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Seasonal Social Preferences

BY

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Seasonal Social Preferences

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Abstract

Christmas is when people are expected to act selflessly for the well-being of others, but are people actually more *altruistic* at this time of the year? Responding to this question poses a challenge because of the confounding factors of charitable tax breaks, reciprocity motives, direct social pressure and persuasive campaigns for giving that are more prevalent in December. In this paper, I use a unique solicitation situation where these factors are eliminated. Using nine years of data and more than 50 million individual giving decisions, I provide three main results. First, the month of December is associated with an 18 percent increase in the proportion of donors, thereby providing strong support to the notion of seasonal social preferences. Second, exploiting a reform that changed the price of giving, I find that this December effect is equivalent to a 42 percent discount on charitable giving. Finally, half of the December increase in generosity persists into January before returning to the baseline in February.

JEL-codes: C33; D03; D64; H41; Z10

Keywords: Altruism; Charitable giving; Christmas; Social preferences

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I have always thought of Christmas time, when it has come round, as a good time; a kind, forgiving, charitable time; the only time I know of, in the long calendar of the year, when men and women seem by one consent to open their shut-up hearts freely, and to think of people below them as if they really were fellow passengers to the grave, and not another race of creatures bound on other journeys.

Charles Dickens

1 Introduction

Charitable giving in the United States corresponds to two percent of the gross domestic product (Andreoni, 2006) — equivalent to some 360 billion USD in 2016. A noteworthy fact is that a considerable share of this amount is given in December, the last month of the calendar year. For example, a survey of 101 different charity organizations reveals that they receive, on average, 40 percent of their annual contributions in the period from Thanksgiving to New Year (Charity Navigator, 2015). Similarly, a report by the Network for Good, a platform for online giving used by more than 45,000 nonprofits, shows that 31 percent of all charitable giving takes place in December and that 12 percent is given in the last three days of the year (Stein, 2015). What can possibly explain this huge surge in charitable giving at the end of the year? In this paper, I seek to understand whether people, evincing the Christmas spirit highlighted in the Charles Dickens quote, actually do become more *altruistic* in December.

Altruism — actions that are costly to the individual but that benefit other person(s) without the expectation of reciprocity or compensation in return — is a key concept in the social preference literature and has been extensively studied by economists (Becker, 1976; Andreoni, 1989, 1990; Simon, 1993). Of particular interest is altruism towards strangers (e.g., charitable giving), which is considered a deeply human trait that may be hardwired into our brains (Christov-Moore, Sugiyama, Grigaityte, and Iacoboni, 2017). However, Shariff and Norenzayan (2007) argue that religion, broadly defined, played a key role in expanding our circle of cooperation to unrelated strangers. Christmas is the most widespread religious event targeting pro-sociality.[1] A direct test on whether and to what extent an institution such as Christmas

[1]Christmas is a formal public holiday in all countries of the world except: Afghanistan, Algeria, Azerbaijan, Bahrain, Bhutan, Cambodia, China, Comoros, Iran, Israel, Japan, Kuwait, Laos, Libya, Maldives, Mauritania, Mongolia, Morocco, North Korea, Oman, Pakistan, Qatar, Sahrawi Arab Democratic Republic, Saudi Arabia, Somalia, Tajikistan, Thailand, Tunisia, Turkey, Turkmenistan, United Arab Emirates, Uzbekistan, Vietnam, and

shape social preferences can therefore provide important insights into the cultural underpinnings of human altruism (Fehr and Fischbacher, 2003).

To answer this research question, we need to go beyond the aggregate data available because there are (at least) three reasons to expect more charitable giving in December — even without a change in the level of altruism.

First, in most countries, including the United States, there is a tax deduction for donations to qualified charity organizations. Thus, for tax purposes, it makes sense to postpone giving until the end of the year, because people will have a better understanding of their annual income. As the wealthy typically gain more from tax planning, it is not very surprising that December 31 is the day of the year with the highest average level of donations (Stein, 2015).

Second, the increase in charitable giving in December may reflect reciprocal motives, rather than purely an increase in altruism. Gift exchange is a cornerstone of modern Christmas celebrations, and end-of-year giving is bound to partly reflect this tradition. In fact, two-thirds of all gifts in the United States are for religious or educational purposes (List, 2011) — causes where individuals have a vested interest and may want to return a favor.

Third, we are likely to observe more total giving in December simply because people are exposed to more giving opportunities, or possibly because solicitors excerpt more social pressure in the holiday season (Andreoni, Rao, and Trachtman, 2011; DellaVigna, List, and Malmendier, 2012). These are clearly supply-side factors, whereas altruism would imply a shift in the demand for giving.

To investigate whether people become more altruistic in December, I analyze data from more than 50 million individual giving decisions from 2006 to 2014, where we can exclude these potential confounding effects. More specifically, I make use of the situation faced by recyclers in a large Swedish supermarket chain.[2] When customers of this chain recycle their cans and bottles, they have to make a choice: whether to keep the money or donate it to a well-known charity organization concerned with foreign aid. The choice is made by pressing one of two buttons placed side by side on the recycling machine. In effect, this means that the decision problem mimics the nonstrategic situation featured in dictator games, which makes it very suitable for studying altruistic preferences.

For the purpose of identifying seasonal variation in altruism, there are several features that

Yemen.

[2]This setting has previously been exploited for research purposes (see, e.g., Ekström, 2012 and Knutsson, Martinsson, and Wollbrant, 2013)

are particularly important to note. First, monetary incentives for giving, including tax breaks, are completely absent. Second, there is no interrelationship between the donor and the cause of the charity — foreign aid — which rules out a reciprocity motive. Third, the solicitation situation is anonymous, impersonal, and exposes the set of potential donors to the same (minimal) social pressure throughout the year. In sum, the decision environment allows for a direct test of whether people are more altruistic in December.

There are three main findings from the analysis.

First, in December each year, the donor rate increases by 18 percent. December is therefore, far and away, the month with the largest share of donors. This result is robust to the inclusion of store and year fixed effects, and neither the number nor the composition of customers can explain this seasonal pattern. Thus, I find strong support for an end-of-year boost in altruism — which I refer to as seasonal social preferences.

Second, I estimate that the end-of-year increase in altruism is equivalent to a 42 percent discount on the cost of giving. To undertake the comparison, I exploit a feature whereby the cost of giving changed dramatically. As a consequence of the abandonment of the 50 öre coin in Sweden in 2010, the deposit on aluminum cans increased from SEK 0.50 to SEK 1.00. I show that the reform mechanically increased the endowment people brought to the store by 35 percent, which in turn decreased the donor rate by 15 percent. Thus, in this setting, there is a clear negative relationship between stake size and the probability to donate.[3] Based on the effect of the price change, back-of-the-envelope calculations suggest that it would require a 42 percent discount to the cost of giving to generate the same level of generosity as the month of December.

Third, I observe persistence in altruism, as January is the month with the second-highest donor rate. In fact, half of the increase in giving experienced in December remains in January. This finding resonates with another quote by Charles Dickens: "I will honor Christmas in my heart, and try to keep it all the year". Unfortunately, people were not able to hold on to the sprit for very long, as the donor rate returned to its baseline in February.

The current study adds to a large literature devoted to the malleability of prosocial behavior, which is of fundamental interest to our understanding of human cooperation.[4] In particular,

[3]There is an ongoing debate on the relationship between stake size and allocation decisions in redistributive games (see, e.g., Andersen, Ertac, Gneezy, Hoffman, and List, 2011).

[4]See, for example, Hoffman, McCabe, Shachat, and Smith (1994); Hoffman, McCabe, and Smith (1996); Henrich, Boyd, Bowles, Camerer, Fehr, Gintis, and McElreath (2001); Andreoni and Petrie (2004); Rege and

it connects to recent laboratory experiments showing that altruism is partly shaped by social norms, i.e., expectations about what others would do in a similar situation (Falk, Fischbacher, and Gächter, 2013; Krupka and Weber, 2013). Intimately linked to Christmas is a social norm of generosity (Restad, 1996). Therefore, a plausible interpretation of my findings is that people become more generous in December because they expect, for good reason, that other people also are more generous. As people are willing to follow the norm in solitude, presumably because of the positive emotions adherence produces, the norm is self-sustaining (Elster, 1989; López-Pérez, 2008).

This paper also adds to the recent literature on how macro-level events affect altruistic preferences. Fisman, Jakiela, and Kariv (2015) investigate how the Great Recession affected attitudes toward redistribution among college students, while Kim, Choi, Lee, Lee, and Choi (Forthcoming) examine whether the division of Korea into North and South altered the social preferences of each country's citizens. The event studied in this paper — Christmas — differs in that it recurs regularly and primarily affects social norms, not economic conditions.

The current investigation also relates to the work by Adam Greenberg, yet fundamentally differs. Greenberg (2014) shows that regular customers in a restaurant tip more during the two weeks surrounding Christmas, which he attributes to two prosocial norms (generosity in the holiday season and tipping in restaurants) being complements as opposed to substitutes. This paper differs in that I seek to verify if people are more generous (i.e. altruistic) during Christmas, not simply assume it is the case. Furthermore, we cannot infer that regular patrons tip more during Christmas because of a surge in altruism *per se*. As in the aggregate data on charitable giving, this effect could be driven by, for example, reciprocity motives towards the waitstaff or changes in the level of service.

The remainder of the paper is organized as follows. Section 2 describes the institutional setting in greater detail. Section 3 provides an overview of the data. Section 4 details the results and the robustness tests. Section 5 concludes by discussing potential implications of the results and avenues for further research.

Telle (2004); Soetevent (2005); Dana, Weber, and Kuang (2007); List (2007); Bardsley (2008).

2 The Setting

In the current study I exploit a situation faced by recycling customers in the Swedish supermarket chain, Coop, to identify social preferences. In Section 2.1, I explain the situation in more detail and why it is suitable for testing the research hypothesis. In Section 2.2, I describe an important institutional change that occurred in the period of analysis.

2.1 The Solicitation Procedure

In 1984, Sweden adopted a mandatory deposit system for cans and bottles that enabled citizens to deposit used containers, in exchange for refunds, in recycling machines located at most grocery stores and supermarkets. Twenty years later, in 2004, the second-largest retail chain in Sweden, Coop, began to gradually add an additional button on its new recycling machines. The new button provided an opportunity to donate the refund to a charity organization called We Effect. Figure 1 illustrates an example of a recycling machine with the two buttons, where the yellow button is the "Aid button" and the green button is the "Refund button". Hence, after recycling their cans and bottles, Coop customers now have to choose one of two actions — retain the refund money themselves or donate the entire amount to charity.

Figure 1 [About here]

The situation described has three attractive features to convincingly approach the question of seasonal social preferences. First, the anonymous and impersonal solicitation method exposes potential donors to the same amount of pressure throughout the year. This is certainly not the case in general as charity organizations often have special campaigns during the holiday season. Second, there is no motive for reciprocity. Gift exchange is common in modern Christmas celebrations, which suggests that people may be more generous at that time of the year. But in any exchange, there is an implicit reciprocity motive, which is certainly something else than unconditional altruism. As the charity is focused on foreign aid, there is no mutual relationship between the donor and recipients, thereby effectively canceling out the effect of reciprocity. Third, prior to 2012, Sweden did not provide any tax incentives for charitable giving. Thus, I have six years of data where monetary incentives for giving are completely absent. Moreover, the tax incentives introduced in 2012 require that each donation exceed SEK 200 to qualify for deduction, which in practice prevents the reform from having any effect on the

decision I study (the average recycled amount in my sample is SEK 19). In addition, it is worth pointing out that recycling in Sweden is far from a marginal activity. In evidence, a survey conducted by the market research firm SIFO reports that end-consumers recycle 90 percent of all cans and bottles (Lundin and Raaschou, 2007). Hence, recycling in Sweden is common and something most citizens do. In combination with the fact that Coop has a market share of 22 percent, the situation I study is likely to capture a fairly representative sample of the Swedish population.

2.2 A Price Change

At the beginning of the sample period (January 2006), the deposit was SEK 0.50 on cans, SEK 1.00 on small bottles, and SEK 2.00 on large bottles.[5] However, as of September 15, 2010, the deposit on cans increased, for the first time in 23 years, from SEK 0.50 to SEK 1.00. In the transition period, cans with both the larger and smaller deposits remained in circulation, but from September 2011, only cans with the new higher deposit were sold in stores. Given that 90 percent of all cans and bottles were already recycled, it may seem unwarranted to increase the monetary incentives. The more important motive for the price change was the discontinuation of the SEK 0.50 coin enforced in September 2010. In the analysis, I will use this reform to test if stakes matter for charitable giving, and thereby quantify the December effect in monetary terms.

3 Data

The data I will use was collected by Tomra, the recycling machine manufacturer. The final data set is a monthly panel that spans 104 months and 374 stores. For each store and month I have information about the number of recycling customers (*recyclers*), the number of customers that donate their funds (*donors*), the total recycled amount (*amount*), and the amount donated (*donated amount*). By dividing donors by recyclers, we obtain the main outcome variable — the *donor rate*.

Table 1 provides summary statistics by store and month. On average, a store attracts about 1,800 recyclers per month, from which 140 (or 7.7 percent) decide to donate their refund to the

[5]The deposit is paid by the consumer at the time of purchase and is refunded if the container is returned to a recycling machine.

charity. To illustrate the extent of store heterogeneity in the data, Figure 2 plots the relationship between the mean number of recycling customers and the mean donor rate, where each dot corresponds to one store in the sample. Although a large fraction of stores cluster around an average of 1,000 customers per month and a donor rate of five percent, there is large variation in both dimensions. For example, there are stores with an average donor rate of 20 percent, and stores with close to 8,000 recycling customers in an average month. The figure also reveals the absence of a relationship between the two variables ($p = 0.593$).

Table 1 [About here]

Figure 2 [About here]

It should be noted that the raw data set contained some inconsistencies, mainly attributable to the data collection process. At the end of each month, Tomra connects to the recycling machines, over wire, to obtain reports on the accumulated figures for each machine at that specific point in time. Based on the accumulated figures, Tomra calculates the monthly statistics by taking the difference between the most recent report and the report one month earlier. In most cases, this procedure works perfectly, but if the connection fails, it has important consequences. First, the current month's statistics are reported as zeroes as the accumulated figures are the same as the month before. Second, if the machine is reachable the next month, that month's statistics will be exaggerated since the difference in the accumulated amount is based on two months of information instead of one. My solution was to visually inspect each store's time series with respect to the number of recycling customers and drop any observations with an unexpectedly large variation over two consecutive months. From the raw data set of 29,594 observations, I exclude 1,603 observations based on this criterion. To ensure that each store has at least one observation for each month of the year, I exclude a further 61 observations, leaving me with 27,930 observations in total.

4 Results

I commence this section by examining the main research question — whether people become more altruistic in December. Then I consider different robustness tests. Finally, I investigate the effect of the higher refund on aluminum cans and compare it to the December effect.

4.1 Main Results

As a first check for seasonal variation in altruism, Figure 3 plots the average donor rate for each month in the sample, starting in January 2006 and ending in August 2014. A clear pattern emerges from the figure — the month of December is persistently associated with a large increase in the donor rate. What also becomes evident from the figure is that the December effect appears to linger in January. Visual inspection suggests that about half of the December increase remains in January. Another important observation is the upward trend during the first five years, which is followed by a distinctive break in 2011 and then a fall in the donor rate. The latter observation is likely because of the 100 percent increase in the deposit on aluminum cans, a feature we return to in Section 4.3.

Figure 3 [About here]

To test the statistical significance of the observed visual pattern, we turn to Table 2, where I report the results of OLS regressions of four different model specifications.[6] In column 1, the donor rate is regressed on four dummy variables: *November*, *December*, *January*, and *February*. We note a large, positive, and statistically significant effect for December, such that in comparison to the reference months (March to October), there is a 21 percent increase in the proportion of people giving the refund to charity. As discussed, half of the increase in generosity remains in January before it returns to the baseline in February. In column 2, I include the dummy variable *Winter*, which equals one for the six months between October and March and zero otherwise. The rationale is that giving behavior may differ in the summer months when the sales of beverages peak. The point estimate of Winter is positive (but statistically not significant), which consequently reduces the point estimates for the remaining winter months (November–February). Importantly people are still 18 percent more generous in December and 8 percent more generous in January. In column 3, I add store fixed effects, and thereby control for all factors that are specific to a store over time. The point estimates remain unaffected. In the final main specification, I also control for a flexible time trend by including year fixed effects. The point estimates remain unaffected but their precision improves — now both the December and January effects are significant at the 1 percent level. We therefore conclude that compared with the other winter months, people are 18 percent more generous in December and 8 percent more generous in January.

[6] To account for intragroup and serial correlation, I cluster the standard errors by store and month.

Table 2 [About here]

Figure 4 complements the regression results by plotting the number of donors (left axis) and the number of recyclers (right axis) by the month of the year.[7] Dividing the donor rate into its two components reveals two things: First, it is the number of donors that increase in December and January, not the number of recyclers that decrease. Second, the number of recyclers is fairly stable and do not stand out in December and January relative to the rest of the year. Hence, all kinds of explanations based on a surge in the number of customers are dismissed.

Figure 4 [About here]

4.2 Robustness tests

In the previous section, we established that more people donate their refund in December. In this section I want to understand how sensitive this effect is with respect to the estimation strategy, the choice of outcome variable, and whether the composition of the customers plays a role.

The estimates in Table 2 are based on OLS regressions, where each store is assigned identical weight. As stores differ substantially in size, it may be that a group of relatively few customers in small stores are driving the general effect. To discard this possibility, I estimate the same model using Weighted Least Squares (WLS). Column 1 of Table 3 reports the results. The estimates are basically the same as in Table 2 and we can therefore omit this possibility.

So far, I have not accounted for the value of the gift. Hence, if the effect is driven by small-stake donors, we may not observe a large corresponding increase in the amount given to charity. Column 2 of Table 2 reports the results from the same regression model, but where the outcome variable is the share of the recycled amount that is donated — the *donation rate*. The pattern is replicated. Compared to the baseline, there is a 27 percent increase in the donation rate. Hence, in comparison to the donor rate, the percentage increase in the share given is actually higher, suggesting that the December effect, if anything, is driven by high-stake donors.

Table 3 [About here]

[7] To account for the different lengths of each month I divide the monthly data by the number of days in the month.

A potential concern with my identification strategy is that the composition of recyclers may vary through the winter months. I have partly addressed this concern by including store fixed effects in the regression models, but these only controls for differences in the composition of recyclers across stores. Hence, it may be that the increased generosity in December and January is explained by an influx of generous people, not that people become more generous *per se*. A benefit of the sample is that most supermarkets only serve the local market. Hence, although one might expect some variation in the pool of customers over the year, it is unlikely to be dramatic. However, to explore this possibility, I make use of a supplementary data set that contains the complete purchase history from a random sample of 25,000 customers participating in Coop's membership program. For this sample of customers I know the age and gender, and have proxy variables on purchasing power and whether there are any children in the household.[8] Figure 5 depicts how each of these characteristics varies by the month of the year (December, January, and the remaining winter months). It is remarkable how little variation there is — each characteristic is basically the same, on average, irrespective of the time of the year. In the appendix, I report the results from regressions of a similar specification as in Table 2, but where the dependent variable is one of the four background characteristics (see Table 5). The results in the table confirm the absence of a pattern between types of customers and the months of December and January, and that the differences, if any, are miniscule. Of course, one objection could be that the above analysis is based on the total sample of Coop customers, whereas the sample of primary interest is the subset of customers recycling in Coop stores. In Table 6, I therefore restrict the analysis to the sample that actually recycles during a visit. Again, there is no evidence of a systematic pattern between the background characteristics of recycling customers and the months of December and January. Hence, there is no evidence in the data indicating that the composition of customers can explain the surge in altruism in December and January.

Figure 5 [About here]

4.3 The Value of the Christmas Spirit

I now turn to the 100 percent increase in the deposit on aluminum cans. The price change was gradually implemented beginning in September 2010 and reached its full effect in September

[8] I thank Coop for providing access to this proprietary material. Both proxy variables are based on individual consumption patterns.

2011. To analyze to what extent this event affected recycling patterns in general and charitable giving in particular, Table 4 reports OLS regression results from a model where *After* is the independent variable of interest. *After* takes a value of one for the 12 months after September 2011 and zero for the 12 months before September 2010. There are three outcome variables of interest: the number of recyclers (column 1), the amount recycled (column 2), and the donor rate (column 3). The estimates of *After* should thus capture the effect of the higher deposit on these variables.

Starting in column 1, we can see that the higher deposit had no effect whatsoever on whether people actually recycled their cans and bottles. This is in some sense surprising, but we should remember that the higher deposit was implemented solely because of the termination of the SEK 0.50 coin and that 90 percent of all containers were recycled even before the price adjustment. In column 2, we note that the recycled amount has increased by 35 percent. As there was no effect on the number of recyclers, the large and positive effect on the amount recycled per day corresponds to the new (and higher) deposit value. That this increase is less than 100 percent simply reflects that the deposit on plastic bottles was unaltered. Finally, in column 3, it is evident that people became significantly less willing to donate the refund when it was suddenly 35 percent larger, as reflected by the 15 percent reduction in the donor rate.[9] The effect of the higher deposit is thus of the same magnitude as the December effect — which increased the donor rate by 18 percent — but in the opposite direction. As a simple approximation, the month of December is equally effective in stimulating altruism as a 42 percent discount on charitable giving.[10]

Table 4 [About here]

5 Conclusions

In this paper, I show that people are more altruistic during the month of December. In particular, by exploiting a unique solicitation situation, I document that December is associated with an

[9] Figure 6 in the appendix plots the monthly-adjusted donor rate from 2006 to 2014. By eliminating the monthly effects, we can clearly observe a fall in the donor rate in the period immediately after September 2011 (the dashed vertical line) compared with the period immediately before September 2010 (the solid vertical line). Consistent with the gradual phase-in of the higher deposit, we also discern a gradual decline in the donor rate between September 2010 and September 2011.

[10] $18 * (35/15) = 42$.

18 percent increase in the fraction of donors, and this effect cannot be explained by either self-selection or instrumental factors such as tax breaks, reciprocity or social pressure. To put the effect in perspective, I make use of a reform that increasesd the endowment people bring to the solicitation situation. From this comparison, I infer that Christmas is equivalent to a 42 percent discount on charitable giving. Another result that emerges from the analysis is that about half of the December effect remains in January, before generosity returns to its baseline in February.

The results of the study add to the academic debate on the origins of human altruism; that is, whether being altruistic is hardwired into our brains or explained by cultural factors. Most researchers would now agree that it probably reflects both, which resonates with the current findings. From a cultural standpoint, it is important to stress that the human construct of Christmas does in fact increase altruism. Conversely, that Christmas cannot boost altruism by more than 18 percent supports the claim that altruism is indeed a fixed trait that is difficult to alter.

The implications from a fundraiser's perspective will, of course, depend on what competitors do. Ignoring this aspect, the results suggest that it is a better idea to focus on mere presence in December and January (when people have a strong personal inclination to give), and reserve more creative and costly campaigns for the remainder of the year (when people may need an extra push to become a donor).

A question that naturally arises is precisely why people become more altruistic in December. My preferred interpretation is that people have internalized the social norm of generosity intertwined with Christmas, and therefore willingly adhere to it in solitude. On a more speculative note, it may be that Christmas has a positive effect on people's mood, which has been shown to affect generosity (Underwood 1977; George 1991). Ultimately, this question goes beyond the scope of the current study and therefore, I defer it to future research.

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6 Figures

Figure 1: The choice situation

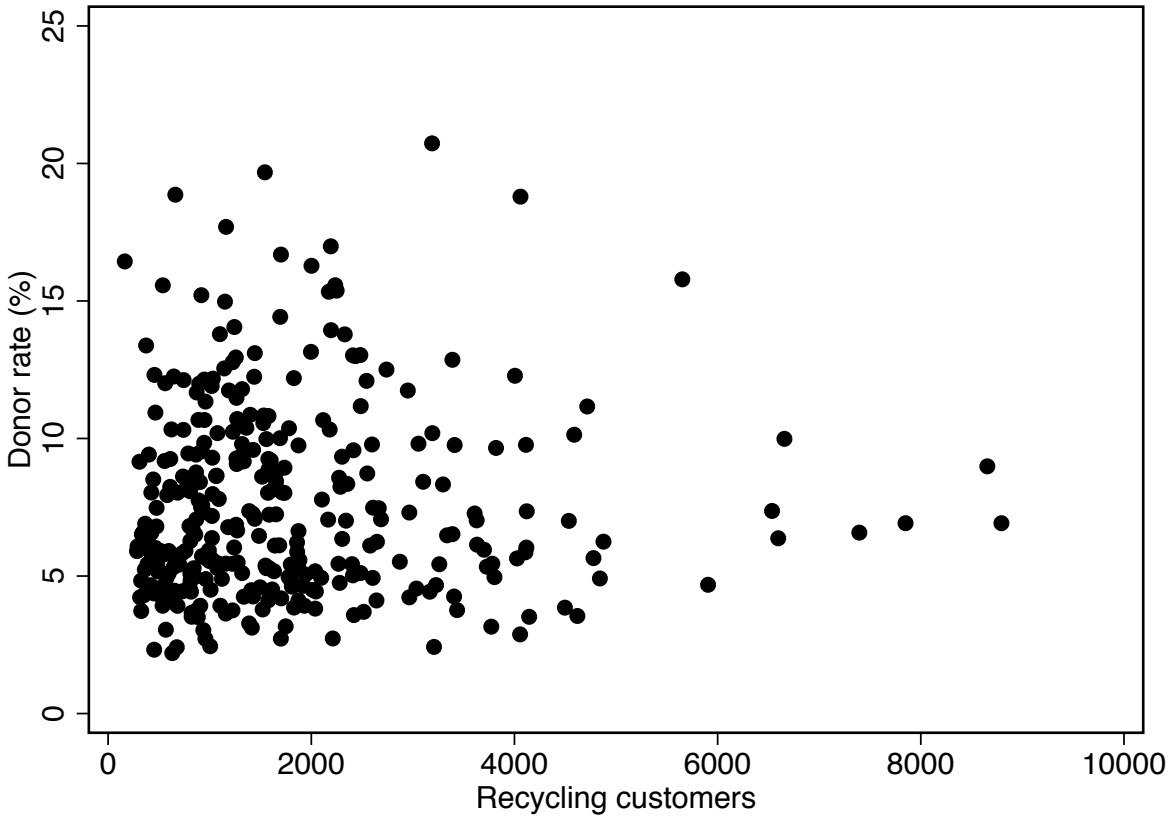


Figure 2: Store heterogeneity

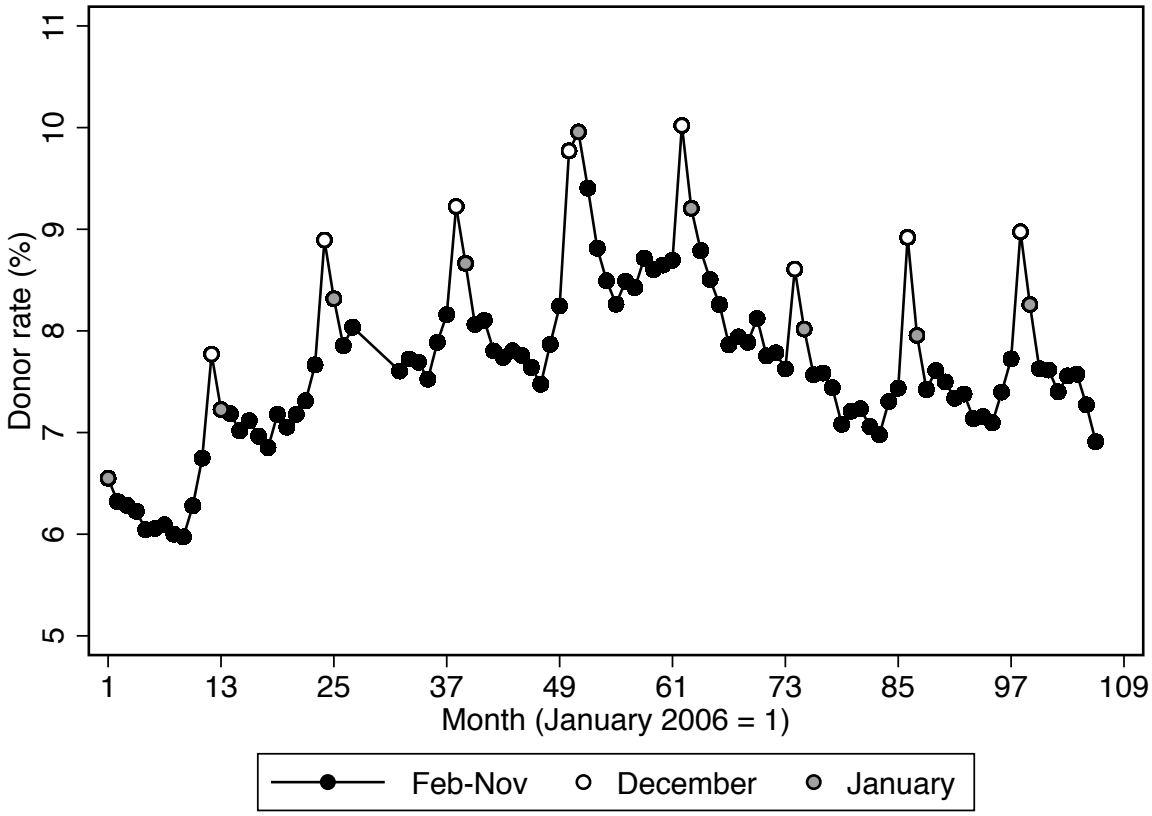


Figure 3: Donor rate by month

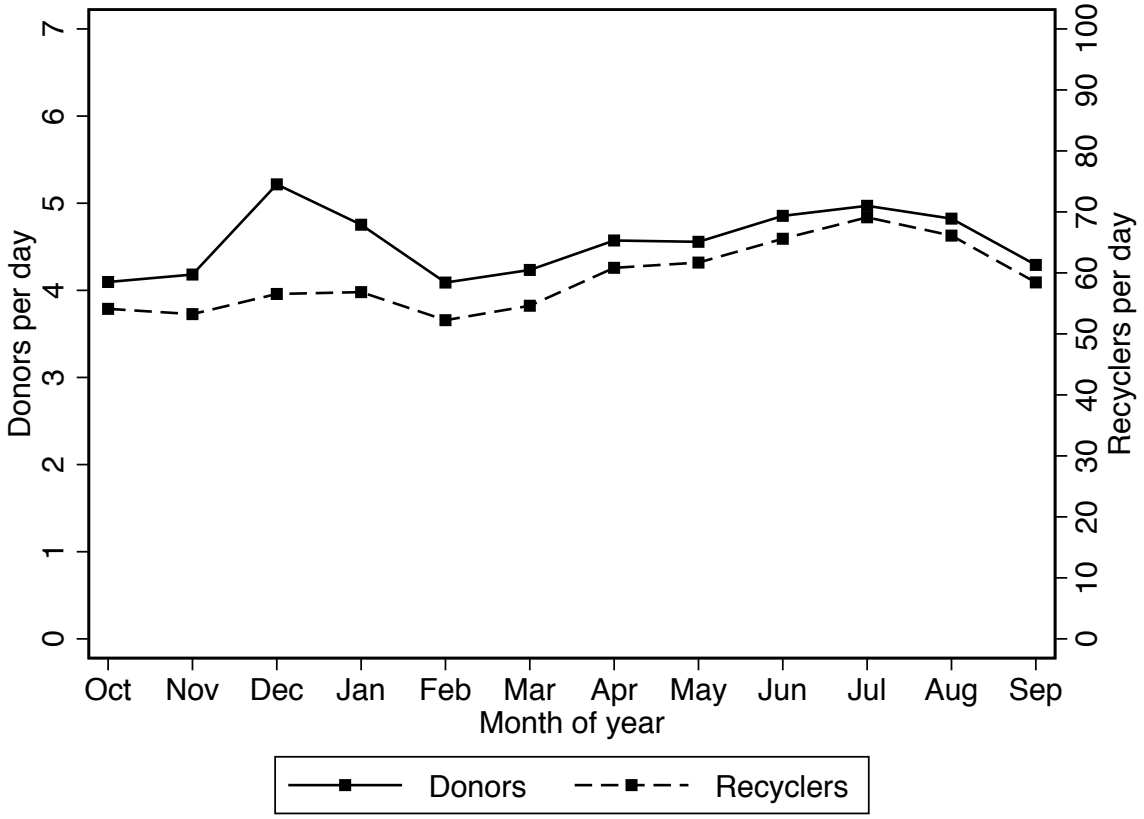
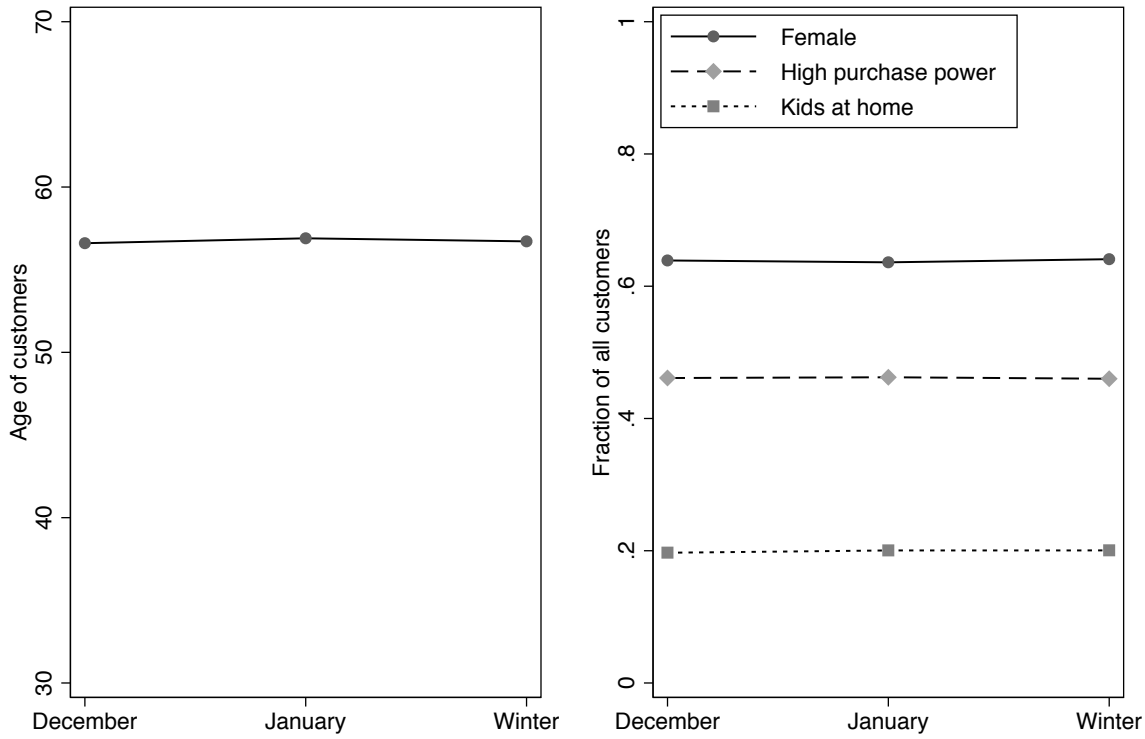


Figure 4: Donors and recyclers by month of year



Note: Winter refers to October, November, February and March

Figure 5: Customer characteristics by time of the year

7 Tables

Table 1: Summary statistics

	Mean	S.D.	Min	Max	*N*
Recyclers	1,803	1,525	26	13,225	27,930
Donors	139	140	0	1,273	27,930
Amount	31,524	30,336	243	337,868	27,930
Donated amount	957	992	0	10,627	27,930
Donor rate	7.71	3.93	0	30.68	27,930

Table 2: Regression results

	Dependent variable: Donor rate			
	(1)	(2)	(3)	(4)
November	0.328	0.143	0.128	0.115
	(0.199)	(0.242)	(0.264)	(0.108)
December	1.560***	1.375***	1.352***	1.341***
	(0.240)	(0.275)	(0.292)	(0.122)
January	0.773**	0.588*	0.564	0.571***
	(0.327)	(0.354)	(0.368)	(0.127)
February	0.341	0.156	0.137	0.143
	(0.291)	(0.321)	(0.339)	(0.0947)
Winter		0.247	0.258	0.241***
		(0.187)	(0.199)	(0.0504)
Store FE			Yes	Yes
Year FE				Yes
P-value: December = January	0.040	0.040	0.048	0.000
Dep. Mean	7.465	7.404	7.404	7.404
N	27,930	27,930	27,930	27,930
R^2 adj.	0.013	0.013	0.053	0.210

Standard errors clustered by both Store and Month in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3: Robustness analysis

	WLS: Donor rate	OLS: Donation rate
November	0.135	0.0541
	(0.112)	(0.0472)
December	1.472***	0.860***
	(0.120)	(0.0760)
January	0.628***	0.386***
	(0.135)	(0.0802)
February	0.136*	0.0692
	(0.0814)	(0.0481)
Winter	0.257***	0.106***
	(0.0560)	(0.0281)
Store FE	Yes	Yes
Year FE	Yes	Yes
P-value: December = January	0.000	0.000
Dep. Mean	7.404	3.176
N	27,930	27,930
R^2 adj.	0.270	0.145

Standard errors clustered by both Store and Month in parentheses.

WLS uses the number of recycling customers as weights.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4: Effect of price change

	Dependent variable		
	Recyclers	Amount	Donor rate
After	0.635	295.7***	-1.317***
	(2.116)	(45.90)	(0.236)
Store FE	Yes	Yes	Yes
Dep. Mean	51.704	855.925	8.761
N	6,594	6,594	6,594
R^2 adj.	-0.048	0.205	0.114

Standard errors clustered by both Store and Month in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

8 Appendix

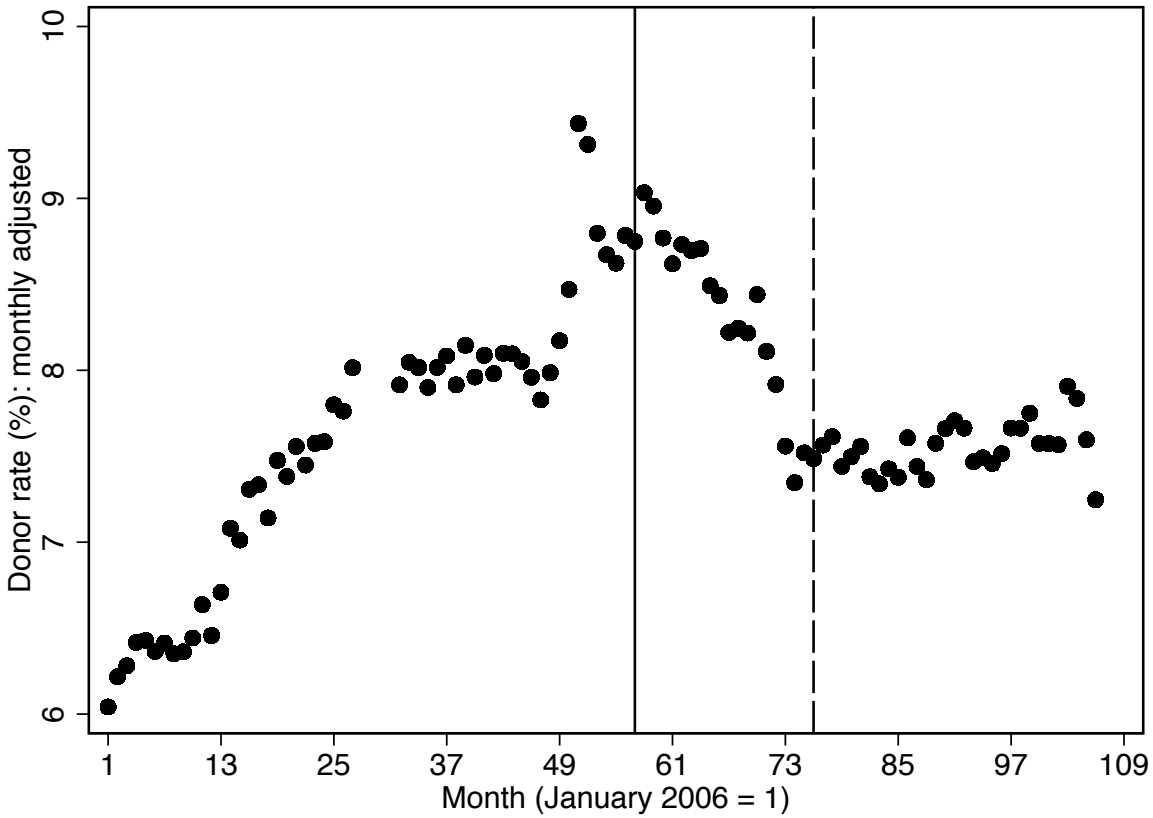


Figure 6: Donor rate by month (monthly adjusted)

Table 5: Composition of customers

	Dependent variable			
	Age	Women	Purchase power	Children at home
November	-0.297	-0.001	0.002	-0.001
	(0.313)	(0.001)	(0.002)	(0.003)
December	-0.160	-0.004*	0.005*	-0.003
	(0.387)	(0.002)	(0.003)	(0.002)
January	0.271	-0.007***	0.003	0.002*
	(0.462)	(0.002)	(0.002)	(0.001)
February	0.335	-0.005**	0.003	0.004***
	(0.529)	(0.003)	(0.003)	(0.001)
Winter	0.0941	-0.002	-0.003	0.002*
	(0.110)	(0.002)	(0.002)	(0.001)
Store FE	Yes	Yes	Yes	Yes
Constant	56.640***	0.644***	0.458***	0.198***
	(0.054)	(0.001)	(0.001)	(0.001)
N	811,969	1,298,636	1,299,858	1,278,106
R^2 adj.	0.108	0.071	0.215	0.090

Standard errors clustered by Month in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Composition of recyclers

	Dependent variable			
	Age	Women	Purchase power	Children at home
November	-0.053	-0.007	0.020**	0.004
	(0.196)	(0.016)	(0.009)	(0.003)
December	-0.887***	-0.020	0.010	-0.004
	(0.260)	(0.012)	(0.014)	(0.006)
January	0.278	-0.009	-0.001	0.001
	(0.207)	(0.013)	(0.009)	(0.004)
February	0.843	-0.015	0.008	0.002
	(0.486)	(0.014)	(0.010)	(0.009)
Winter	0.056	0.003	-0.016**	0.007*
	(0.220)	(0.008)	(0.006)	(0.004)
Store FE	Yes	Yes	Yes	Yes
Constant	60.860***	0.592***	0.450***	0.132***
	(0.173)	(0.003)	(0.004)	(0.003)
N	14,852	25,392	25,450	24,937
R^2 adj.	0.220	0.253	0.364	0.188

Standard errors clustered by Month in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

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