Hossain and Li, 2013). This approach derives conclusions based on preferences as revealed through actual decisions, which are more accurate than self-reported preferences as per surveys and interviews (Becker, DeGroot and Marschak, 1964; Lazear, Malmendier and Weber, 2012). The reliability of our conclusions is further enhanced through use of field experiments embedded in a real company's interactions with its customers during day-to-day operations (Harrison and List, 2004; Chatterji, Findley,

Jensen, Meier and Nieldson, 2016). Not having to rely on stylized tasks or special subject pools (like students) helps overcome challenges that laboratory experiments face in capturing real-world settings (Charness, Gneezy and Kuhn, 2013; Levitt and List, 2007). Nevertheless, since underlying mechanisms can be harder to isolate in the field, and the findings to some extent unique to the specific context, we view a study like ours as one more step in a cumulative body of research (Charness and Fehr, 2015).

Our research also has close links to the literature on cause-related marketing, which takes philanthropic initiatives as a complement to traditional advertising and brand-building efforts (Bronn and Vrioni, 2001; Sheikh and Beise-Zee, 2011; Varadarajan and Menon, 1988). A key distinction of our study is our focus not just on take-up of promotions but also on associated longitudinal changes in customer purchases. Another unique aspect is our direct comparison of charity-linked and discount-based promotions across a range of monetary amounts, allowing examination of the sensitivity to amount. As already mentioned, our study is also distinct in examining promotions in the context of operations of an actual company, that too in the novel empirical setting of an online marketplace (Kabra, Belavina and Girotra, 2015).

The first half of our analysis pertains to how customer participation rates in charity-linked promotions varies for different monetary amounts, and how this compares with the same for discount-based promotions. Not surprisingly, we find take-up rates for charity-linked promotions to be smaller than those for discount-based promotions. What is more novel is our finding that, even though take-up rates do go up with the monetary amount for both kinds of promotions, the sensitivity to the amount is smaller for charity-linked promotions than for discount-based promotions. This result is consistent with a view that, when individuals contribute to a charitable cause, the mere fact that they are helping others comprises a large part of the "warm glow" they feel and the exact amount matters less relative to a scenario of private benefits in the form of a price rebate (Andreoni, 1990; Bierhoff, 2002; Carson, 2012; Meier, 2007).

The second half of our investigation involves longitudinal analysis of taxi booking data from the company's MIS system. What is of interest here is studying whether there is an increase in a customer's daily taxi booking frequency in the days following a promotion, an effect we might expect particularly for charity-linked promotions if they do enhance the company's reputation or brand as claimed (Bronn and Vrioni, 2001; Sheikh and Beise-Zee, 2011; Varadarajan and Menon, 1988). Although we find the promotional bookings themselves to indeed represent new purchases rather than mere substitution of bookings that would have occurred anyway, there is little evidence of a net increase in subsequent non-promotional bookings as well. Given the absence of a multiplier effect beyond the promotional booking and the high cost of executing each promotion, the cost-benefit equation does not stack up favorably. Admittedly, the interventions we employ are relatively weak, and that might be one reason for this pessimistic result. Although we can obviously not generalize to other possible designs of philanthropic

3

interventions, our results do raise skepticism regarding the commonly accepted "business case" for indiscriminate spending on promotions in online marketplaces. Future research could help further investigate the issues and concerns we raise in order to help reach more definitive conclusions.

2. HYPOTHESES REGARDING CHARITY-LINKED PROMOTIONS

Promotion take-up rates are a useful short-term measure of success of a campaign, and also serve as a leading indicator of longer-term benefits it might bring. So our first two hypotheses (Hypotheses 1 and 2) focus on take-up rates of charity-linked promotions, and how we expect these to compare against the same for discount-based promotions. For the last two hypotheses (Hypotheses 3 and 4), our focus turns to longitudinal patterns in the customers' purchase behavior. Our interest for these is in uncovering any patterns in a customer's daily purchase frequency before, during and after the promotion period.

2.1. Take-Up Rates for Different Promotions

It is now well-established that categorizing people as either "prosocial" or "selfish" is too simplistic: most human beings have at least some tendency to be prosocial (Andreoni and Payne, 2013; Bierhoff, 2002; Erat and Gneezy, 2011; Gneezy, Imas and Madarasz, 2014; Meier, 2007). Many studies find at least some segments of customers to exhibit at least some preference for making a positive social impact (Trudel and Cotte, 2009; Hainmueller and Hiscox, 2012a, 2012b). However, there remains divergence in views on how much prosocial preferences matter *relative to* other considerations driving purchasing behavior. For example, although Casadesus-Masanell, Crooke, Reinhardt and Vasishth (2009) find adoption of a pro-environment initiative at Patagonia (a leader in sustainability) to correlate with an increase in demand, the company's leadership has maintained that customer purchases are ultimately driven by product quality rather than sustainability (Chouinard and Brown, 1997). Similarly, although studies in the context of online auctions find a price premium for products associated with a positive impact (e.g., through Fair Trade certification), it is debatable whether this arises more from prosocial preferences or a signaling related to product quality (Elfenbein and McManus, 2010; Hiscox, Broukhim and Litwin, 2011).

In the context of charity-linked promotions, a customer taking up a promotion for social impact does incur some form of cost, even in cases when the amount to be given to the cause itself comes from the company. In a scenario where the customer would otherwise not have made the purchase in the absence of a promotion, this involves either an economic cost (e.g., paying for the taxi ride rather than taking public transport or walking) or at least a psychological cost (e.g., switching from a competing booking platform that the customer normally uses). Even if the customer were going to make the purchase from the company anyway, there is at least the mental effort of recalling the specific promotion code (sent, for

example, via an SMS) and using it accurately at the right time, even if this is inconvenient or time-consuming (e.g., typing it in a mobile app when making a booking).

Importantly, if the promotion take-up process is standardized across amounts and the company is the one donating to the cause (conditions met in our empirical context), the cost to a customer of taking up a promotion is independent of the amount. Yet the customer should perceive an unambiguous increase in his or her utility as the monetary amount goes up, since a larger amount donated to the cause represents a bigger social impact that should lead to a pro-social customer feeling better about the purchase. While the threshold at which it is worthwhile to make the effort to take up a promotion will vary from one customer to another, the above arguments suggest that the fraction of people for which this threshold will be crossed should monotonically increase as the amount involved goes up. This leads to our first hypothesis:

Hypothesis 1. The take-up rate for a charity-linked promotion will go up with the monetary amount that the company gives to the charity when the customer makes a purchase.

Even if take-up rates for charity-linked promotions increase with the amount, there is reason to believe that the absolute magnitude of these would likely be small. In interpreting existing research on consumer behavior, Devinney, Auger and Eckhardt (2010) conclude that the common image of the "ethical consumer" willing to pay a premium for a positive impact is mostly a myth, and applicable only to niche segments. This suggests that customers care more about private benefits, and impact becomes a prominent consideration only for otherwise comparable offerings. Newman, Gorlin and Dhar (2014) argue that over-emphasizing positive societal impact as a core feature can even hurt business, as customers perceive this to come at the expense of quality. Chernev and Blair (2015) similarly find that, while customers react positively to charitable causes, this benefit diminishes if the efforts are advertised too prominently.

Extrapolating to our research context, the above discussion has implications for how the take-up rate for a promotion involving a charitable cause ought to compare with a promotion of a comparable amount being offered simply as a price discount to the customers. We expect that customers would generally value a private rebate for themselves more than an equivalent amount given to charity. This difference might be further accentuated by the relative lack of transparency regarding the final outcome for charity-linked promotions (Bénabou and Tirole, 2006; Dana, Weber and Kuang, 2007): customers would see greater certainty in their take-up of a discount-based promotion leading to the promised private benefits (a price rebate) than of a charity-linked promotion translating into intended impact (the amount being delivered to the charity as well as intended and the charity spending it effectively on its cause).

The above arguments can be extended to examine not just the level of promotion take-up but also the sensitivity of how take-up responds to increases in the monetary amount involved. Just as a neoclassical utility function shows diminishing returns with the extent of private benefits, we should expect "diminishing returns" from the amount even for charity-linked promotions. A more nuanced expectation may be that this effect is in fact even stronger for charity-linked promotions than discount-linked promotions, the reason being that when individuals contribute to a social cause, the mere fact that they are helping others comprises a large part of the "warm glow" they feel, and the exact amount should therefore matter less (Andreoni, 1990; Bierhoff, 2002; Carson, 2012; Meier, 2007).

Survey-based research on how much people care for non-market goods, such as protection of endangered species, has indeed found relative individual insensitivity to the exact amount donated to a social cause. For example, in a widely-cited study that has since been replicated in different forms, Desvousfes et al. (1993) asked separate groups of people how much they would donate to save 2,000, 20,000 or 200,000 migrating birds from drowning in oil ponds. They found strikingly similar responses of $80, $78 and $88 respectively. Kahneman, Ritov and Schkade (1999) argue that such robust findings of "scope neglect" are best explained in terms of the psychological process of "affective valuation", where the quantitative aspect of the impact is not very salient. Hsee and Rottenstreich (2004) make a similar argument in distinguishing between "valuation by calculation" and "valuation by feeling", with decisions involving societal impact often falling into the latter category. A natural implication of the above for charity-based promotions is that customers would likely care a lot about the mere fact that they are supporting a cause, and less about the exact amount. In contrast, when people receive direct monetary benefits through discount-based promotions, the exact amount is far more salient. We state this formally:

Hypothesis 2. The promotion take-up rate will be less sensitive to the monetary amount for charity-linked promotions than for discount-based promotions.

2.2. Demand Patterns Associated with Different Promotions

From the point of view of a company evaluating charity-linked promotions as a marketing tool, an important issue beyond immediate take-up is how subsequent demand is affected by the promotional intervention. Hence we now turn to examining how charity-linked promotions might affect customer purchases in the period following the promotion, and how any such effects compare with those for discount-based promotions. From a commercial point of view, the take-up of a promotion – whether charity-linked or discount-based – is not the ultimate goal in itself (even if, as discussed earlier, it serves as a useful indicator of a campaign's visibility and likely impact). For example, if the promotion take-up

only represents purchases merely substituting for non-promotion purchases that would have taken place anyway, the demand-generation rationale for using them is not met.

The rationale for a promotional campaign typically lies in an expectation that it will boost even non-promotional purchases during as well as after the promotion period. Our expectation based on prior literature is that charity-linked promotions would not have very high take-up rates. Nevertheless, the commercial value of using them lies in an expectation of a multiplier effect in terms of increases the purchasing frequency even beyond the promotion itself. For example, Arora and Henderson (2007) demonstrate that cause-related marketing of a product can serve well as a sales promotion strategy. Similarly, Krishna and Rajan (2009) find that charity-linked promotions boost profitability even in a competitive setting, and that a customer's willingness to pay increases even beyond just the products the company covers in its promotions. These findings are consistent with broader research demonstrating how social engagement activities in general can be a means of improving a company's image and brand equity with customers (Brown and Dacin, 1997; Hoeffler and Keller, 2002; Sen and Bhattacharya, 2001).

The desire to contribute to a social cause may only be one aspect of the mechanism driving customer participation in charity-linked promotions. A related aspect, in fact one that might be more critical from the point of view of long-term business outcomes, is a reinforcing of the identification of customers with the company running such social initiatives (Lichtenstein, Drumwright and Braig, 2004; Luo and Bhattacharya, 2006; Sen and Bhattacharya, 2001). Associating itself with a cause can serve as a way for a company to raise its reputation with its stakeholders, particularly so for customers who as a result identify with the company and the cause it supports (Arnett, German and Hunt, 2008; Shang, Redd and Croson, 2008). This identification is central to the logic of using charity-linked promotions as a marketing tool analogous to traditional advertising and other brand-building tools (Bronn and Vrioni, 2001; Sheikh and Beise-Zee, 2011; Varadarajan and Menon, 1988). These arguments lead us to our next hypothesis:

Hypothesis 3. A charity-linked promotion will lead to a net increase in overall demand for the company's products and services.

While charity-linked promotions appear to be growing in popularity, discount-based promotions remain more prevalent and often constitute more than half of a company's overall marketing budget (Ailwandi, Harlam, Cesar and Trounce, 2006). Through a temporary lowering of price through a rebate, discount-based promotions intend to boost adoption based on an assumption that the customer would find the product worthwhile upon use. Such promotions are credited with having helped improve important marketing metrics like sales volume and store traffic in many instances (Aribarg and Arora, 2008). At the same time, however, an excessive focus on discounts carries the risk of accentuating customers price

sensitivity and brand erosion – especially in a setting where multiple competitors go after the same set of customers through aggressive discounts (Blattberg and Neslin, 1990).

In contrast to discount-based promotions, charity-linked promotions are believed to allow a firm to differentiate from its competitors through improved perception of its social performance (Bronn and Vrioni, 2001; Hull and Rothenberg, 2008; Sheikh and Beise-Zee, 2011; Varadarajan and Menon, 1988). The psychological processes underlying promotion take-up differ for charity-linked and discount-based promotions, with an expectation of increased loyalty in subsequent customer behavior in the case of charity-linked promotions supporting causes that the customer cares about (White and Peloza, 2009; Winterich and Barone, 2011). Ultimately, the expectation is that charity-linked promotions produce the desired response of increasing customer demand without having the risk of negative side effects that price discounts can have (Arora and Henderson, 2007; Henderson and Arora, 2010; Krishna and Rajan, 2009). In settings where the underlying product has a premium positioning, such effects might be further boosted if customers taking up a charity-linked promotion feel so good about having helped others that they are more likely to subsequently splurge on themselves subsequently (Mazar and Zhong, 2010). For example, they might be more willing to spend money on another taxi ride rather than just using public transport.

Summarizing the above arguments, we form an expectation that the customers taking up charity-linked promotions would become more "sticky" than those for discount-based promotions. In other words, charity-linked promotions are more effective as a loyalty-building tool in terms of the *quality* of relationship with the customer, even if the *fraction* of customers that take up a charity-linked promotion might be smaller relative to that for a discount-based promotion. This leads to our final hypothesis:

Hypothesis 4. The net increase in overall demand associated with a charity-linked promotion will be greater than that for a discount-based promotion involving the same monetary amount.

3. EMPIRICAL APPROACH

We carried out field experiments in collaboration with a leading online taxi booking company in Asia. The company uses an automated smartphone-based booking and dispatch platform to match supply and demand for taxis, creating value by making taxi services more reliable and safe and helping the taxi drivers be more efficient and effective. Like other online marketplaces, it has attracted significant funding, a large chunk of which is used for attracting and retaining users. Despite being just a few years old, the company is already one of the leading taxi booking platforms in Asia: it has a network of over 200,000 drivers and several million customers across multiple countries. (The company identity and detailed operational and financial data cannot be revealed for confidentiality reasons.)

3.1. Design of Field Experiments

We worked closely with the company to design three field experiments executed as a part of its Singapore operations. Among the locations where it operates, Singapore is the most developed and comparable to major Western cities. Even in terms of 2014 per capita incomes, Singapore and the U.S. are similar (Singapore at USD 56.3K, the U.S. at USD 54.6K). Our population is defined as Singapore-based customers who had taken at least one taxi ride through the company's platform by May 22, 2015, and were not on Singapore's "do not call" list (phone numbers that cannot be contacted for marketing).[1]

In each field experiment, randomly selected customers were sent one message each as a private SMS on the phone numbers registered with the company. Since customers may differ in their preference for causes, we rely on two different causes: raising funds for Nepal following two devastating earthquakes on April 25 and May 12, 2015 (our first two experiments, conducted two and three weeks respectively after the second earthquake), and giving to a Singapore-based charity called Singapore Cancer Society (our third experiment, conducted in October 2015).[2]

Table 1a details the promotions and the sample sizes used, and the appendix presents the full text of all messages. All promotions were executed truthfully as a part of the company's operations, building on as well as contributing to the company's reputation of honoring all of its promotions. Thus customers using a discount-based promotion code for a taxi booking got a price rebate as promised, and use of a charity-linked code triggered a real donation of the stated amount to the supported cause. The SMS messages were private, and gave no indication of whether and how many other customers had received the promotion. This anonymity is designed to get at mechanisms beyond just peer pressure or social desirability considerations (which can be very effective for raising funds too, but are not the focus here).[3]

3.2. Longitudinal Taxi Booking Data

The company provided us with access to the entire database of taxi bookings for 2015, making it feasible to carry out analyses of not just promotion take-up rates but also taxi booking frequency patterns for all customers. We merged the promotion take-up data from our field experiments into the database of all

---

[1] Customers on this list are likely to have systematically different preferences (Lazear, Malmendier and Weber, 2012), so our results apply to the population of customers *not* on this list. However, this is the relevant population for managerial implications anyway, given that the company can send marketing promotions only to these people.

[2] Examining effective promotion design is beyond the scope of the current study. This is a research area in itself, with illustrative studies being Anik, Norton and Ariely (2014), Asensio and Delmas (2014), Gneezy, Gneezy, Nelson and Brown (2010), Goldstein, Cialdini and Griskevicius (2008) and Ryzhov, Han and Bradic (2015).

[3] Promotion codes did leak out, as is evident from some "illegal" attempts to use a code by customers not sent the code. However, this was a small fraction of code take-up rates. In the company's IT system as of experiments 1 and 2, such misuse could be detected but not prevented, so we just excluded these rare observations from our analysis. By experiment 3, the company's IT system had been enhanced to simply deny illegitimate attempts to use a code.

bookings as the basis of constructing three longitudinal taxi booking datasets corresponding to the three experiments. To manage size of the datasets and focus on the duration most relevant for each, we chose a 33-day window of coverage: the 14-day period just prior to the promotional period for the given experiment, the actual five-day promotional period and the 14-day period right after the promotional period.[4] For expositional clarity, Figure 1 summarizes the coverage of our three longitudinal datasets.

Our analyses of longitudinal data takes the customer-day as a unit of analysis, with the main dependent variable being the number of bookings made by a given customer on a given day. In addition to customers that were sent the promotion codes in each experiment, all three datasets include two kinds of control groups also summarized in Table 1a. The first group involves customers that were sent a "placebo" SMS not involving any promotion code (with the appendix providing the exact text). The second involves customers drawn from the same population but not sent an SMS.[5]

The company does not capture demographic data like age, gender or education. Fortunately, sampling through randomization ensures that unobserved heterogeneity is not a concern in estimating at least the main treatment effects. Nevertheless, we created a few customer-level control variables that our data allow: *customer tenure* (how long had a person been a customer, measured in years), *booking history* (cumulative number of bookings the customer had made since January 1, 2015), *promotion history* (the number of these past bookings that involved a promotion code) and *apple device* (whether the customer made a past booking using an Apple device, perhaps a crude proxy for their socioeconomic status).

As Table 1b summarizes, the average customer had been with the company (as of the first day of the respective experiment) for just 0.52 years for experiment 1, 0.55 years for experiment 2 and 0.89 years for experiment 3. The count for the overall bookings (promotional bookings) since January 1, 2015 for the average customer was 12.3 (0.13) for experiment 1, 13.1 (0.15) for experiment 2 and 27.2 (1.31) for experiment 3. The fraction of customers that had used an Apple device was 0.58. The customers taking up promotions were systematically different from the average: they had been with the firm longer, had a higher number of overall and promotional bookings, and were more likely Apple users.

Table 1b also shows daily booking statistics for the 33-day period studied for each experiment. The average number of daily bookings for customers taking up promotions is consistently between three and

---

[4] The only exceptions are just a few customers that entered our database through a first ride between May 13 and May 22 (the last date of any new customers entering our database coverage), for which we have daily observations only when they actually started. All findings reported here are robust to simply dropping these customers.

[5] We use both groups in all our regressions, using the group not sent any SMS as the omitted category and using an indicator for the group sent an SMS without any promotional code. The coefficient estimate for this indicator is never statistically significant, implying that the two groups are indistinguishable as far as our analysis is concerned.

four times that for the overall customer sample. (As demonstrated later, this is driven almost entirely by who selects into the promotions rather than by treatment effects attributable to the promotions.)

Finally, Table 1b also shows the average taxi fares estimated using data on pick-up and drop-off locations for customers that took at least one taxi ride during the 33-day period (about half of all passengers).[6] This estimate is between SGD 16.6 and SGD 17.6 for the overall sample in the three experiments, and the corresponding figure just for people taking up promotions is not too far off from the population average in each of the three cases.[7] The analysis below focuses more on the count of taxi bookings rather than their combined fare, as the relevant financial transaction from the point of view of the taxi company we study involves a flat fee the driver pays the company for every booking done through the company's mobile app. (This flat fee is under SGD 1, the precise amount not being reported here for confidentiality reasons.)

4. ANALYSIS OF PROMOTION TAKE-UP RATES

4.1. Promotion Take-up: Experiment 1

Our first experiment involved charitable giving for relief efforts for Nepal following two devastating earthquakes there just a few weeks earlier. As summarized in Table 1a, we used five promotional codes involving the amount to be donated being SGD 1, 2, 3, 4 and 5 respectively. The codes were sent via SMS messages to 19,108 randomly selected customers each, and were valid for one-time use during the five-day promotion period (May 27-May 31). The full text for the messages sent to these five customer groups and an additional "placebo" group (who got an SMS without a code) is provided in the appendix.

The average take-up rates are reported in Table 1a and are depicted graphically in Figure 2a (with a formal statistical comparison across promotions postponed till our regressions later). The findings on comparing "1Nepal" (giving SGD 1 to Nepal relief) and "Nepal5sgd" (giving SGD 5 to Nepal relief) seem to be in line with *Hypothesis 1* that take-up rates ought to be larger for bigger amounts.

However, we do not see a monotonic increase across all monetary amounts. For example, "Nepal3sgd" and "4sgd" promotion take-up rates deviate from what the trend from "1Nepal" to "2sgd" might suggest. Our informal investigation uncovered two plausible reasons for this anomaly. First, "4" is an unlucky number (representing death) in Chinese culture (the ethnic majority in Singapore), reducing the attractiveness of the "4sgd" promotion. Second, the code "Nepal3sgd" is harder to remember and use

---

[6] The final payment between the passenger and the driver is based on the actual fare as per the taxi meter, but this is not reported back to the taxi company. In a majority of cases, this transaction takes place in cash. Tipping taxi drivers is not common in Singapore, and tips are much smaller than in the US even when they do occur.

[7] In terms of average exchange rate during 2015, 1 SGD (Singapore Dollar) was about 0.73 USD (U.S. Dollar).

relative to a code like "2sgd", likely contributing to a downward bias in its take-up rate. To mitigate a repetition of such concerns, we used more standardized codes in the subsequent experiments.

4.2. Promotion Take-up: Experiment 2

In addition to using more standardized codes, our second experiment brings in a comparison of charity-linked promotions with discount-based promotions: one customer group was sent a discount-based promotion for SGD 1 their next taxi booking ("1off") and another a charity-linked promotion giving SGD 1 for Nepal earthquake relief ("1sms"). We also used a charity-linked promotion involving a larger amount of SGD 7 ("7sms") to test the robustness of the charity amount result from experiment 1. The exact text of the SMS messages is again reported in the appendix.

For reasons of budget efficiency, we used a stratified sampling approach, whereby the discount-based promotion was sent to just 8,000 people but the charity-linked promotions were sent to 28,000 people each. It therefore becomes even more important to compare take-up rates as percentages and not as raw counts. Again, these are reported in Table 1a and shown graphically in Figure 2b.

The overall take-up rates for the charity-linked promotion are now lower than those in experiment 1, likely a reflection of the additional time elapsed since the Nepal earthquakes.[8] From the point of view of testing *Hypothesis 1*, it is reassuring that the ratio of take-up rates for "7sms" and "1sms" in experiment 2 is just a bit greater than the ratio for "Nepal5sgd" and "1Nepal" in experiment 1. In other words, the findings are still qualitatively and quantitatively consistent with *Hypothesis 1* that the charity-linked promotion take-up rates should be larger when customers see a bigger amount going to charity.

Experiment 2 also allows a comparison of a discount-based promotion ("1off") with a charity-linked promotion of the same amount ("1sms"). It is striking that the take-up rates for SGD 1 received as a price discount on a booking are almost twelve times that for SGD 1 going to charity, and six times that for even SGD 7 going to charity. The difference remains stark (more than a factor of five) even if we compare the "1off" results here with the "1Nepal" result from the equivalent charity-linked promotion from experiment 1 (temporally closer to the Nepal earthquakes).

4.3. Promotion Take-up: Experiment 3

One might wonder whether part of the differences between charity-linked and discount-based promotions above are driven by Nepal earthquake relief not being an important cause in the mind of Singapore-based

---

[8] This is also consistent with a finding reported by Madsen and Dodgers (2015) that, in a cross-sectional comparison of natural disaster relief initiatives across public companies, initiatives that were more prompt in addressing disaster-created needs received more stakeholder attention as inferred through greater media coverage.

customers. This in part motivated experiment 3, which relies instead on a local cause that people in Singapore did seem to care a lot about (at least as per local media coverage and a nationwide campaign in 2015): cancer-associated giving to a local charity called Singapore Cancer Society.

Our third field experiment compares charity-linked promotions with discount-based promotions across a wider range of amounts: SGD 1, 5 and 10. This allows us to examine diminishing returns from take-up rates with these monetary amounts and how they might vary across the two kinds of promotions. We again used a stratified sampling approach, whereby promotions involving discounts and larger amounts use smaller sample sizes. These sample sizes and the corresponding take-up rates are reported in Table 1a, with the relative take-up also shown graphically as Figure 2c. The exact text for the six promotional messages as well as the placebo SMS appear in the appendix.[9]

The take-up rates for the charity-linked promotion for experiment 3 are similar to those in experiment 1 (and greater than in experiment 2), even though the cause is now different. The take-up rates show diminishing returns on both discount-based and charity-based promotions, but are less sensitive to an increase in the amount for charity-based promotions. For example, a tenfold increase in the charity-linked promotion amount (from SGD 1 in "1give" to SGD 10 in "10give") leads to a mere doubling of the take-up rate (from 0.48% to 0.95%), while doing the same for discount-based promotions (going from SGD 1 in "1off" to SGD 10 in "10off") leads to the take-up rate becoming 3.6 times as much (up from 3.47% to 12.44%). In line with *Hypothesis 2*, customers appear to be more sensitive to the exact amount when it accrues to the customers themselves in the form of private benefits provided as a discount.

4.4. Regression Analysis for Promotion Take-Up

We now employ a logistic regression framework to estimate the likelihood of customers taking up a promotion, helping us examine our first two hypotheses through statistical tests corresponding to the informal comparison above. This regression analysis is reported in Table 2, with the key independent variables being the indicator variables for different promotion codes within each experiment (represented using indicator variables starting with an "$i\_$" and followed by the promotion code from Table 1a).

In interpreting the regression findings for experiment 1 in column (1), it is useful to refer back to Figure 2a. The omitted (reference) category in this model is the customers receiving the "1Nepal" promotion. The take-up rates for "2sgd", "4sgd" and "Nepal5sgd" are positive and statistically significant relative to

---

[9] The wording "*up to* 5 SGD" for "5off" and "*up to* 10 SGD" for "10off" makes it clear that – in line with similar promotions in the past – customers do not get "refunded" if their actual fare is smaller than the maximum discount allowed. In any case, such a scenario is not frequent: only 1 of the 468 "5off" cases had an estimated fare below SGD 5 and only 36 of the 311 "10off" cases below SGD 10. And even for these cases the gap was typically small.

this reference, consistent with *Hypothesis 1*. In line with our prior discussion of Figure 2a, the lack of a significant coefficient for "Nepal3sgd" represents an anomaly in an otherwise monotonic trend.

Cross-promotion comparison for experiments 2 and 3 is also consistent with our discussion of Figures 2b and 2c respectively. Experiment 2 findings in column (2) use "1sms" as the omitted (reference) category, and indicate that both "7sms" and "1off" have take-up rates that are larger in a statistically meaningful way – providing additional support for *Hypothesis 1*. Similarly, the experiment 3 findings in column (3), which are based on using "1give" as the omitted category, show that all other promotion codes within experiment 3 have significantly larger take-up rates than this reference and that the magnitude of the coefficients increases with the monetary amount involved in all cases.

Calculations of the implied marginal effects from the regression estimates indicate that the take-up rate for a charity-linked promotion is an order of magnitude smaller than for a discount-based promotion of a comparable amount (for experiments 2 and 3, the two that allow such a comparison). We also see diminishing returns in take-up rates, for example, as the amount goes from SGD 1 to SGD 5 versus from SGD 5 to SGD 10 in experiment 3.[10] In line with *Hypothesis 2*, the sensitivity of take-up rates to the amount is smaller for charity-linked than for discount-based promotions.[11]

Considering the individual characteristics included as controls, customers who have made more bookings in recent months (larger *booking history*), those who have taken more promotional rides in particular (larger *promotion history*) and those using an Apple device (*apple device* being 1) are more likely to take up a promotion in all three experiments. The findings across experiments are mixed when it comes to *customer tenure* (the estimate being insignificant for the first experiment but positive for the last two).

5. ANALYSIS OF LONGITUDINAL DEMAND PATTERNS

The analysis so far has focused just on take-up rates of the promotions. We now extend the analysis in two ways. First, we examine how the promotions change the riding behavior of the customers beyond just their promotional booking, both during and after the promotion period. Second, we look for any effects the promotions might have had even on customers receiving but not taking up the promotional codes.

5.1. Summary Statistics

---

[10] This diminishing returns finding is based on post-estimation Wald tests executed in Stata as "*test _b[i_10give] - _b[i_5give] = _b[i_5give]*" and "*test _b[i_10off] - _b[i_5off] = _b[i_5off] - _b[i_1off]*".

[11] This conclusion about sensitivity of take-up rates to the amount is derived using post-estimation Wald tests executed in Stata as "*test _b[i_5give] = _b[i_5off] - _b[i_1off])*" and "*test _b[i_10give] = _b[i_10off] - _b[i_1off]*".

Figures 3a, 3b and 3c graphically present the daily taxi booking averages for customers participating in the three respective experiments. The x-axis for each of the figures is labelled so that "Day 0" refers to the day when the respective five-day promotion period started (as detailed in Figure 1). While the data are noisy, three patterns appear to hold across all three experiments. First, there appears to be a spike in the daily demand during the 5-day promotion period for the customers receiving the promotions. Second, the daily demand more or less returns to the pre-promotion levels thereafter. Third, the above pattern holds for both charity-linked promotions and discount-based promotions, with no obvious difference between the two. We now "zoom in" to these patterns through promotion-level summary statistics (and statistically verify these observations through formal hypothesis testing in a regression framework later in the paper).

Table 3a provides daily booking behavior for customers taking up the promotions, with the control groups also shown for comparison. Customers taking up charity-linked promotions have significantly above-average rides per day already in the pre-promotion period. Customers that have been less frequent users are less likely to take up the promotions, which is notable given that such customers are often the intended targets of such promotions. Getting more fine-grained, we also note that people taking up either charity-linked promotions or lower-amount promotions are even more atypical in terms of prior average daily rides than customers taking on discount-based promotions or higher-amount promotions.

Comparing the pre-promotion period with the promotion period, customers taking up promotions show an increase in their daily rides, in line with *Hypothesis 3*. Note that if the promotional rides were neither substitutes nor complements for non-promotional rides, we would expect this average to have gone up by 0.2 (the extra ride divided over five days in the promotional period). On the other hand, if they came at the expense of non-promotional rides that would be taken anyway, the daily average should not have moved. The fact that the observed change in the average is much closer to 0.2 than to zero (typically between 0.15 and 0.25) indicates that the promotional rides do represent at least some new demand. However, the fact that this increase does not significantly exceed 0.2 leads to a pessimistic nuance that the number of *non-promotional* bookings does not increase during the promotion period. What is also noteworthy is that the above pattern holds for both charity-linked and discount-based promotions, with not much difference in the magnitudes of the two. There is thus no support for *Hypothesis 4*, which had set an expectation that the net increase in overall demand would be greater for charity-linked promotions.

Looking at the statistics beyond the promotion period, the daily booking rate seems to return more or less to the pre-promotion levels, especially viewed as a "difference in differences" statistic relative to the trend in the control groups. There is therefore no further support for *Hypothesis 3* or *Hypothesis 4*, as there is no material increase in post-promotion demand for people taking up the charity-linked promotions. Table 3b considers the statistics for *not* taking up the promotional codes they received. In principle, just receiving a

promotional message (even without the customer using the code in it) could have had an effect on demand. However, the temporal patterns do not offer much evidence of this.

5.2. Panel Data Regression Analysis: Experiment 1

We now turn to regression analysis to formally test our hypotheses regarding demand patterns (*Hypotheses 3* and *Hypothesis 4*). Our framework employs a full set of indicator variables for the calendar date, and thus controls for fluctuations in bookings related to exogenous factors like weather or weekends as well as competitive factors like pricing or promotion decisions of competitors. We employ linear regressions (with standard errors clustered by customer) as these are well suited for difference-in-differences models with a large number of indicator variables (Angrist and Pischke, 2009).

The first four columns in Table 4 report findings related to experiment 1. The variables starting with "*i_*" represent time-invariant indicators for the subgroups receiving a charity-linked promotion code or the subgroup receiving a "placebo" message (without any code). The indicators *DURING_CHARITY* and *DURING_NOCODE* switch to 1 during the "treatment period" (May 27-May 31 as per Figure 1) for people receiving a charity-linked code and a message without a code, respectively. The indicators *POST_CHARITY* and *POST_NOCODE* become 1 in the "post-treatment period" (June 1-June 14) for people receiving a charity-linked code and a message without any code, respectively. The omitted (reference) category is the control group not sent any SMS at all. The regression estimates (*i_NOCODE*, *DURING_NOCODE* and *POST_NOCODE*) for the control group receiving a message without a code lack significance, indicating that all findings relate to actual promotions and not just receiving an SMS.[12]

We find a positive and significant coefficient for all five indicator variables (starting with an "*i_*") in column (1), indicating that people taking up any of the charity-linked promotions tend to be those already taking above-average numbers of rides even in the period leading up to the intervention. Comparing the indicators across different codes, the estimate is larger for *i_1Nepal* than for *i_Nepal5sgd*, supporting the view that frequent customers are more likely to take up charity-linked promotions when smaller amounts are involved (a finding that we revisit in discussing the subsequent experiments below).[13]

The coefficient for *DURING_CHARITY* in column (1) is close to 0.2, indicative of the promotional booking representing new demand. Importantly, however, it is not significantly above 0.2, meaning that the additional demand generation does not extend beyond the promotional ride. Further analysis in

---

[12] Looking at the control variables across models: the average bookings frequency is greater for individuals who have not been customers for too long, those with significant past booking frequency and using Apple devices for their bookings. The coefficient for history of taking other promotions is also positive but not always significant.

[13] It might appear odd that the coefficient estimate for *i_Nepal3sgd* is not greater than for *i_1Nepal*. This could, as discussed before, at least in part be the result of insufficient standardization of promotion codes in experiment 1.

column (2), restricted to only non-promotional bookings, confirms this interpretation: the estimate for *DURING_CHARITY* is no longer significant. In other words, even if the promotional ride itself does represent new demand, it brings no multiplier effect in terms of increased non-promotional bookings.[14]

Turning now to booking behavior beyond the promotional period, the estimate for *POST_CHARITY* being insignificant in columns (1) and (2) reflects that the charity-linked promotions do not increase demand for the period immediately following the intervention. Putting this together with the finding that non-promotional demand does not increase even during the promotion period, this would seem like bad news for the business case underpinning these promotions: the new demand manifesting as take-up of charity-linked promotions is transient and does not translate into further non-promotional bookings. The analysis in column (3) explores the possibility that promotions might influence ride-taking behavior even for customers that received a promotion code but did not take it up. This is not the case either, as the model does not find any significant estimates for either *DURING_CHARITY* or *POST_CHARITY*.

It is worth acknowledging that even the observed transient demand mentioned above could be a reflection of the kind of people that select themselves into the sample taking up a promotion. A technically more accurate treatment effect estimate has to consider the combined sample of all customers, which column (4) does. The coefficients for *DURING_CHARITY* and *POST_CHARITY* are now both insignificant. This is perhaps not surprising given that people taking up the promotions represent just a tiny fraction of the overall population, leading to the results from column (3) dominating those from column (1) when the samples are combined. On the whole, therefore, there is at best weak support for *Hypothesis 3* (in the form of just the promotional booking representing increased demand but no further increase beyond that) and no support for *Hypothesis 4* (which suggested a stronger effect for charity-based promotions).

5.3. Panel Data Regression Analysis: Experiment 2

To examine longitudinal results for experiment 2, we now turn to columns (5) through (8) in Table 4. These include *i_DISCOUNT*, an additional time-invariant indicator for customers receiving a discount-based promotion. The time-varying indicators *DURING_CHARITY, DURING_DISCOUNT* and *DURING_NOCODE* become 1 only during the promotion period (June 4-June 8 as per Figure 1) for the groups receiving a charity-linked code, a discount code and a message without any code, respectively. The variables *POST_CHARITY, POST_DISCOUNT* and *POST_NOCODE* are analogous indicator variables that turn 1 only in the "post-treatment period" (June 9-June 22).

---

[14] In models not reported here, we estimated *DURING_CHARITY* separately for the five different subgroups, and found this interpretation to also hold individually for all five promotions.

Similar to experiment 1, people taking up a promotion have above-average number of daily rides in the recent past. It is now of interest to compare the estimates for the indicators for the two charity-linked promotion groups ("1sms" and "7sms") and the one discount group ("1off"). The pre-promotion period booking average is larger for *i_1sms* than for *i_7sms*, consistent with the view from experiment 1 that frequent customers are more willing to help charitable causes even when smaller amounts are involved. The estimate for *i_1off* falls between the above two, indicating that customers taking up a discount-based promotion are "less unusual" than those taking on a charity-linked promotion of a comparable amount.

The coefficients for both *DURING_CHARITY* and *DURING_DISCOUNT* once more turn out to be close to 0.2 in column (5). Supplementary analysis reported in column (6), which restricts the dependent variable to only non-promotional bookings (still for people taking up the promotions), again finds no significant decline or increase in non-promotional bookings due to the intervention. The insignificant estimates for *POST_CHARITY* and *POST_DISCOUNT* in columns (5) and (6) additionally reflect that the interventions do not lead to an increase in non-promotional demand in the post-promotion period either.[15]

Column (7) explores the possibility that promotions influence behavior of customers not taking up the promotion. For charity-linked promotions, as in experiment 1, this turns out not to be the case. If anything, the news is even worse for discount-based promotions: the *negative* estimate for *DURING_DISCOUNT* in column (7) points towards a possible penalty in terms of *decreased* bookings by people who receive a discount-based promotion but do not use it. However, this effect, even if real, is also short-lived: the estimate for *POST_DISCOUNT,* just like that of *POST_CHARITY*, is insignificant.

For calculating a technically more sound overall treatment effect, column (8) repeats the above analysis using a sample combining those used in columns (5) and (7). The *DURING_CHARITY* and *DURING_DISCOUNT* coefficients are both insignificant. On the whole, as in experiment 1, there is at best weak support for *Hypothesis 3* (with the promotional booking perhaps representing new demand but without any evidence of a further increase in demand beyond that even for the take-up customers) and no support for *Hypothesis 4* (an expectation of a greater demand increase for charity-based promotions).

5.4. Panel Data Regression Analysis: Experiment 3

The last four columns in Table 4 turn to longitudinal analysis for experiment 3 (promotion period Oct 6- Oct 10 as per Figure 1). Column (9) shows that the customers self-selecting into promotions are again more frequent customers to start with. Further, the estimate for *i_1off* is smaller than for *i_1give*, that for *i_5off* is smaller than for *i_5give*, and that for *i_10off* is smaller than for *i_10give*. In other words, as in

---

[15] In models not reported here, we also tried to estimate *DURING_CHARITY* and *POST_CHARITY* separately for the two charity-linked subgroups, but the main findings turned out to be the same in both cases.

experiment 2, customers taking a discount-based promotion are "less unusual" than those taking on a charity-linked promotion of a comparable amount. In addition, the average number of bookings per day in the pre-promotion period is larger for smaller amounts: as the monetary amount involved increases, the customers taking on the promotions look more like the population average.

As in the prior experiments, coefficients for both *DURING_CHARITY* and *DURING_DISCOUNT* turn out to be quite close to 0.2 in column (9), again indicative of the promotional rides of either kind being new demand. Additional analysis reported in column (10), which restricts the dependent variable to be only non-promotional bookings, again finds neither a significant decline nor increase in non-promotional bookings.[16] While the coefficient estimate for *POST_CHARITY* remains insignificant in column (9), the coefficient for *POST_DISCOUNT* is now positive but statistically significant only at the 10% level. The analysis in column (11) explores the possibility that promotional messages might influence other ride-taking behavior even for customers that choose not to take up the promotion themselves. For charity-linked promotions, this again turns out not to be the case. And, as before, the negative and statistically significant estimate for *DURING_DISCOUNT* points towards a penalty in terms of *decreased* non-promotional bookings by people who received but did not use a discount-based code. Once more, this effect is short-lived as we do not find a post-promotion effect for *POST_DISCOUNT*.[17]

Column (12) returns to analysing the overall sample for estimating a treatment effect with a clean causal interpretation. Both *DURING_CHARITY* and *POST_CHARITY* remain insignificant, indicating no support for *Hypothesis 3* or *Hypothesis 4*. While there is a positive effect for *DURING_DISCOUNT*, it is small and short-lived: we do not find a corresponding effect for *POST_DISCOUNT*. In any case, this effect does not provide any support to the hypotheses, which are regarding charity-linked promotions.

6. SUMMARY, DISCUSSION AND CONCLUSION

6.1. Summary and Interpretation of Findings

We start by summarizing the key findings from our field experiments. Take-up rates for charity-linked promotions are smaller than for discount-based promotions of comparable amounts. The former are also less sensitive to the amount, consistent with a view that customer behavior is driven in part by a "warm glow" effect independent of the actual social impact. Although the promotional bookings themselves do

---

[16] We again also carried out this estimation separately for the different subgroups and found the estimates to be very similar across all of these (close to 0.2 and statistically indistinguishable from each other).

[17] In additional analysis, this effect appeared to be driven by the discounts of larger amounts (SGD 5 and 10 more than SGD 1). Further, it is statistically robust but of relatively modest *per person* magnitude.

seem to represent new demand rather than mere substitution of bookings that would have been made anyway, we find little evidence of a rise in non-promotional bookings following either kind of promotion.

Our research design combines the overall benefits of an experimental approach with the specific benefits of carrying out field experiments in the context of a real company. By studying charity-linked promotions across a range of amounts for two different causes, and doing the same for discount-based promotions as well, we have been able to conduct a like-for-like comparison for a range of promotions. Our study makes a particular contribution to research on the increasingly relevant empirical context of online marketplaces. The issue of promotion effectiveness in this setting remains under-studied, despite large amounts of investor funds being spent on such promotions in the hope of quickly building market share.

Interesting implications arise from our finding that customer take-up rates for charity-linked promotions are not very sensitive to the exact amount, which indicates that customers are driven substantially by just the "warm glow" from the mere act of participating rather than necessarily the final social impact. For a firm maximizing profits, this suggests that the optimal approach – assuming that it is going ahead with a campaign in any case – might be to keep the donation amounts small. This, in turn, raises a critical question for the policymaker: even in settings where customers seem to care about the society, can a profit-seeking firm really be trusted to channel substantial resources towards maximizing social welfare?

Considering the overall promotion economics, recall that the cost of a promotion that is taken up is between SGD 1 and SGD 10. Even without considering initial costs of messaging and administration, even for the cheapest promotion (SGD 1) this exceeds the flat fee the taxi booking company earns per booking. Thus our finding that the promotion does not have any spillover benefit beyond the promotional booking is a concern: the numbers do not seem to support a clear "business case" for such promotions. While the specific economics could be very different in a different settings (e.g., if the company earned a percentage cut from each fare rather than its small flat fees of less than SGD 1), it does at least raise scepticism about the "more is better" approach to promotions often seen in online marketplaces.

6.2. Selection versus Treatment Effects

It is worth reiterating that our finding of the promotional bookings themselves representing new demand is conditional on considering only the subsample of customers taking up a promotion (as summarized in Table 3a, in columns (1), (5) and (9) of Table 4, and in Figure 3). This does not represent an overall "treatment effect" on the population. In fact, the unconditional treatment effect for every one of our charity-linked interventions, which requires considering instead the estimates reported in columns (4), (8) and (12) of Table 4 respectively, is statistically indistinguishable from zero. Admittedly, this could be driven in part by the interventions being relatively weak and exhibiting low take-up rates. Further, the

experiments only involve messages received and responded to privately, reducing effects that could have been facilitated by social pressures (Ariely, Bracha and Meier, 2009; Bénabou and Tirole, 2006).

It is intriguing to reflect upon the selection effects in terms of who takes up the promotions in the first place. While the intended target audience of promotions is often the less frequent users, it is noteworthy that the more regular customers comprise a disproportionately *larger* fraction of people actually taking up the promotions (as manifested in pre-intervention daily booking average being systematically larger for these customers). Further, this average is greater for charity-based promotions than discount-based promotions of comparable amounts, indicating that the regular customers comprise an even greater fraction of people taking up charity-linked promotions. One plausible explanation could be that more frequent users identify better with the firm, and are likely to take up charity-based promotions that further reaffirm this identification. An alternative could be that regular customers represent the richer population segments, and these segments might be less sensitive to discount-based promotions than charity-linked promotions. Trying to disentangle these different mechanisms affecting take-up differences among customers would be an interesting direction for future research, requiring additional customer-level data.

6.3. Limitations and Directions for Future Research

While carrying out experiments in the field rather than a laboratory setting makes the study more realistic, it still faces the issue of external generalizability. Some of the effects we observe may vary from one company to another in terms of how far customers identify with their values, and how genuine they are perceived to be in their societal concern (Cuypers, Koh and Wang, 2016; Patten, 2008; Servaes and Tamayo 2013). Caution should therefore be exercised in extrapolating from this setting to firms that differ in the extent to which they are seen as prosocial or differ in positioning on other dimensions (Brown and Dacin, 1997; Du, Bhattacharya and Sen, 2011; Luo and Bhattacharya, 2006; Muller and Kraussl, 2011).

Our findings may also be specific to the sector we study (the online marketplace for taxi booking), being tied in part to the nature of the product or the competitive landscape involved. For example, the nature of the product –whether it is a basic product versus one with premium or luxury positioning – could drive some of the effects (Strahilevitz, 1999; Strahilevitz and Myers, 1998). They may also be unique to the specific geography where the study was carried out, although Singapore resembles in many ways a city in the Western world. Given the scarcity of such studies from outside the U.S., bringing a dataset from outside the U.S. (specifically from Asia) can be seen as a unique contribution. At the same time, generating meaningful insights on cross-country differences would require cross-country studies.

We should also acknowledge that our study focuses only on existing customers, given the nature of our data, and that promotions sent to new customers might have different effects. Nor can we rule out the

possibility that framing the messages differently or using other causes might have produced different outcomes. There is also a possibility that philanthropic or social responsibility efforts that are seemingly unattractive in the short run might pay off in the long term. Specifically, given that charity-linked promotions have a lower take-up, the same budget for running a discount-based promotion once would suffice to reach a comparable population multiple times with charity-linked promotions. To the extent that such repeated messaging is more effective for building a prosocial reputation – possibly even for people not taking up the promotion – this could pay off in a way our study does not capture.

Another direction to extend this study would be to dig deeper into moderating effects and also ask what kind of promotion refinements might help get "more bang for the buck" (Acquisti and Varian, 2005; Barone and Roy, 2010). It is likely that some of the effects differ significantly with customer demographics, e.g., as women might be more sensitive to pro-social campaigns (Hainmueller and Hiscox, 2012a). Specific (and often intangible) benefits would then have to be translated into net financial implications to understand the overall cost-benefit equation by customer segment, also considering the fixed costs of the campaign and the associated variable cost per customer.

In closing, we should highlight three broader caveats. First, we have considered only one specific kind of corporate social engagement: philanthropy in the form of charity-linked promotions. Second, we have only considered customer-related business outcomes, whereas a "business case" for CSR might also involve mechanisms operating through a diverse set of stakeholders (Besley and Ghatak, 2005; Bode, Singh and Rogan, 2015; Crilly, Zollo and Hansen, 2012; Henisz, Dorobantu and Nartey, 2014; Muller and Kraussl, 2011; Wang and Qian, 2011). Third, we have discussed CSR as ultimately an instrumental tool for business. There is a broader debate on whether and how much corporate social engagement ought to be grounded only in commercial considerations rather than social impact also being as an end in itself (Baron, 2007; Friedman, 1970; Stout, 2012). Getting into such debates is beyond the scope of this study.

REFERENCES

Acquisti A, Varian HR (2005) Conditioning prices on purchase history. *Marketing Science* 24(3): 367-81.

Advertising Age (2003) Cause marketing: After two decades of growth, the $1 billion spending mark is in sight. July 28: 2.

Ailwadi K, Harlam B, Cesar J, Trounce D (2006) Promotion profitability for a retailer: The role of promotion, brand, category, and store characteristics. *Journal of Marketing Research* 43: 518-535.

Andreoni, J (1990) Impure altruism and donations to public goods: A theory of warm-glow giving. *Economic Journal* 100 (June): 464-77.

Andreoni J, Payne AA (2013) Charitable giving. Chapter 1 in *Handbook of Public Economics*, Vol 5, (Amsterdam: North Holland), A. Auerbach, R. Chetty, M. Feldstein, E. Saez, editors, 1-50.

Angrist JD, Pischke JS (2009) *Mostly Harmless Econometrics: An Empiricist's Companion.* Princeton University Press.

Anik L, Norton MI, Ariely D (2014) Contingent match incentives increase donations. *Journal of Marketing Research* LI: 790-801.

Aribard A, Arora N (2008) Brand portfolio promotions. *Journal of Marketing Research* 45: 391-402.

Ariely D, Bracha A, Meier S (2009) Doing good or doing well? Image motivation and monetary incentives in behaving prosocially. *American Economic Review* 99(1): 544-555.

Arnett DB, German SD, Hunt SD (2003) The identity salience model of relationship marketing success: The case of non-profit marketing. *Journal of Marketing* 67(2): 89-105.

Arora N, Henderson T (2007) Embedded premium promotion: Why it works and how to make it more effective. *Marketing Science* 26: 514-531,

Barkley (2011) American millennials: Deciphering the enigma generation. Barkley. Downloaded from https://www.barkleyus.com/AmericanMillennials.pdf on March 3, 2016.

Barnett ML, Salomon RM (2012) Does it pay to be really good? Addressing the shape of the relationship between social and financial performance. *Strategic Management Journal* 33(11): 1304–1320.

Baron DP (2007) Corporate social responsibility and social entrepreneurship. *Journal of Economics and Management Strategy* 16(3): 683-717.

Barone MJ, Roy T (2010) Does exclusivity always pay off? Exclusive price promotions and consumer response. *Journal of Marketing*: 74(2): 121-132.

Becker GM, DeGroot MH, Marschak J (1964) Measuring utility by a single-response sequential method. *Behavioral Science* 9(3): 226-232.

Bénabou R, Tirole J (2006) Incentives and prosocial behavior. *American Economic Review* 96(5): 1652-1678.

Besley T, Ghatak M (2005) Competition and incentives with motivated agents. *American Economic Review* 95(3): 616-636.

Bierhoff HW (2002). *Prosocial Behaviour*. New York: Psychology Press.

Blattberg RC, Neslin SA (1990) *Sales Promotions: Concepts, Methods and Strategies*. Englewood Cliffs, NJ: Prentice Hall.

Bode C, Singh J, Rogan M (2015) Corporate social initiatives and employee retention. *Organization Science* 26(6)

Bronn PS, Vrioni AB (2001) Corporate social responsibility and cause-related marketing: An overview. *International Journal of Advertising* 20: 207-222.

Brown TJ, Dacin PA (1997) The company and the product: corporate associations and consumer product responses. *Journal of Marketing* 61(1): 68–84.

Burbano VC (2016) Social responsibility messages and worker wage requirements: Field experimental evidence from online labor marketplaces. *Organization Science*, forthcoming.

Carson RT (2012) Contingent valuation: A practical alternative when prices aren't available. *Journal of Economic Perspectives* 26(4): 27-42.

Casadesus-Masanell R, Crooke M, Reinhardt F, Vasishth V (2009) Households' willingness to pay for green goods: Evidence from Patagonia. *Journal of Economics & Management Strategy* 18: 203-233.

Charness G, Fehr E. (2015) From the lab to the real world. *Science* 350: 512-513.

Charness G, Gneezy U, Kuhn M (2013) Experimental methods: Extra-laboratory experiments - extending the reach of experimental economics. *Journal of Economic Behavior & Organization*, 91: 93-100

Chatterji AK, Findley MG, Jensen NM, Meier S, Nieldson D (2016) Field experiments in strategy research. *Strategic Management Journal*, 37(1): 116-132.

Chernev A, Blair S (2015) Doing well by doing good: The benevolent halo of corporate social responsibility. *Journal of Consumer Research* 41(6): 1412-1425.

Chouinard Y, Brown MS (1997) Going organic: Converting Patagonia's cotton product line. *Journal of Industrial Ecology* 1(1): 117-130.

Cone (2015) Cone Communications/Ebiquity Global CSR Study. Cone Communications. Downloaded http://www.conecomm.com/2015-global-csr-study on March 3, 2016.

Crilly D, Zollo M, Hansen MT (2012) Faking it or muddling through? Understanding decoupling in response to stakeholder pressures. *Academy of Management Journal* 55(6): 1429-1448.

Cuypers IRP, Koh PS, Wang H (2016) Sincerity in corporate philanthropy, stakeholder perceptions and firm value. *Organization Science*, forthcoming.

Dana J, Weber RA, Kuang JX (2007) Exploiting moral wiggle room: experiments demonstrating an illusory preference for fairness. *Economic Theory* 33(1): 67-80.

Desvousges WH, Johnson FR, Dunford RW, Hudson SP, Wilson KN, Boyle KJ (1993). Measuring resource damages with contingent valuation: Tests of validity and reliability. In J. Hausamn (Ed.), *Contingent valuation: A critical assessment* (pp. 91-164). Amsterdam: North-Holland.

Devinney, TM, Auger P, Eckhardt GM (2010) *The Myth of the Ethical Consumer*. Cambridge: Cambridge University Press.

Du S, Bhattacharya CB, Sen S (2011) Corporate social responsibility and competitive advantage: Overcoming the trust barrier. *Management Science* 57:1528-1545.

Eccles RG, Ioannou I, Serafeim G (2014) The impact of corporate sustainability on organizational processes and performance. *Management Science* 60 (11): 2835-2857.

Elfenbein DW, Fisman R, McManus B (2012) Charity as a substitute for reputation: Evidence from an online marketplace. *Review of Economic Studies* 79:1441-1468.

Elfenbein DW, McManus B (2010) A greater price for a greater good? Evidence that consumers pay more for charity-linked products. *American Economic Journal: Economic Policy* 2:28-60.

Erat S, Gneezy U (2011) White lies. *Management Science* 58 (4): 723-733.

Fradkin A (2015) Search frictions and the design of online marketplaces. Working Paper.

Frank DH, Smith NC (2014) Employees and corporate social responsibility: Will employees sacrifice pay to work for a good cause? Working Paper.

Friedman M (1970) The social responsibility of business is to increase its profits. *The New York Times Magazine*.

Goldstein NJ, Cialdini RB, Griskevicius V (2008) A room with a viewpoint: Using social norms to motivate environmental conservation in hotels. *Journal of Consumer Research* 35 (3): 472-482.

Gneezy A, Gneezy U, Nelson LD, Brown A (2010) Shared social responsibility: A field experiment in pay-what-you-want pricing and charitable giving. *Science* 329(5989), 325-327.

Gneezy U, Imas A, Madarasz K (2014) Conscience accounting: Emotion dynamics and social behavior. *Management Science*.

Hall JV, Krueger AB (2015) An analysis of the labor market for Uber's driver-partners in the United States. Working Paper.

Hainmueller J, Hiscox MJ (2012a) Buying green? Field experimental tests of consumer support for environmentalism. Working Paper.

Hainmueller J, Hiscox MJ (2012b) The socially conscious consumer? Field experimental tests of consumer support for fair labor standards. Working Paper.

Harrison GW, List JA (2004) Field experiments. *Journal of Economic Literature* 42(4): 1009–1055.

Henderson T, Arora N (2010) Promoting brands across categories with a social cause: Implementing effective embedded premium programs. *Journal of Marketing* 75: 41-60.

Henisz W, Dorobantu S, Nartey L (2014) Spinning gold: The financial returns to external stakeholder engagement. *Strategic Management Journal* 35:1727-1748.

Hiscox MJ, Broukhim M, Litwin C (2011) Consumer demand for fair trade: New evidence from a field experiment using eBay auctions of fresh roasted coffee. Working Paper.

Hoeffler S, Keller KL (2002). Building brand equity through corporate societal marketing. *Journal of Public Policy & Marketing* 21(1): 78–89

Hossain T, Li KK (2013) Crowding out in the labor market: A prosocial setting is necessary. *Management Science* 60(5): 1148-1160.

Hsee CK, Rottenstreich Y (2004) Music, pandas, and muggers: on the affective psychology of value. *Journal of Experimental Psychology: General* 133(1):23-30.

Hull CE, Rothenberg S (2008) Firm performance: The interactions of corporate social performance with innovation and industry differentiation. *Strategic Management Journal* 29: 781–789.

IEG (2015) Sponsorship spending report. Downloaded on March 2, 2016 from http://www.sponsorship.com/IEG/files/4e/4e525456-b2b1-4049-bd51-03d9c35ac507.pdf.

Kabra A, Belavina E, Girotra K (2015) Bike-share systems: Accessibility and availability. Working Paper.

Kahneman D, Ritov I, Schkade D (1999) Economic preferences or attitude expressions? An analysis of dollar responses to public issues. *Journal of Risk and Uncertainty* 19(1): 203-235.

Karlan D, List JA (2007) Does price matter in charitable giving? Evidence from a large-scale natural field experiment. *American Economic Review* 97(5): 1774-1793.

Kitzmueller M, Shimshack J (2012) Economic perspectives on corporate social responsibility. *Journal of Economic Literature* 50(1): 51-84.

Krishna A, Rajan U (2009) Cause marketing: Spillover effects of cause-related products in a product portfolio. *Management Science* 55(9): 1469-1485.

Lazear EP, Malmendier U, Weber RA (2012) Sorting in experiments with application to social preferences. *American Economic Journal: Applied Economics* 4(1): 136-163.

Lev B, Petrovits C, Radhakrishnan S (2010) Is doing good good for you? How corporate charitable contributions enhance revenue growth. *Strategic Management Journal* 31(2): 182–200.

Levitt S, List J (2007) What do laboratory experiments measuring social preferences tell us about the real world? *Journal of Economic Perspectives* 21:153-174.

Lichtenstein DR, Drumwright ME, Braig BM (2004) The effect of corporate social responsibility on customer donations to corporate-supported nonprofits. *Journal of Marketing* 68: 16-32.

Luo X, Bhattacharya CB (2006) Corporate social responsibility, customer satisfaction, and market value. *Journal of Marketing* 70(4): 1-18.

MSLGROUP (2014) The future of business citizenship. MSLGROUP. Downloaded on March 2, 2016 from http://www.mslgroup.com/insights/2014/the-future-of-business-citizenship.

Madsen PM, Rodgers ZJ (2015) Looking good by doing good: The antecedents and consequences of stakeholder attention to corporate disaster relief. *Strategic Management Journal* 36: 776-794.

Mazar N, Zhong CB (2010) Do green products make us better people? *Psychological Science* 21: 494-98.

Meier S (2007) A survey of economic theories and field evidence on pro-social behavior. In *Economics and Psychology: A Promising New Cross-Disciplinary Field*, ed. BS Frey and A Stutzer, 51–88.

Newman GE, Gorlin M, Dhar R (2014) When going green backfires: How firm intentions shape the evaluation of socially beneficial product enhancements. *Journal of Consumer Research* 41(3): 823-839.

Patten D (2008) Does the market value corporate philanthropy? Evidence from the response to the 2004 tsunami relief effort. *Journal of Business Ethics* 81(3): 599–607.

Porter ME, Kramer MR (2002) The competitive advantage of corporate philanthropy. *Harvard Business Review* 80(12): 56–68.

Porter ME, Kramer MR (2011) Creating shared value. *Harvard Business Review*: 62-77.

Ryzhov IO, Han B, Bradic J (2015) Cultivating disaster donors using data analytics. *Management Science*.

Sen S, Bhattacharya CB (2001) Does doing good always lead to doing better? Consumer reactions to corporate social responsibility. *Journal of Marketing Research* 38(2): 225-243

Servaes H, Tamayo A (2013) The impact of corporate social responsibility on firm value: The role of customer awareness. *Management Science* 59:1045-1061.

Shang J, Reed A, Croson R (2008) Identity congruency effects on donations. *Journal of Marketing Research* 45(3): 351-361.

Sheikh SR, Beise-Zee R (2011) Corporate social responsibility or cause-related marketing? The role of cause specificity of CSR. *Journal of Marketing Research* 28(1): 27-39.

Snir EM, Lorin MH (2003) Costly bidding in online markets for it services. *Management Science* 49(11): 1504-1520.

Solomon B (2016). Leaked: Uber's financials show huge growth, even bigger losses. Accessed at http://www.forbes.com/sites/briansolomon/2016/01/12/leaked-ubers-financials-show-huge-growth-even-bigger-losses on January 21, 2016.

Strahilevitz MA (1999) The effects of product type and donation magnitude on willingness to pay more for a charity-linked brand. *Journal of Consumer Psychology* 8(3): 215-241.

Strahilevitz MA, Myers JG (1998) Donations to charity as purchase incentives: How well they work may depend on what you are trying to sell. *Journal of Consumer Research* 24: 434-446.

Stout LA (2012). The problem of corporate purpose. *Issues in Governance Studies*.

Surroca J, Tribó JA, Waddock S (2010). Corporate responsibility and financial performance: The role of intangible resources. *Strategic Management Journal* 31(5): 463-490.

Trudel R, Cotte J (2009) Does it pay to be good? *Sloan Management Review* 50(2): 61-68.

Varadarajan PR, Menon A (1988) Cause-related marketing: A co-alignment of marketing strategy and corporate strategy and corporate philanthropy. *Journal of Marketing* 52(3): 58-74.

Wang H, Qian C (2011) Corporate philanthropy and corporate financial performance: The roles of stakeholder response and political access. *Academy of Management Journal* 54(6): 1159-1181.

White K, Peloza J (2009) Self-benefit versus other-benefit marketing appeals: Their effectiveness in generating charitable support. *Journal of Marketing* 73(4): 109-124.

Winterich KP, Barone MJ (2011) Warm glow or cold, hard cash? Social identity effects on consumer choice for donations versus discount promotions. *Journal of Marketing Research* XLVIII: 855-868.

Table 1a. Promotion codes, sample sizes and take-up rates for the three experiments

	EXPERIMENT #1				EXPERIMENT #2				EXPERIMENT #3			
	Promocode	N	Take-up	Avg fare	Promocode	N	Take-up	Avg fare	Promocode	N	Take-up	Avg fare
Charity-linked promotion:												
SGD 1	1Nepal	19,108	92 (0.48%)	SGD 17.1	1sms	28,000	62 (0.22%)	SGD 17.6	1give	50,000	242 (0.48%)	SGD 15.0
SGD 2	2sgd	19,108	129 (0.68%)	SGD 15.8								
SGD 3	Nepal3sgd	19,108	98 (0.51%)	SGD 17.7								
SGD 4	4sgd	19,108	128 (0.67%)	SGD 17.6								
SGD 5	Nepal5sgd	19,108	166 (0.87%)	SGD 17.1					5give	50,000	406 (0.81%)	SGD 15.8
SGD 7					7sms	28,000	126 (0.45%)	SGD 19.1				
SGD 10									10give	20,000	190 (0.95%)	SGD 16.2
Discount-based promotion:												
SGD 1					1off	8,000	204 (2.55%)	SGD 17.5	1off	50,000	1,734 (3.47%)	SGD 15.1
SGD 5									5off	5,000	468 (9.36%)	SGD 15.8
SGD 10									10off	2,500	311 (12.44%)	SGD 17.1
No promotion (controls):												
SMS without promocode	NONE	19,107			NONE	28,000			NONE	50,000		
No SMS at all	NONE	53,857			NONE	53,857			NONE	33,004		
Total sample size		**168,504**	**613**			**145,857**	**392**			**260,504**	**3,351**	

Table 1b. Summary statistics for the customer sample

	EXPERIMENT #1			EXPERIMENT #2			EXPERIMENT #3		
	N	Mean	Std Dev	N	Mean	Std Dev	N	Mean	Std Dev
All customers in the sample									
customer tenure	168,504	0.52	0.38	145,857	0.55	0.38	260,504	0.89	0.38
booking history	168,504	12.3	21.8	145,857	13.1	22.0	260,504	27.2	44.0
promotion history	168,504	0.13	0.92	145,857	0.15	0.98	260,504	1.31	5.06
apple device	168,504	0.58	0.49	145,857	0.58	0.49	260,504	0.58	0.49
average taxi bookings per day	168,504	0.09	0.19	145,857	0.08	0.17	260,504	0.09	0.21
average taxi fare (SGD)	88,823	17.4	7.0	73,389	17.6	25.5	119,678	16.6	28.2
Customers taking up a promotion									
customer tenure	613	0.57	0.39	392	0.64	0.41	3,351	0.95	0.39
booking history	613	29.7	37.4	392	27.1	33.4	3,351	61.2	63.1
promotion history	613	0.54	2.31	392	0.52	2.36	3,351	6.27	11.45
apple device	613	0.67	0.47	392	0.68	0.47	3,351	0.66	0.47
average taxi bookings per day	613	0.30	0.29	392	0.26	0.26	3,351	0.35	0.34
average taxi fare (SGD)	613	16.9	5.3	392	18.0	6.0	3,351	15.4	5.7

Table 2. Logistic regression analysis for likelihood of a customer taking up a promotion

	EXPERIMENT #1	EXPERIMENT #2	EXPERIMENT #3
	(1)	(2)	(3)
Experiment #1 Subgroup Indicator:			
i_1Nepal (SGD 1 to Nepal relief)	[Omitted]		
i_2sgd (SGD 2 to Nepal relief)	0.3349*		
	(0.1376)		
i_Nepal3sgd (SGD 3 to Nepal relief)	0.0780		
	(0.1461)		
i_4sgd (SGD 4 to Nepal relief)	0.3417*		
	(0.1377)		
i_Nepal5sgd (SGD 5 to Nepal relief)	0.6110**		
	(0.1311)		
Experiment #2 Subgroup Indicator:			
i_1sms (SGD 1 to Nepal relief)		[Omitted]	
i_7sms (SGD 7 to Nepal relief)		0.7317**	
		(0.1559)	
i_1off (SGD 1 discount)		2.5052**	
		(0.1465)	
Experiment #3 Subgroup Indicator:			
i_1give (SGD 1 to Singapore Cancer Society)			[Omitted]
i_5give (SGD 5 to Singapore Cancer Society)			0.5289**
			(0.0831)
i_10give (SGD 10 to Singapore Cancer Society)			0.6758**
			(0.0996)
i_1off (SGD 1 discount)			2.0791**
			(0.0704)
i_5off (SGD 5 discount)			3.1991**
			(0.0828)
i_10off (SGD 10 discount)			3.5179**
			(0.0908)
customer tenure	-0.0577	0.3563**	0.1534**
	(0.1131)	(0.1373)	(0.0483)
booking history	0.0153**	0.0122**	0.0072**
	(0.0009)	(0.0013)	(0.0003)
promotion history	0.0597**	0.0837**	0.0459**
	(0.0150)	(0.0200)	(0.0017)
apple device	0.2932**	0.3895**	0.2530**
	(0.0873)	(0.1102)	(0.0382)
Constant	-5.7859**	-6.8314**	-6.0957**
	(0.1334)	(0.1688)	(0.0831)
Observations	95,539	64,000	177,499
Log likelihood	-3571.23	-2132.57	-13983.71
LR chi-squared	269.57**	511.22**	5275.88**

Notes: The unit of analysis is the customer, with the dependent variable being an indicator for whether or not a customer took up a promotion by using the promotion code received (via SMS) to book a taxi ride within the five-day promotion period. Logistic regressions are employed. The indicator variables starting with "*i_*" under exact experiment refer to the respective promotion codes as per Table 1. The indicator variable "*i_DISCOUNT*" takes the value of 1 just for the subgroups getting the discount-based promotional message for each of the three experiments. The sample only includes the customers sent a promotion code in the respective field experiment. (** $p < 0.01$, * $p < 0.05$, + $p < 0.1$)

Table 3a. Average daily bookings for customers taking up their promotion code

	EXPERIMENT #1				EXPERIMENT #2				EXPERIMENT #3			
	Promocode	Pre-Promo	During-Promo	Post-Promo	Promocode	Pre-Promo	During-Promo	Post-Promo	Promocode	Pre-Promo	During-Promo	Post-Promo
Charity-linked promotion:												
SGD 1	1Nepal	0.378	0.528	0.346	1sms	0.308	0.526	0.287	1give	0.400	0.575	0.388
SGD 2	2sgd	0.226	0.453	0.239								
SGD 3	Nepal3sgd	0.315	0.500	0.289								
SGD 4	4sgd	0.262	0.439	0.235								
SGD 5	Nepal5sgd	0.238	0.408	0.234					5give	0.330	0.574	0.336
SGD 7					7sms	0.221	0.425	0.229				
SGD 10									10give	0.335	0.547	0.357
Discount-based promotion:												
SGD 1					1off	0.219	0.414	0.224	1off	0.328	0.543	0.333
SGD 5									5off	0.270	0.495	0.279
SGD 10									10off	0.249	0.438	0.263
No promotion (controls):												
SMS without promocode	NONE	0.093	0.095	0.087	NONE	0.088	0.088	0.078	NONE	0.101	0.108	0.098
No SMS at all	NONE	0.090	0.090	0.082	NONE	0.087	0.086	0.076	NONE	0.104	0.112	0.100

Table 3b. Average daily bookings for customers choosing not to take up their promotion code

	EXPERIMENT #1				EXPERIMENT #2				EXPERIMENT #3			
	Promocode	Pre-Promo	During-Promo	Post-Promo	Promocode	Pre-Promo	During-Promo	Post-Promo	Promocode	Pre-Promo	During-Promo	Post-Promo
Charity-linked promotion:												
SGD 1	1Nepal	0.090	0.089	0.083	1sms	0.089	0.089	0.079	1give	0.090	0.096	0.087
SGD 2	2sgd	0.091	0.090	0.082								
SGD 3	Nepal3sgd	0.090	0.090	0.084								
SGD 4	4sgd	0.092	0.092	0.085								
SGD 5	Nepal5sgd	0.088	0.089	0.082					5give	0.087	0.093	0.085
SGD 7					7sms	0.086	0.085	0.074				
SGD 10									10give	0.089	0.095	0.086
Discount-based promotion:												
SGD 1					1off	0.082	0.074	0.071	1off	0.083	0.088	0.080
SGD 5									5off	0.068	0.066	0.065
SGD 10									10off	0.072	0.070	0.068
No promotion (controls):												
SMS without promocode	NONE	0.093	0.095	0.087	NONE	0.088	0.088	0.078	NONE	0.101	0.108	0.098
No SMS at all	NONE	0.090	0.090	0.082	NONE	0.087	0.086	0.076	NONE	0.104	0.112	0.100

Table 4. Regression analysis using panel data on daily taxi booking

	EXPERIMENT #1				EXPERIMENT #2				EXPERIMENT #3			
Customer Sample:	Customers Taking Up Promo		Not Taking Promo	All Customers	Customers Taking Up Promo		Not Taking Promo	All Customers	Customers Taking Up Promo		Not Taking Promo	All Customers
Daily Taxi Bookings Considered:	All Bookings	Non-Promo	Non-Promo	All Bookings	All Bookings	Non-Promo	Non-Promo	All Bookings	All Bookings	Non-Promo	Non-Promo	All Bookings
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
DURING_CHARITY	0.1855**	-0.0145	-0.0004	0.0008	0.2095**	0.0095	0.0005	0.0012	0.2097**	0.0081	-0.0009	0.0006
	(0.0118)	(0.0118)	(0.0010)	(0.0010)	(0.0203)	(0.0203)	(0.0010)	(0.0010)	(0.0122)	(0.0122)	(0.0012)	(0.0012)
DURING_DISCOUNT					0.1956**	-0.0044	-0.0068**	-0.0016	0.2059**	0.0035	-0.0033**	0.0058**
					(0.0175)	(0.0175)	(0.0020)	(0.0020)	(0.0064)	(0.0064)	(0.0012)	(0.0013)
DURING_NOCODE	0.0020	0.0020	0.0020	0.0020	0.0004	0.0004	0.0004	0.0004	-0.0014	-0.0014	-0.0014	-0.0014
	(0.0015)	(0.0015)	(0.0015)	(0.0015)	(0.0013)	(0.0013)	(0.0013)	(0.0013)	(0.0013)	(0.0013)	(0.0013)	(0.0013)
POST_CHARITY	-0.0024	-0.0024	0.0006	0.0006	0.0086	0.0086	-0.0006	-0.0006	0.0056	0.0056	0.0006	0.0006
	(0.0101)	(0.0101)	(0.0008)	(0.0008)	(0.0161)	(0.0161)	(0.0009)	(0.0009)	(0.0099)	(0.0099)	(0.0010)	(0.0010)
POST_DISCOUNT					0.0151	0.0151	-0.0002	0.0002	0.0095+	0.0095+	0.0003	0.0007
					(0.0160)	(0.0160)	(0.0017)	(0.0017)	(0.0056)	(0.0056)	(0.0011)	(0.0011)
POST_NOCODE	0.0015	0.0015	0.0015	0.0015	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003
	(0.0013)	(0.0013)	(0.0013)	(0.0013)	(0.0011)	(0.0011)	(0.0011)	(0.0011)	(0.0011)	(0.0011)	(0.0011)	(0.0011)
i_1Nepal (SGD 1 to Nepal relief)	0.1172**	0.1172**	-0.0009	-0.0004								
	(0.0241)	(0.0241)	(0.0011)	(0.0011)								
i_2sgd (SGD 2 to Nepal relief)	0.0474**	0.0474**	-0.0016	-0.0013								
	(0.0158)	(0.0158)	(0.0011)	(0.0011)								
i_Nepal3sgd (SGD 3 to Nepal relief)	0.0883**	0.0883**	-0.0011	-0.0007								
	(0.0251)	(0.0251)	(0.0012)	(0.0012)								
i_4sgd (SGD 4 to Nepal relief)	0.0723**	0.0723**	0.0010	0.0015								
	(0.0154)	(0.0154)	(0.0012)	(0.0012)								
i_Nepal5sgd (SGD 5 to Nepal relief)	0.0661**	0.0661**	-0.0005	0.0001								
	(0.0144)	(0.0144)	(0.0011)	(0.0011)								
i_1sms (SGD 1 to Nepal relief)					0.0760*	0.0760*	0.0020+	0.0021*				
					(0.0305)	(0.0305)	(0.0010)	(0.0010)				
i_7sms (SGD 7 to Nepal relief)					0.0602**	0.0602**	-0.0008	-0.0005				
					(0.0180)	(0.0180)	(0.0010)	(0.0010)				
i_1off (SGD 1 discount)					0.0772**	0.0772**	-0.0015	0.0005				
					(0.0156)	(0.0156)	(0.0017)	(0.0017)				
i_1give (SGD 1 to cancer charity)									0.1426**	0.1427**	-0.0004	0.0003
									(0.0183)	(0.0183)	(0.0011)	(0.0011)
i_5give (SGD 5 to cancer charity)									0.1096**	0.1095**	-0.0017	-0.0007
									(0.0137)	(0.0137)	(0.0011)	(0.0011)
i_10give (SGD 10 to cancer charity)									0.1123**	0.1124**	-0.0020	-0.0008
									(0.0189)	(0.0189)	(0.0014)	(0.0014)
i_1off (SGD 1 discount)									0.1006**	0.1006**	-0.0033**	-0.0000
									(0.0067)	(0.0067)	(0.0011)	(0.0011)
i_5off (SGD 5 discount)									0.0803**	0.0804**	-0.0121**	-0.0015
									(0.0116)	(0.0116)	(0.0019)	(0.0021)
i_10off (SGD 10 discount)									0.0774**	0.0774**	-0.0108**	0.0031
									(0.0135)	(0.0135)	(0.0028)	(0.0031)
i_NOCODE	0.0007	0.0007	0.0006	0.0006	0.0004	0.0004	0.0004	0.0004	-0.0003	-0.0003	-0.0003	-0.0003
	(0.0012)	(0.0012)	(0.0012)	(0.0012)	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0011)	(0.0011)	(0.0011)	(0.0011)
customer tenure	-0.0443**	-0.0443**	-0.0482**	-0.0484**	-0.0400**	-0.0400**	-0.0405**	-0.0406**	-0.0240**	-0.0240**	-0.0238**	-0.0241**
	(0.0015)	(0.0015)	(0.0045)	(0.0044)	(0.0022)	(0.0022)	(0.0015)	(0.0015)	(0.0016)	(0.0016)	(0.0015)	(0.0014)
booking history	0.0061**	0.0061**	0.0064**	0.0064**	0.0055**	0.0055**	0.0056**	0.0056**	0.0032**	0.0032**	0.0032**	0.0032**
	(0.0001)	(0.0001)	(0.0003)	(0.0003)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0000)	(0.0000)	(0.0001)	(0.0001)
promotion history	0.0018	0.0018	0.0022+	0.0024*	0.0034**	0.0034**	0.0032**	0.0034**	0.0043**	0.0043**	0.0040**	0.0042**
	(0.0011)	(0.0011)	(0.0012)	(0.0012)	(0.0010)	(0.0010)	(0.0007)	(0.0007)	(0.0003)	(0.0003)	(0.0002)	(0.0002)
apple device	0.0055**	0.0055**	0.0029**	0.0030**	0.0037**	0.0037**	0.0037**	0.0038**	-0.0008	-0.0008	-0.0003	0.0000
	(0.0009)	(0.0009)	(0.0010)	(0.0010)	(0.0009)	(0.0009)	(0.0007)	(0.0007)	(0.0010)	(0.0010)	(0.0006)	(0.0006)
Observations	2,411,928	2,411,928	5,504,253	5,524,282	2,712,382	2,712,382	4,797,230	4,810,163	2,849,715	2,849,715	8,486,049	8,596,632
R-squared	0.130	0.130	0.150	0.151	0.129	0.128	0.127	0.127	0.167	0.163	0.158	0.160

Notes: The unit of analysis in this table is the customer-day (see Figure 1). The dependent variable is the number of bookings made by a customer on the given day. Linear regressions are employed, with calendar date fixed effects and robust standard errors clustered on passenger id. All analyses include the two control groups from Table 1. (** $p < 0.01$, * $p < 0.05$, + $p < 0.1$)

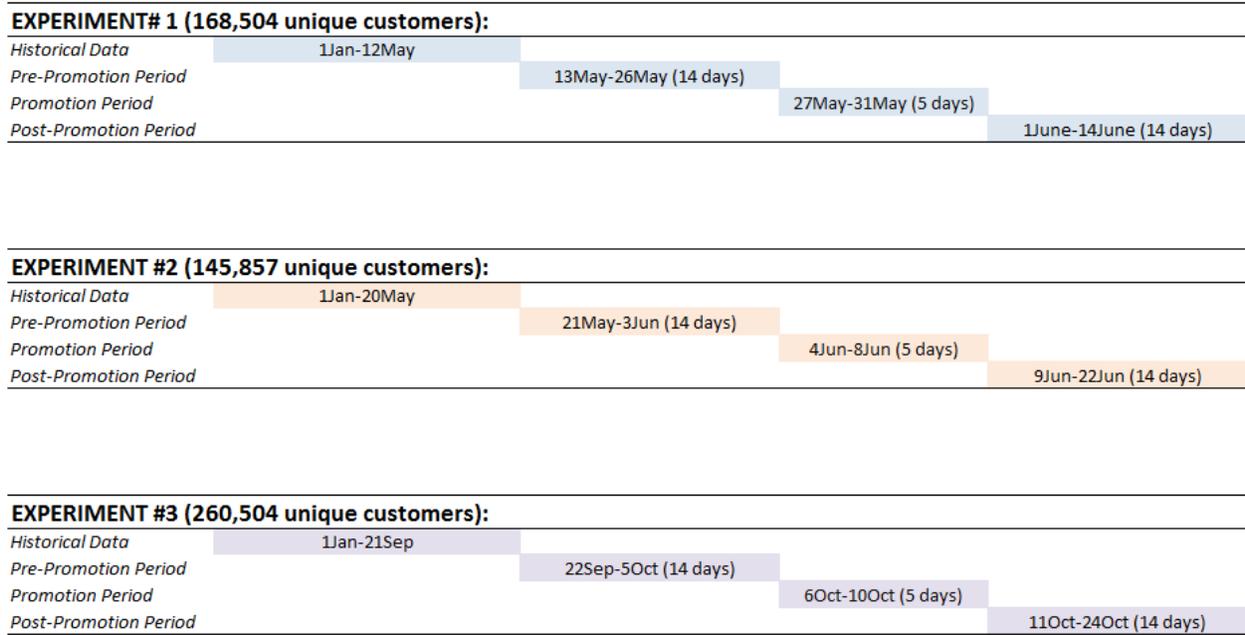**Figure 1. Construction of panel data on daily taxi booking**

EXPERIMENT# 1 (168,504 unique customers):

Historical Data	1Jan-12May
Pre-Promotion Period	13May-26May (14 days)
Promotion Period	27May-31May (5 days)
Post-Promotion Period	1June-14June (14 days)

EXPERIMENT #2 (145,857 unique customers):

Historical Data	1Jan-20May
Pre-Promotion Period	21May-3Jun (14 days)
Promotion Period	4Jun-8Jun (5 days)
Post-Promotion Period	9Jun-22Jun (14 days)

EXPERIMENT #3 (260,504 unique customers):

Historical Data	1Jan-21Sep
Pre-Promotion Period	22Sep-5Oct (14 days)
Promotion Period	6Oct-10Oct (5 days)
Post-Promotion Period	11Oct-24Oct (14 days)

Figure 2a. Promotion take-up rates: Experiment 1
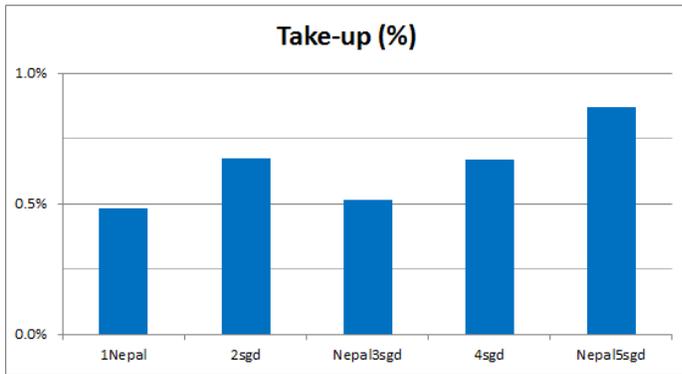
Figure 2b. Promotion take-up rates: Experiment 2
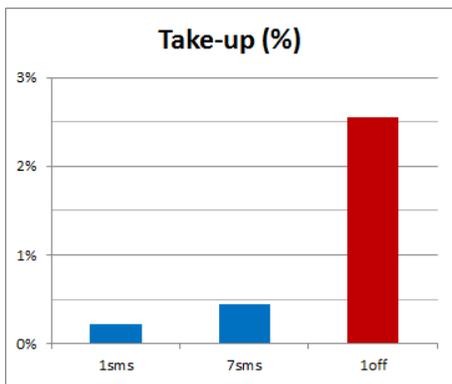

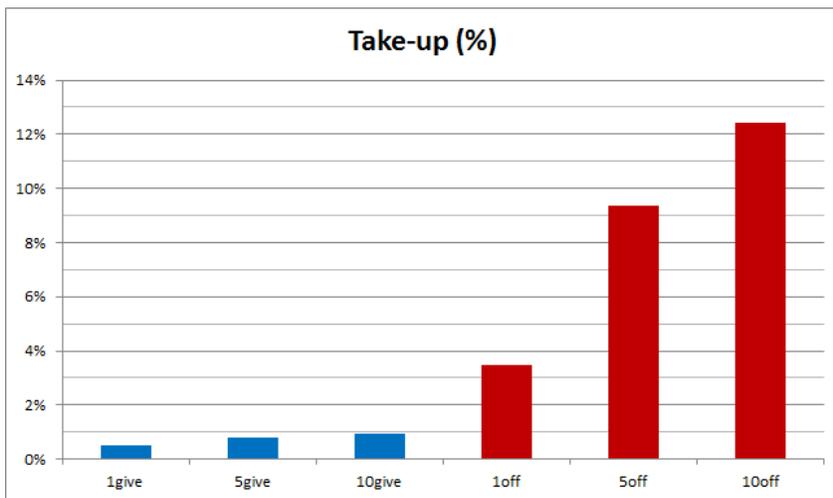**Figure 2c. Promotion take-up rates: Experiment 3**

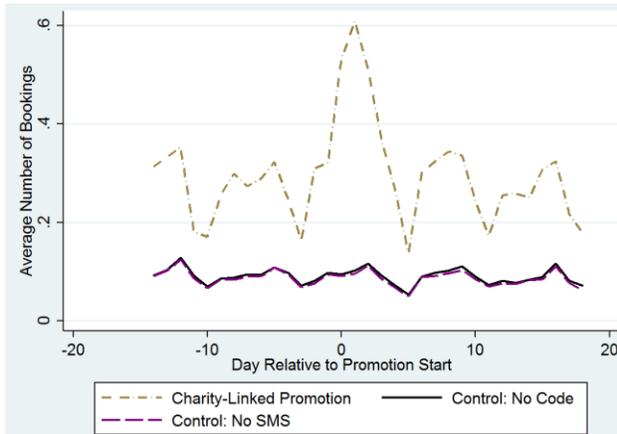**Figure 3a. Daily taxi booking pattern for customers taking up promotions: Experiment 1**

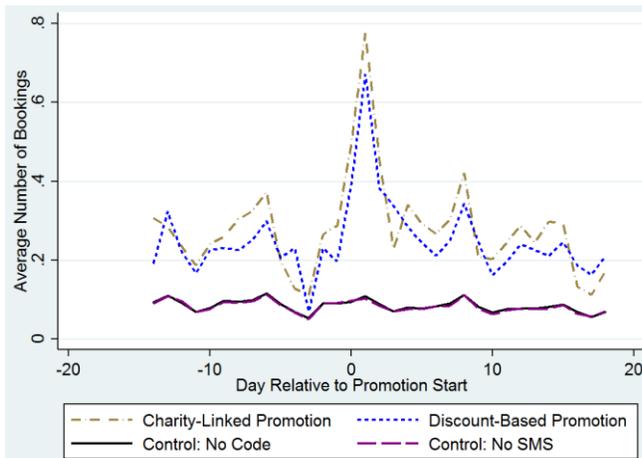**Figure 3b. Daily taxi booking pattern for customers taking up promotions: Experiment 2**
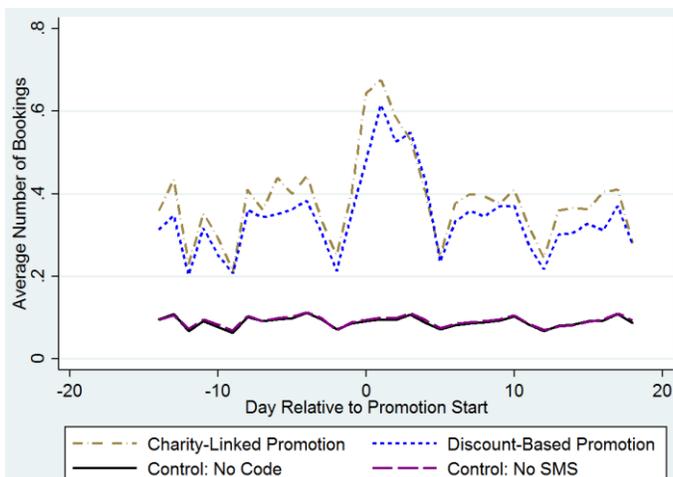

Figure 3c. Daily taxi booking pattern for customers taking up promotions: Experiment 3

ONLINE APPENDIX

Table A-1a. Exact text for customer promotions: Experiment 1

1Nepal

Key in promo code: **1Nepal** and [company name] will donate 1 SGD to Nepal.

[company name] will donate 1 SGD from your next ride booked through our app to aid earthquake relief efforts in Nepal. Book a ride to aid Nepal!

Promo ends 31 May and good for one-time use only.

2sgd

Key in promo code: **2sgd** and [company name] will donate 2 SGD to Nepal.

[company name] will donate 2 SGD from your next ride booked through our app to aid earthquake relief efforts in Nepal. Book a ride to aid Nepal!

Promo ends 31 May and good for one-time use only.

Nepal3sgd

Key in promo code: **Nepal3sgd** and [company name] will donate 3 SGD to Nepal.

[company name] will donate 3 SGD from your next ride booked through our app to aid earthquake relief efforts in Nepal. Book a ride to aid Nepal!

Promo ends 31 May and good for one-time use only.

4sgd

Key in promo code: **4sgd** and [company name] will donate 4 SGD to Nepal.

[company name] will donate 4 SGD from your next ride booked through our app to aid earthquake relief efforts in Nepal. Book a ride to aid Nepal!

Promo ends 31 May and good for one-time use only.

Nepal5sgd

Key in promo code: **Nepal5sgd** and [company name] will donate 5 SGD to Nepal.

[company name] will donate 5 SGD from your next ride booked through our app to aid earthquake relief efforts in Nepal. Book a ride to aid Nepal!

Promo ends 31 May and good for one-time use only.

No Code

[company name] offers safety, speed & certainty to bring you to your destination with just a few taps. What are you waiting for? Book your ride now!

Table A-1b. Exact text for customer promotions: Experiment 2

<u>**1sms**</u>

Key in promo code: **1sms** and [company name] will donate 1 SGD to Nepal.

[company name] will donate 1 SGD from your next ride booked through our app to aid earthquake relief efforts in Nepal. Book a ride to aid Nepal!

Promo ends 8 June and good for one-time use only.

<u>**7sms**</u>

Key in promo code: **7sms** and [company name] will donate 7 SGD to Nepal.

[company name] will donate 7 SGD from your next ride booked through our app to aid earthquake relief efforts in Nepal. Book a ride to aid Nepal!

Promo ends 8 June and good for one-time use only.

<u>**1off**</u>

Key in promo code: **1off** and receive 1 SGD off your next ride.

[company name] offers safety, speed & certainty to bring you to your destination with just a few taps. What are you waiting for? Book your ride now!

Promo ends 8 June and good for one-time use only.

<u>**No Code**</u>

[company name] offers safety, speed & certainty to bring you to your destination with just a few taps. What are you waiting for? Book your ride now!

Table A-1c. Exact text for customer promotions: Experiment 3

<u>1give</u>

Key in promo code: **1give** for your next booking through our app and [company name] will donate 1 SGD to the Singapore Cancer Society (promo ends 11 Oct).

[company name] offers safety, speed & certainty to bring you to your destination with just a few taps. What are you waiting for? Book your ride now!

<u>5give</u>

Key in promo code: **5give** for your next booking through our app and [company name] will donate 5 SGD to the Singapore Cancer Society (promo ends 11 Oct).

[company name] offers safety, speed & certainty to bring you to your destination with just a few taps. What are you waiting for? Book your ride now!

<u>10give</u>

Key in promo code: **10give** for your next booking through our app and [company name] will donate 10 SGD to the Singapore Cancer Society (promo ends 11 Oct).

[company name] offers safety, speed & certainty to bring you to your destination with just a few taps. What are you waiting for? Book your ride now!

<u>1off</u>

Key in promo code: **1off** for your next booking through our app and [company name] will give you 1 SGD off for that ride (promo ends 11 Oct).

[company name] offers safety, speed & certainty to bring you to your destination with just a few taps. What are you waiting for? Book your ride now!

<u>5off</u>

Key in promo code: **5off** for your next booking through our app and [company name] will give you up to 5 SGD off for that ride (promo ends 11 Oct).

[company name] offers safety, speed & certainty to bring you to your destination with just a few taps. What are you waiting for? Book your ride now!

<u>10off</u>

Key in promo code: **10off** for your next booking through our app and [company name] will give you up to 10 SGD off for that ride (promo ends 11 Oct).

[company name] offers safety, speed & certainty to bring you to your destination with just a few taps. What are you waiting for? Book your ride now!

<u>No Code</u>

[company name] offers safety, speed & certainty to bring you to your destination with just a few taps. What are you waiting for? Book your ride now!