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Mathias Ekström

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Research Institute of Industrial Economics
P.O. Box 55665
SE-102 15 Stockholm, Sweden
info@ifn.se
www.ifn.se

Seasonal altruism:
How Christmas shapes unsolicited charitable giving

Mathias Ekström*[a, b]

[a]*Department of Economics, NHH Norwegian School of Economics, Helleveien 30, 5045 Bergen, Norway*

[b]*Research Institute of Industrial Economics, Grevgatan 34, 10215 Stockholm, Sweden*

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Abstract

Christmas is a holiday of Christian origin with traditions that emphasize prosocial behavior, including charitable giving, but does it actually make people more *altruistic*? Responding to this question poses a challenge because of the confounding factors of charitable tax breaks, reciprocity motives, pressure from the solicitors 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. Based on nine years of data and more than 50 million giving decisions, I provide three main results. First, the month of December is associated with a 14 percent increase in the probability to make

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a donation, thereby providing strong support to the notion of seasonal altruism. Second, exploiting a reform that changed the price of giving, I find that this December effect is equivalent to a 32 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

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. An intriguing fact is that a considerable fraction of this money 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 — defined as 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).[1] 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. Although not universal, Christmas is a widespread

[1]Consistent with the literature on charitable giving, I use the broadest definition of the term altruism, which includes both pure and impure altruism (see, for example, Andreoni, 1989 and Ottoni-Wilhelm, Vesterlund, and Xie, 2017). Impure altruism refers to the non-pecuniary utility the individual gets from their specific contribution to the cause (often referred to as warm-glow), whereas pure altruism refers to the non-pecuniary utility an individual gets from the total contribution to the cause (independent of the their own gift).

holiday, of Christian origin, with a particular focus on generosity and kindness towards others (D'Costa, 2016).[2] A direct test on whether and to what extent an institution such as Christmas shapes altruism can therefore provide important insights into its cultural underpinnings (Fehr and Fischbacher, 2003).[3]

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 exert more social pressure in the holiday season (Pharoah and McKenzie, 2009; 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 based on more than 50 million 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

[2]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 Yemen.

[3]It is reasonable to assume that Christmas mainly affects people celebrating the holiday. Hence, when I use the word "people" in the text, the relevant population is citizens of Christian heritage living in developed Western countries.

Swedish supermarket chain.[4] 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 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, solicitation is impersonal, anonymous and exposes the set of potential donors to the same campaign material throughout the year. In sum, the decision environment involves a redistributive choice between self and others without the expectation of reciprocity, sanctions or compensation in return. Thus, it allows for a clean test of whether people are more altruistic in December.[5]

There are three main findings from the analysis.

First, in December each year, the probability to donate increases by 14 percent. December is therefore, far and away, the month with the largest share of donations. This result is robust to the inclusion of store and year fixed effects; and neither the number of recycling transactions, the value of the refunds, nor the composition of customers or containers can explain this seasonal pattern. Thus, I find strong support for an end-of-year boost in altruism.

Second, I estimate that the end-of-year increase in altruism is equivalent to a 32 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 32 percent, which in turn decreased the probability to donate by 14 percent. Thus, in this

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

[5]Note that I include *indirect* social pressure, such as, shared social norms and general campaigns promoting generosity in December, in the term Christmas spirit. What I claim is fixed, is the pressure exerted by the particular charity organization. I elaborate on potential explanations in Section 5.

setting, there is a clear negative relationship between stake size and the probability to donate.[6] Assuming symmetric response, the effect of the price change suggests that it would require a 32 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 donation 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 probability to donate returned to its baseline in February.[7]

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.[8] In particular, 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).[9] 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 I show that people are willing to follow the norm in solitude, presumably because of the positive effect adherence has for the self-image, the norm can be 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 (2017) examine whether the division of Korea into North and South altered the social prefer-

[6]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).

[7]Rosen and Sims (2011) and Meer (2013) find that altruistic behavior can be persistent also in the longer run: people that, for exogenous reasons, donate money or time to a cause at young age are more like to donate later in life.

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

[9]For example, the American embassy refers to Christmas as a period of goodwill and an occasion for charitable and volunteer work (US Embassy, 2016). Hence, many people do generous acts in December, and it can thus be considered expected behavior.

ences 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. In Section 5, I elaborate on potential explanations for the increase in altruism. Section 6 concludes.

2 The Setting

In the current study I exploit a situation faced by recycling customers in the Swedish supermarket chain, Coop, to identify altruistic behavior. 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 plastic 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 amount to charity.[10]

Notes: The text below the green refund button is: "Press here and you will get your refund". The text below the yellow aid button is: "Press here and let your refund help families in poor countries".

Figure 1: The choice situation.

The situation described has three attractive features to convincingly approach the question of seasonal altruism. First, the anonymous and impersonal solicitation procedure 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.

[10]In principle, customers can also split their endowment (e) in two: an amount x which is donated and the remaining amount ($e-x$) which is kept. A survey with almost 500 Coop customers, conducted on my behalf, revealed, however, that only two percent of the respondents split the endowment. Hence, the large majority treat the decision as a binary choice, and I interpret the findings in light of this wisdom (see the end of section 4.2 for a more detailed description of the survey and a discussion of the results in terms of affecting the extensive and intensive margins.

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, which at the current exchange rate corresponds to USD 2.30). 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 plastic bottles, and SEK 2.00 on large plastic bottles.[11] 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. All else equal, the higher deposit should increase the monetary value an average recycler brings to the store. 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 transactions (*transactions*), the number of

[11] The deposit is paid by the consumer at the time of purchase and is refunded if the container is returned to a recycling machine. Note that glass containers do not carry refund.

donations made (*donations*), the total recycled amount (*recycled amount*), and the amount donated (*donated amount*). By dividing donations by the number of transactions, I obtain the main outcome variable — the *donation rate* — which is the probability that a transaction ends up in a donation (expressed as a percentage).

Table 1 provides summary statistics by store and month. On average, a store handles about 1,800 transactions per month, out of which 140 (or 7.7 percent) end up in a donation to the charity. The total recycled amount per store and month is SEK 31,524, which means that the average transaction consists of cans and bottles worth approximately SEK 19. It is noteworthy that less than 8 percent of all transactions result in a donation, and that less than 4 percent of the total recycled amount is donated to charity. Hence, donating the refund is not the norm in the current situation.

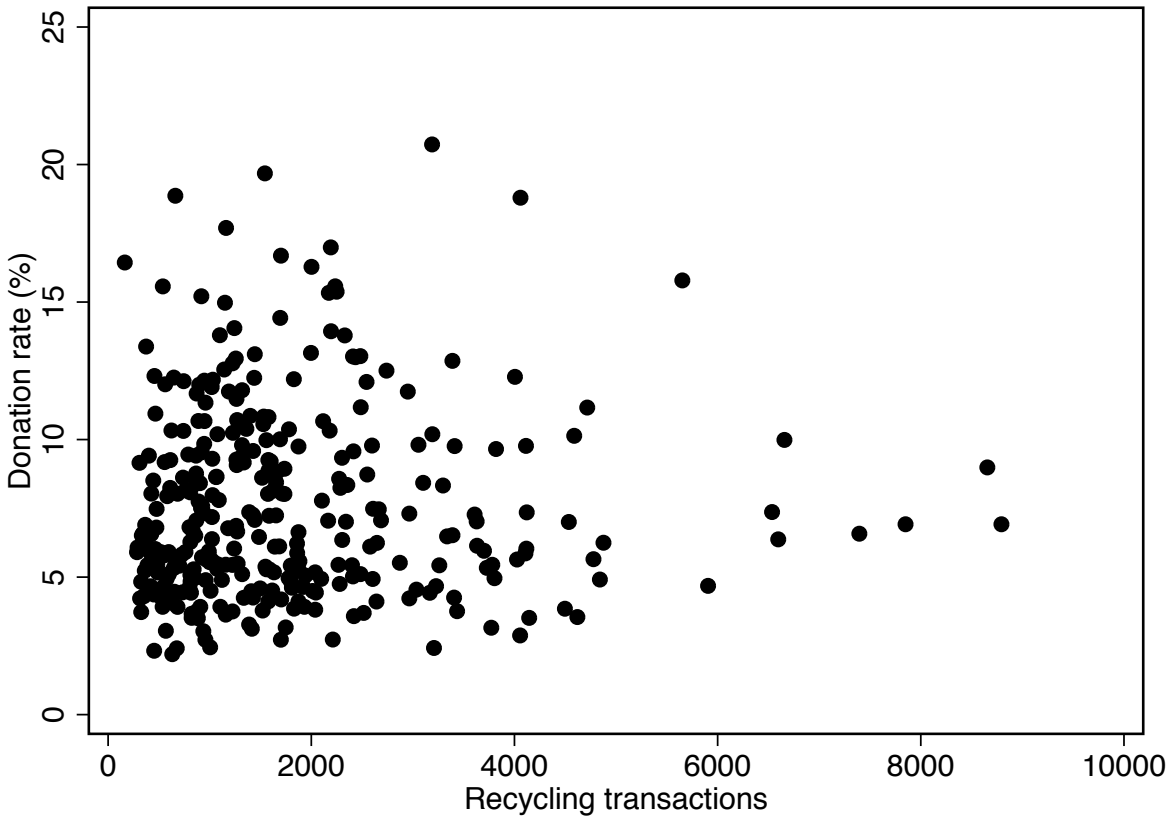
To illustrate the extent of store heterogeneity in the data, Figure 2 plots the relationship between the mean number of recycling transactions and the mean donation rate, where each dot corresponds to one store in the sample. Although a large fraction of stores cluster around an average of 1,000 transactions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

Table 1: Summary statistics.

	Mean	S.D.	Min	Max	*N*
Transactions (#)	1,803	1,525	26	13,225	27,930
Donations (#)	139	140	0	1,273	27,930
Recycled amount (SEK)	31,524	30,336	243	337,868	27,930
Donated amount (SEK)	957	992	0	10,627	27,930
Donation rate (%)	7.71	3.93	0	30.68	27,930

Notes: All variables are measured at the store-month level.

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



Notes: Each dot in the scatterplot represents the average number of recycling transactions and donation rate for one particular store.

Figure 2: Store heterogeneity.

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 transactions 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, with a focus on the donation rate. 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

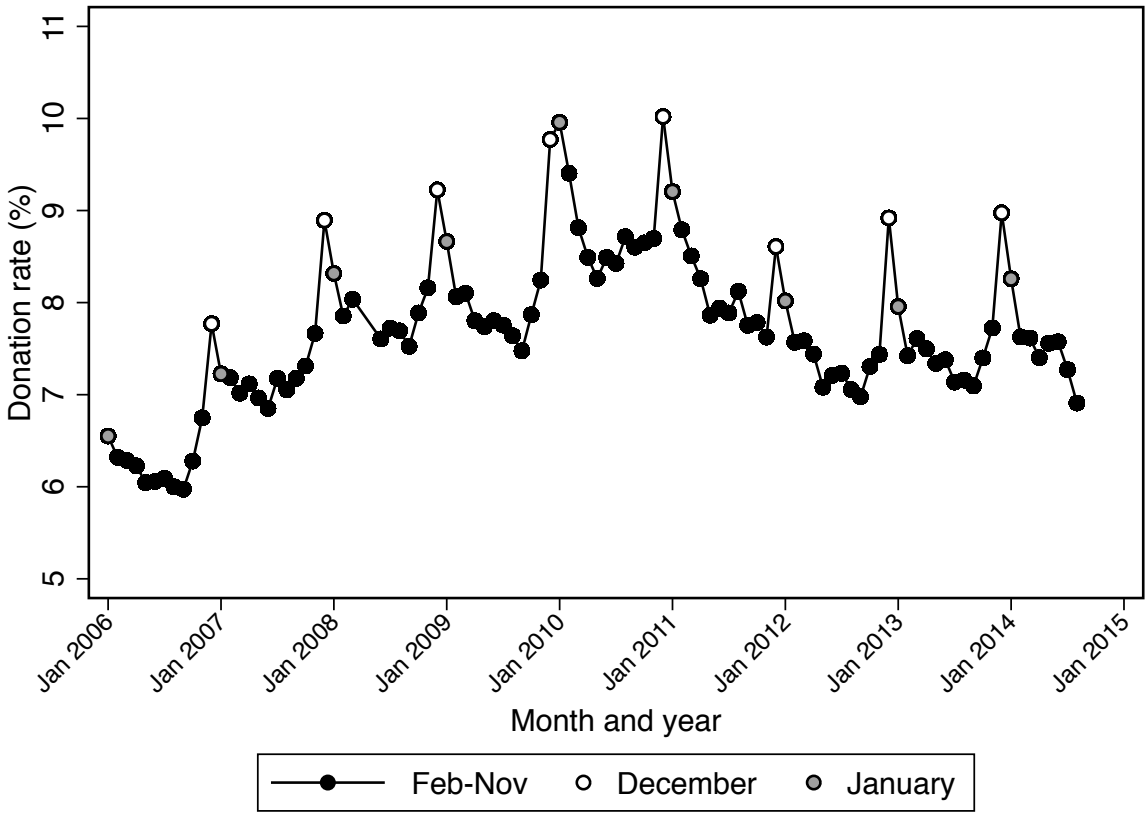


Figure 3: Donation rate by month.

As a first check for seasonal variation in altruism, Figure 3 plots the average donation 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 probability to donate. 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. Two other observations are that the donation rate seems to reach its low point in the summer months, and that there is an upward trend during the

first five years, which is followed by a distinctive break in 2011 and then a fall in the donation 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.

To test the statistical significance of the observed visual pattern, we turn to Table 2, where I report the results of OLS regressions of three different model specifications.[12] In column 1, the donation rate is regressed on dummy variables for all twelve months, with March as the omitted category. I highlight the point estimates of the four most comparable months: November, December, January and February (Table A.1 in the appendix reports the point estimates for all eleven months). We note a large, positive, and statistically significant effect for December. In column 2, 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.[13] The point estimates remain largely unaffected but their precision improves — now both the December and January effects are significant at the 1 percent level. We therefore conclude that compared to March, people are 14 percent more generous in December and 7 percent more generous in January.

4.2 Robustness tests

In the previous section, I established that the probability to donate the refund increased in December. In this section I want to dissect this effect more closely. In addition, I want to understand how sensitive the effect is with respect to the estimation strategy, the choice of outcome variable, and whether the composition of the customers (and containers) plays a role. I will end the section by discussing the effect in terms of extensive and intensive margins.

Figure 4 complements the regression results in Table 2 by plotting the number of donations (left axis) and the number of transactions (right axis) by the month of the year.[14] Dividing the donation rate into its two components reveals two things: First, it is the number of donations that increase in December and January, not the number of transactions that decrease. Second, the number of transactions 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 general surge in the number

[12] To account for intragroup and serial correlation, I cluster the standard errors by store and month using multi-way clustering (Cameron, Gelbach, and Miller, 2011).

[13] For comparability of the four months, a year is defined to begin in October and end in September.

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

Table 2: OLS regression results.

	Dependent variable: Donation rate		
November	0.0646	0.0581	-0.135
	(0.296)	(0.319)	(0.0855)
December	1.297***	1.282***	1.092***
	(0.323)	(0.342)	(0.0927)
January	0.509	0.494	0.493***
	(0.393)	(0.409)	(0.0931)
February	0.0775	0.0669	0.0657
	(0.363)	(0.383)	(0.0663)
Month FE	Yes	Yes	Yes
Store FE		Yes	Yes
Year FE			Yes
P-value: December = January	0.040	0.048	0.000
Dep. Mean (March)	7.723	7.723	7.723
N	27,930	27,930	27,930
R^2 adj.	0.013	0.054	0.210

Notes: For comparability of the four months, a year is defined to begin in October and end in September. March is the omitted month. Standard errors clustered by both Store and Month using multiway clustering in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

of transactions are dismissed.[15]

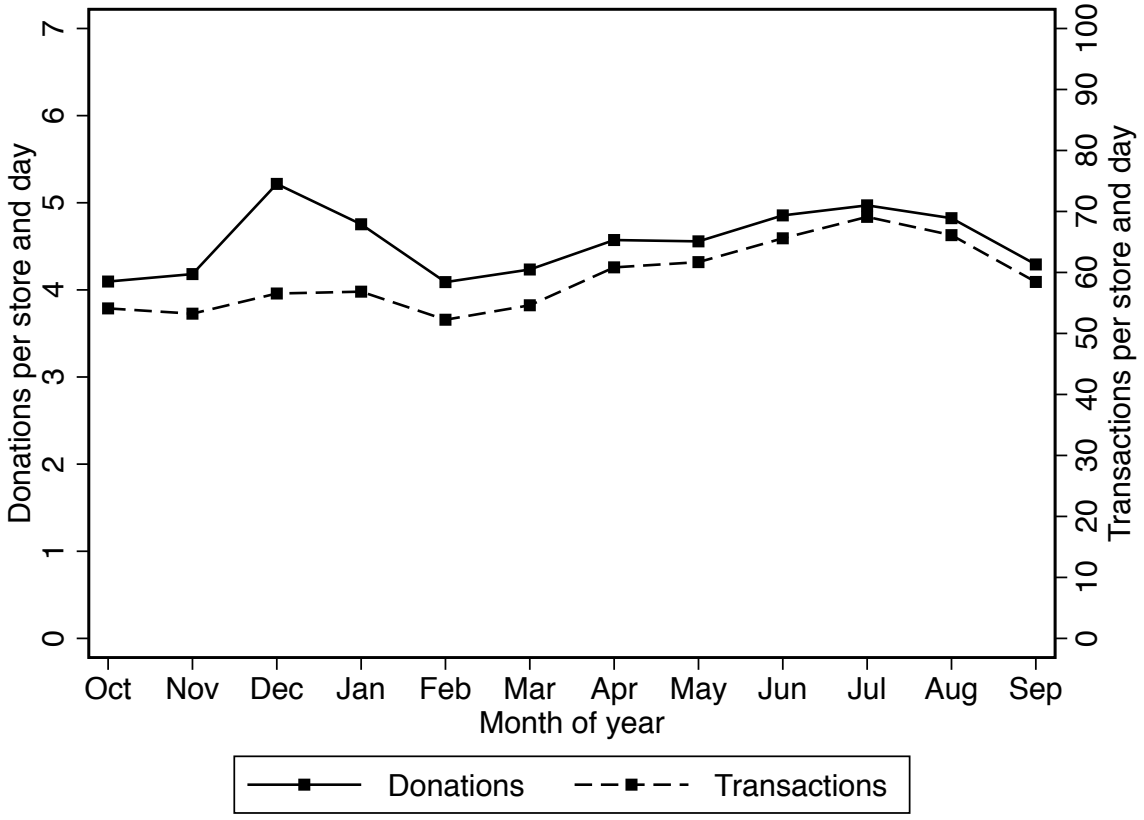


Figure 4: Donations and transactions per day by month of year.

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 3 reports the results from the main model specification, but where the outcome variable is the *share donated* — that is, the share of the recycled amount that is donated to charity. The pattern is replicated. Compared to March, there is a 23 percent increase in the share donated. Hence, in comparison to the donation rate, the percentage increase in the

[15]Figure A.1 in the appendix reveals an identical pattern when looking at the amount recycled respectively donated. Hence, the December effect cannot be explained by a change in the monetary value of the endowment either.

share given is actually higher, suggesting that the December effect, if anything, is driven by high-stake donors.[16]

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 use two different tests.

In the first test, I investigate whether the December effect is more pronounced in stores that experience a larger increase in the customer base in December relative to March. For both systematic and idiosyncratic reasons, some stores in my sample have, on average, more recycling transactions in December relative to March, whereas the opposite is true for other stores. Figure 5 shows the average donation rate in December and March, respectively, depending on which quartile the store is in terms of the influx of recyclers in December. What becomes clear from the figure is that stores with relatively more transactions in December have a higher donation rate in general. The main point, however, is that there is no difference in the December effect across stores. No matter which quartile the store belongs to, in terms of the relative increase of transactions in December, December entails a 15 percent increase in the probability to donate. That the net inflow or outflow of recycling customers in a store has no impact on the December effect indicates that selection is unlikely to be a major issue.

In the second test for selection, 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.[17] Figure 6 depicts how each of these characteristics varies by the month of the year. 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

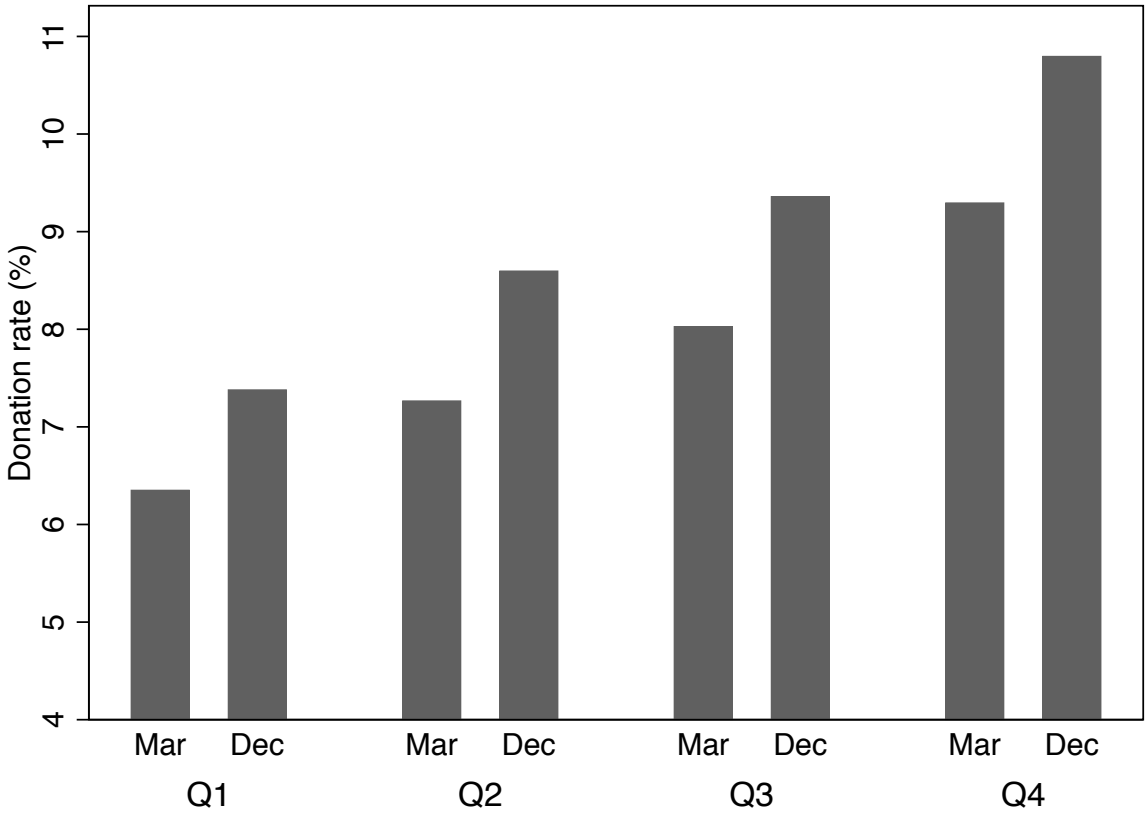
[16]Table A.2 in the appendix includes the point estimates for all eleven months.

[17]I thank Coop for providing access to this proprietary material. Both proxy variables are based on individual consumption patterns. Since this data do not reveal whether recycling customers donate the refund, I cannot use it to look at the December effect *per se*.

Table 3: Robustness analysis.

	WLS: Donation rate	OLS: Share donated
November	-0.133	-0.0350
	(0.0972)	(0.0553)
December	1.191***	0.772***
	(0.125)	(0.0639)
January	0.547***	0.351***
	(0.105)	(0.0705)
February	0.0550	0.0334
	(0.0556)	(0.0409)
Month FE	Yes	Yes
Store FE	Yes	Yes
Year FE	Yes	Yes
P-value: December = January	0.000	0.000
Dep. Mean (March)	7.723	3.317
N	27,930	27,930
R^2 adj.	0.269	0.146

Notes: For comparability of the four months, a year is defined to begin in October and end in September. March is the omitted month. WLS uses the number of transactions as weights. Share donated is the percentage of all recycled money that is donated. Standard errors clustered by both Store and Month using multiway clustering in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

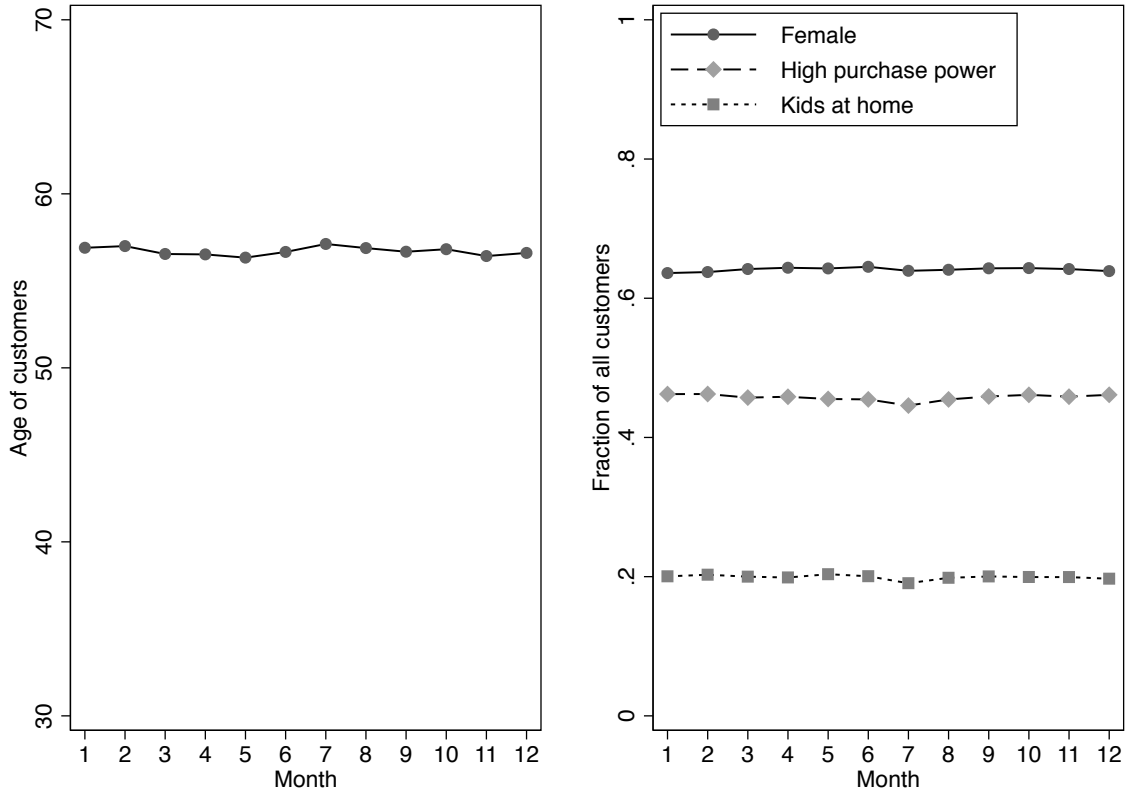


Notes: Q1, Q2, Q3 respectively Q4 refers to the quartile a store belongs to in terms of the average difference in recycling transactions in December relative to March. The bounds of each quartile are: $Q1 = [-562, -17.125); Q2 = [-17.125, 17.5); Q3 = [17.5, 95.35); Q4 = [95.35, 1138.5]$.

Figure 5: December effect by relative increase in number of transactions.

specification as in Table 2, but where the dependent variable is one of the four background characteristics (see Table A.3). 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 A.4, 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.[18]

[18]The results indicate that recyclers are about one year younger, on average, in December relative to March, which could indicate some form of selection. However, recyclers are about as young in May, June, July, August and October as in December. Hence, age in itself is unlikely to capture the increase in altruism observed in



Notes: The statistics are based on a representative sample of 25,000 members of Coop's loyalty program.

Figure 6: Customer characteristics by month of the year.

A final concern is that the December effect is driven by a change in the composition of containers. It is not entirely clear, *ex ante*, why the composition of containers mechanically should affect the likelihood to donate. One possibility, however, is that people use a decision rule where they donate all money stemming from one type of containers (e.g. plastic bottles) and keep all money from other types of containers (e.g. cans). The existing data does not distinguish between the type of container so I need to use other sources of information to investigate this issue.

First, I gathered data on the total number of cans and plastic bottles recycled in Sweden, by month, from January 2008 to August 2014.[19] As shown in Figure A.2 in the appendix, the data

December.

[19]I thank Sara Riismark at Returpack for access to the data. Since the data is not disaggregated by store I cannot use it in the main analysis. It is also worth to point out that alcoholic beverages mostly are sold in glass containers, which do not carry refund in Sweden. Hence, there is no reason to expect any systematic change in the alcoholic content of the containers.

reveal that the share of bottles is stable at 35% throughout the period, but increases to about 37% in December and January, most likely due to bulk purchases in the holiday season.[20] If people use the decision rule described above, the increase in the share of bottles could potentially explain the December effect (although the percentage increase is larger for the donation rate). To shed light on whether people actually use such a decision rule, and the general prevalence of splitting the endowment in two, I had research assistants survey customers in Coop stores. The survey asked a single question: "What did you do the last time you recycled in a Coop store?" The respondents had five choice alternatives: A) "I pressed the recycling button and thus kept everything myself"; B) "I pressed the aid button and thus gave everything to charity"; C) "I pressed both buttons: I donated a specific amount and kept the rest"; D) "I pressed both buttons: I donated containers of a certain type and kept money from containers of other types"; E) "I do not recycle in Coop stores". Of 465 respondents, not a single person answered the option reflecting the above-described decision rule (i.e. option D). Hence, it seems rather unlikely that the composition of containers can explain the December effect present in my data, at least in combination with the particular decision rule.[21]

The survey also sheds light on the broader issue of whether people treat the donation decision as binary or continuous (see Table A.5 in the appendix for a summary of the responses). Of the 310 respondents stating that they recycle at Coop, 2.6 percent (8 respondents) answered that they pressed both buttons, whereas 97.4 percent pressed only one of the two buttons (302 respondents). Clearly, the overwhelming majority treat the donation decision as binary, and the

[20] For the average recycler in my sample, the two percentage point increase corresponds to 0.3 additional bottles in December and January respectively. To do the calculation I assume that all plastic bottles have a refund of SEK 2 and that all cans have a refund of SEK 1. Based on the respective market shares the expected refund is: $2 * 0.35 + 1 * 0.65 = 1.35$, which implies that the average transaction consists of $19/1.35 = 14.1$ containers, out of which $0.35 * 14.1 = 4.9$ are plastic bottles. Increasing the market share from 0.35 to 0.37 then implies an additional 0.3 bottles.

[21] Although the survey only captures a small fraction of Coop customers, I took some steps to get a diverse sample. In particular, I included stores from two separate cities (Jönköping and Stockholm), and made sure that answers were collected on different days of the week, as well as different times of the day. It should be noted, however, that the share stating that they donated the refund is about 33 percent in the survey sample, which should be compared to about 11 percent for stores in the same cities in the actual data. This discrepancy likely reflects that people who donate the refund are more willing to answer surveys, which casts some doubts about the representativeness of this particular sample (and self-selected survey samples more generally). Still, that not a single respondent chose option D indicates that donating contingent on the composition of containers is unusual. A complete summary of the survey responses is provided in Table A.5 in the appendix.

December effect in the current study is bound to reflect this observation. That is, December is mainly causing some customers to switch from keeping everything to donating everything. This, however, is not to say that December cannot have an effect on the intensive margin in other solicitation situations.

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 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 transactions (column 1), the recycled amount (column 2), and the donation 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 the extensive margin (i.e. the number of transactions). 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 by end-consumers even before the price adjustment. In column 2, we note that the average amount recycled per day and store has increased by 32 percent — from SEK 856 to SEK 1,129. As there was no effect on the number of recycling transactions, the large and positive effect on the amount recycled per day is caused by the new (and higher) deposit value *per se*, as well as its potential indirect effect on the number of containers people choose to recycle (rather than throw in the trash). 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 32 percent larger, as reflected by the 14 percent reduction in the donation rate.[22] The effect of the higher deposit is thus of the same magnitude as the December

[22]Figure A.3 in the appendix plots the monthly-adjusted donation rate from 2006 to 2014. By eliminating each month's fixed effect on the donation rate, using the dummy variable method, we can clearly observe a fall in the donation 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

Table 4: Effect of price change.

	Dependent variable		
	Transactions	Recycled amount	Donation rate
After	1.238	272.7***	-1.199***
	(2.005)	(49.02)	(0.234)
Store FE	Yes	Yes	Yes
Dep. Mean	51.70	855.9	8.761
N	6,587	6,587	6,587
R^2 adj.	-0.045	0.179	0.093

Notes: The table reports the results from OLS regressions, using 24 months of data: the 12 months between September 2009 and September 2010 is the before period, and the 12 months between September 2011 and September 2012 is the after period with a higher refund on cans. *Dep. Mean* gives the unconditional mean of the respective outcome variable in the before period. The outcome variables refer to store averages per day. Standard errors clustered by both Store and Month using multiway clustering in parentheses.

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

effect — which increased the donation rate by 14 percent — but in the opposite direction. As a simple approximation, the month of December is equally effective in stimulating generosity as a 32 percent discount on charitable giving.[23]

5 Discussion

A question that naturally arises is precisely why people become more altruistic in December. Ultimately, this question goes beyond the scope of the current study and therefore, I defer it to future research. Below, however, I briefly mention different, not mutually exclusive, explanations and provide some speculative remarks.

deposit, we also discern a gradual decline in the donation rate between September 2010 and September 2011.

[23]The estimated effect of stake size on the likelihood to donate can also explain the lower donation rate observed in the period from April to October (see Table A.1). During these months the amount donated per day is, on average, 15 percent higher relative to March, while the average donation rate falls with 5 percent.

As discussed in the introduction, and captured in the quote by Charles Dickens, Christmas is strongly associated with generosity (at least in developed Western countries). My preferred interpretation is therefore that people have internalized this norm of generosity and willingly adhere to it in solitude. Possibly, this occurs because of self signalling, where the individual acts according to beliefs about appropriate conduct not to spoil his or her self-image (Bénabou and Tirole, 2006).

Another possibility, is that Christmas has a positive effect on people's mood, which has been shown to affect generosity (Underwood, Froming, and Moore, 1977; George, 1991). Alternatively it may be that general campaigns for giving, and the emphasis on being generous in December, increases the salience of altruistic decisions, thus reinforcing altruistic behavior (Bordalo, Gennaioli, and Shleifer, 2012).

A more context specific explanation of my findings could be that people in general are under more time pressure in December (and January) and therefore become more likely to give to charity. A growing literature is looking at the effect of reflection time on altruistic decisions. This literature is, however, still undecided in terms of whether there even is an effect, and if so, whether it is positive or negative (Andersen, Gneezy, Kajackaite, and Marx, 2018). Hence, it is not clear that time pressure would play a role in the current situation.

Finally, one may argue that Christmas is not really increasing giving, but simply shifts it towards the end of the year. I do not refute that possibility, but the shift may still be consistent with seasonal altruism. We know that tax breaks shifts giving to the end of the year because it facilitates better income planning. But why would Christmas, in itself, shift unsolicited giving to the end of the year? A plausible reason is that people get more warm-glow, and hence more utility, from behaving altruistically at that time of the year (Andreoni, 1990).

6 Conclusions

In this paper, I show that customers of a large grocery chain in Sweden are more altruistic during the month of December. In particular, by exploiting a unique solicitation procedure, I document that December is associated with a 14 percent increase in the probability to donate, and this effect cannot be explained by instrumental factors such as tax breaks, reciprocity, or pressure from the charity. To put the effect in perspective, I make use of a reform that increased the endowment people decide over. From this comparison, I infer that Christmas is equivalent

to a 32 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 14 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).

To provide a clean test of how Christmas affects altruistic behavior, the current study investigated one particular context of charitable giving. It would, however, be interesting to understand whether the observed patterns generalize to other solicitation situations. In particular, exploring whether the December effect is even greater when giving can be affected along both the extensive and intensive margin, and which of the two is more important, could add important insights.

Appendix

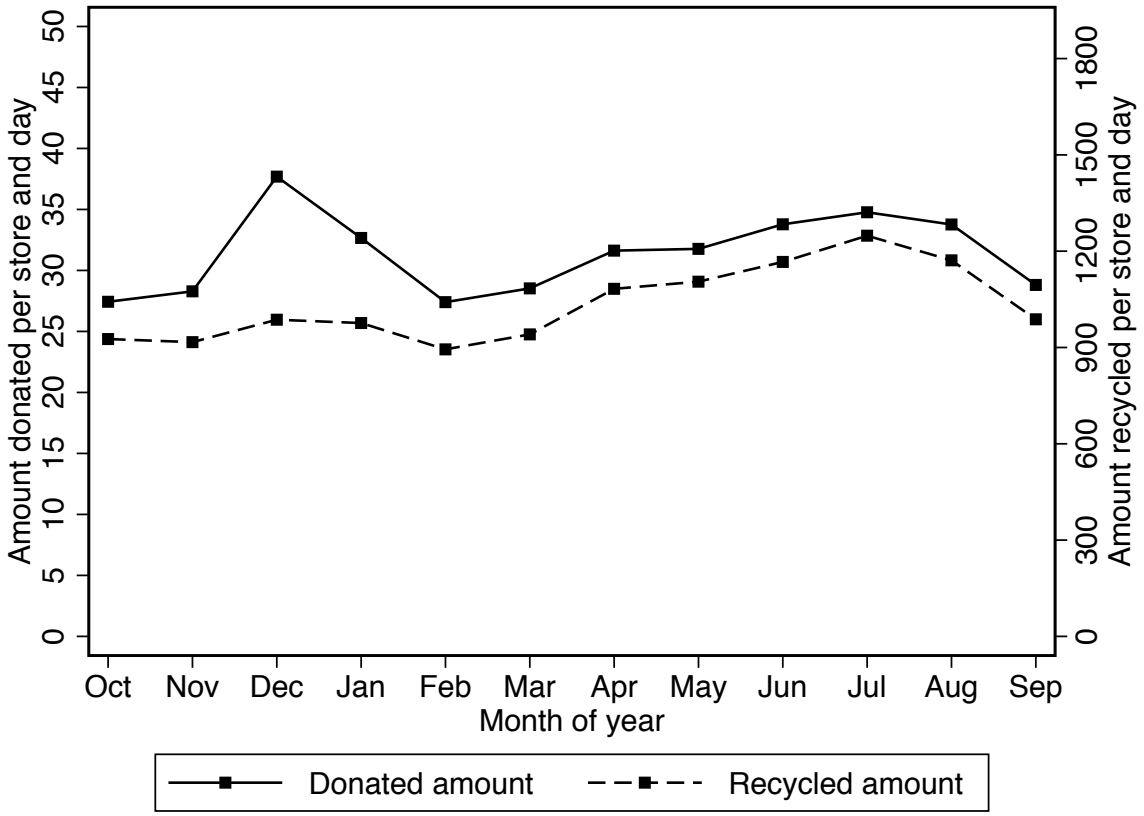
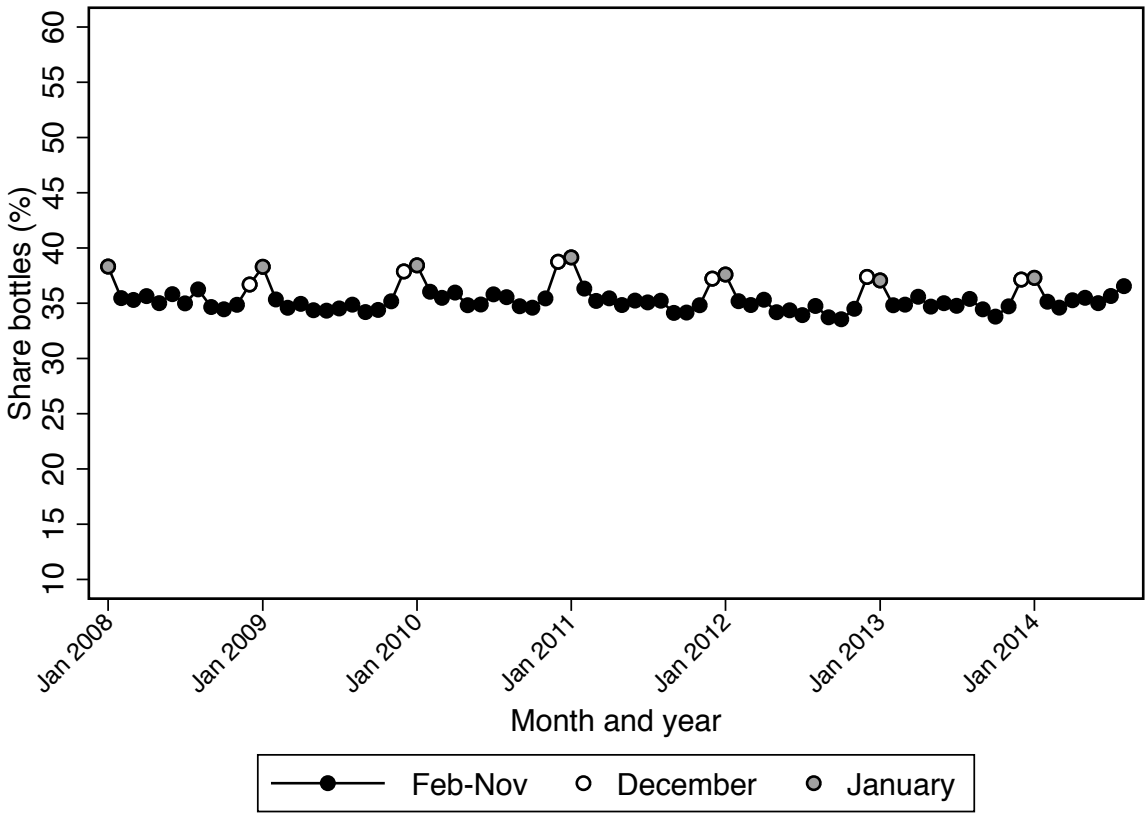
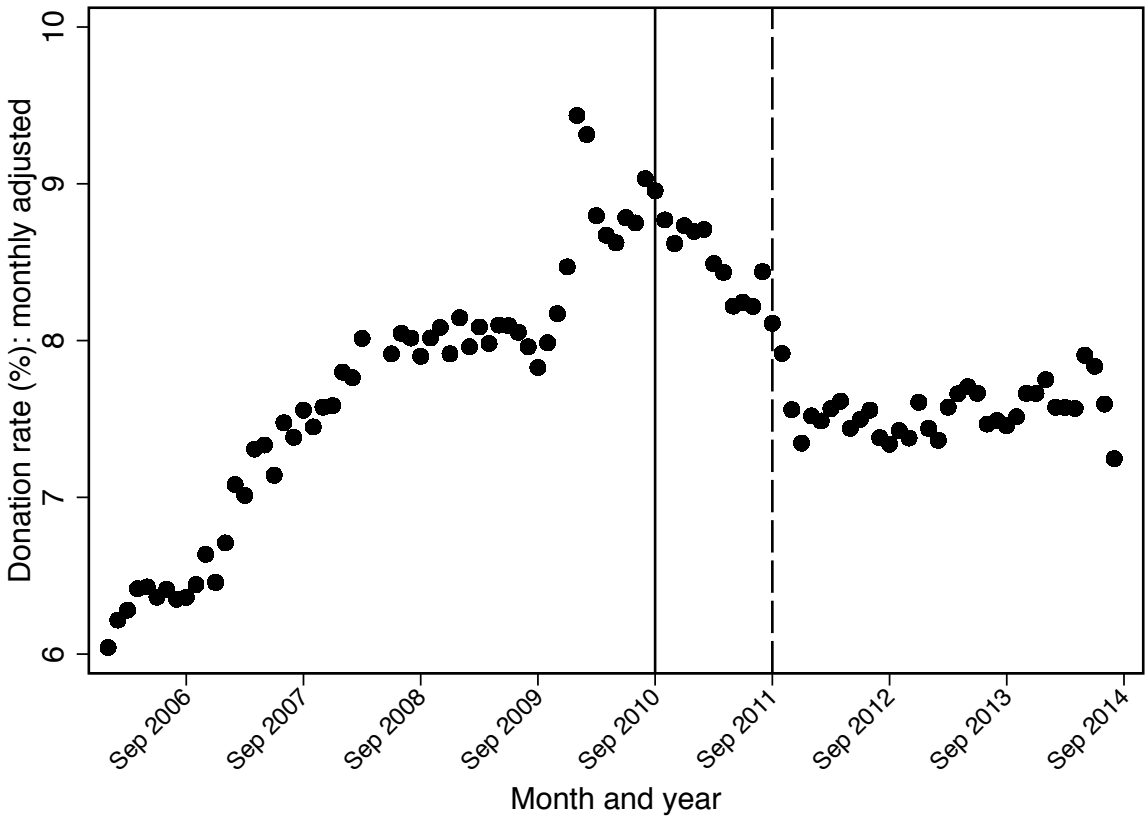


Figure A.1: Donated and recycled amount per day by month of year.



Notes: The figure plots the share of plastic bottles, relative to all containers (cans and plastic bottles), recycled in Sweden by month and year. Data provided by Returpack.

Figure A.2: Composition of containers by month.



Notes: The figure plots the monthly adjusted donation rate, using the dummy variable method, by year and month. The solid vertical line indicates the month when the new higher refund on cans was introduced; the dashed vertical line indicates the month when the new higher refund on cans was fully incorporated.

Figure A.3: Donation rate by month (monthly adjusted).

Table A.1: OLS regression results (including estimates for all months).

	Dependent variable: Donation rate		
November	0.0646	0.0581	-0.135
	(0.296)	(0.319)	(0.0855)
December	1.297***	1.282***	1.092***
	(0.323)	(0.342)	(0.0927)
January	0.509	0.494	0.493***
	(0.393)	(0.409)	(0.0931)
February	0.0775	0.0669	0.0657
	(0.363)	(0.383)	(0.0663)
April	-0.200	-0.197	-0.176***
	(0.325)	(0.346)	(0.0380)
May	-0.376	-0.384	-0.364***
	(0.321)	(0.340)	(0.0644)
June	-0.295	-0.313	-0.315***
	(0.318)	(0.335)	(0.0583)
July	-0.317	-0.339	-0.337***
	(0.312)	(0.328)	(0.0856)
August	-0.354	-0.348	-0.345***
	(0.336)	(0.351)	(0.0721)
September	-0.412	-0.386	-0.396***
	(0.335)	(0.354)	(0.0913)
October	-0.168	-0.150	-0.336***
	(0.317)	(0.342)	(0.121)
Month FE	Yes	Yes	Yes
Store FE		Yes	Yes
Year FE			Yes
P-value: December = January	0.040	0.048	0.000
Dep. Mean (March)	7.723	7.723	7.723
N	27,930	27,930	27,930
R^2 adj.	0.013	0.054	0.210

Notes: For comparability of the four months, a year is defined to begin in October and end in September. March is the omitted month. Standard errors clustered by both Store and Month using multiway clustering in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A.2: Robustness analysis (including estimates for all months).

	WLS: Donation rate	OLS: Share donated
November	-0.133	-0.0350
	(0.0972)	(0.0553)
December	1.191***	0.772***
	(0.125)	(0.0639)
January	0.547***	0.351***
	(0.105)	(0.0705)
February	0.0550	0.0334
	(0.0556)	(0.0409)
April	-0.152***	-0.0728***
	(0.0388)	(0.0270)
May	-0.354***	-0.211***
	(0.0569)	(0.0386)
June	-0.335***	-0.152***
	(0.0597)	(0.0400)
July	-0.395***	-0.166***
	(0.0981)	(0.0509)
August	-0.388***	-0.106***
	(0.0769)	(0.0366)
September	-0.391***	-0.148***
	(0.0870)	(0.0400)
October	-0.316**	-0.125**
	(0.126)	(0.0495)
Month FE	Yes	Yes
Store FE	Yes	Yes
Year FE	Yes	Yes
P-value: December = January	0.000	0.000
Dep. Mean (March)	7.723	3.317
N	27,930	27,930
R^2 adj.	0.269	0.146

Notes: For comparability of the four months, a year is defined to begin in October and end in September. March is the omitted month. WLS uses the number of transactions as weights. Share donated is the percentage of all recycled money that is donated. Standard errors clustered by both Store and Month using multiway clustering in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A.3: Composition of customers.

	Dependent variable			
	Age	Women	Purchase power	Children at home
November	-0.144	-0.000249	0.00469***	-0.00225
	(0.305)	(0.00134)	(0.00154)	(0.00255)
December	-0.00833	-0.00339	0.00783***	-0.00397*
	(0.381)	(0.00234)	(0.00252)	(0.00199)
January	0.423	-0.00625**	0.00558**	0.000257
	(0.456)	(0.00263)	(0.00215)	(0.000563)
February	0.487	-0.00475	0.00611**	0.00277**
	(0.527)	(0.00283)	(0.00257)	(0.00116)
April	0.0155***	0.00177	0.00405**	-0.00298*
	(0.00315)	(0.00361)	(0.00151)	(0.00165)
May	-0.170***	0.00102	0.000144	0.00163***
	(0.00513)	(0.00230)	(0.00271)	(0.000358)
June	-0.0106	0.00448*	0.00719**	-0.00267***
	(0.0232)	(0.00261)	(0.00263)	(0.000606)
July	0.234***	0.00215	0.0111***	-0.0114***
	(0.0341)	(0.00520)	(0.00314)	(0.000583)
August	0.148***	0.00156	0.00749***	-0.00452***
	(0.0296)	(0.00466)	(0.00175)	(0.000937)
September	0.107***	0.00222	0.00629***	-0.00204***
	(0.0221)	(0.00206)	(0.00149)	(0.000480)
October	0.279***	0.00115	0.00593***	-0.00232***
	(0.0225)	(0.00130)	(0.00145)	(0.000356)
Month FE	Yes	Yes	Yes	Yes
Store FE	Yes	Yes	Yes	Yes
Constant	56.58***	0.641***	0.452***	0.201***
	(0.0145)	(0.00128)	(0.00147)	(0.000339)
N	811,969	1,298,636	1,299,858	1,278,106
R^2 adj.	0.108	0.071	0.215	0.090

Notes: The table reports OLS regression results, where consumer background characteristics have been regressed on month, and store, fixed effects (March is the omitted category). The underlying data is based on the complete two-year purchase history of a random sample of 25,000 customers participating in Coop's membership program. Standard errors clustered by Month in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A.4: Composition of recyclers.

	Dependent variable			
	Age	Women	Purchase power	Children at home
November	-0.235	-0.00798	0.0270***	0.00509**
	(0.168)	(0.0150)	(0.00703)	(0.00241)
December	-1.070***	-0.0204**	0.0165	-0.00267
	(0.198)	(0.00944)	(0.0129)	(0.00625)
January	0.0941	-0.0101	0.00613	0.00162
	(0.158)	(0.0117)	(0.00813)	(0.00381)
February	0.660	-0.0154	0.0148	0.00261
	(0.441)	(0.0122)	(0.00927)	(0.00856)
April	0.416***	-0.00903	0.0171***	-0.0208***
	(0.0740)	(0.0117)	(0.00293)	(0.00190)
May	-0.169**	-0.00265	0.0182***	0.00215
	(0.0631)	(0.00461)	(0.00277)	(0.00313)
June	-0.722***	-0.00629	0.0200	0.00498
	(0.103)	(0.0101)	(0.0128)	(0.00340)
July	-0.361***	0.00422	0.0321***	-0.00504
	(0.0803)	(0.00355)	(0.0108)	(0.00326)
August	-0.635***	-0.00300	0.0190***	-0.00692***
	(0.0703)	(0.00836)	(0.00557)	(0.00240)
September	0.106	-0.00284	0.0286***	-0.0116*
	(0.0942)	(0.00535)	(0.00483)	(0.00612)
October	-0.416***	-0.00142	0.0144	0.00165
	(0.126)	(0.0137)	(0.00885)	(0.00426)
Month FE	Yes	Yes	Yes	Yes
Store FE	Yes	Yes	Yes	Yes
Constant	61.10***	0.595***	0.428***	0.138***
	(0.0636)	(0.00117)	(0.00274)	(0.00137)
N	14,852	25,392	25,450	24,937
R^2 adj.	0.220	0.253	0.364	0.188

Notes: The table reports OLS regression results, where consumer background characteristics have been regressed on month, and store, fixed effects (March is the omitted category). The underlying data is based on the complete two-year purchase history of a random sample of 25,000 customers participating in Coop's membership program. Standard errors clustered by Month in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A.5: Survey responses.

	Answer alternative					
	A	B	C	D	E	*N*
Jönköping	91	40	1	0	68	200
Stockholm	106	65	7	0	87	265
Total	197	105	8	0	155	465

Notes: The table breaks down responses to the survey by city and answer alternative. The survey asked a single question: "What did you do the last time you recycled in a Coop store?" The respondents had five choice alternatives: A) "I pressed the recycling button and thus kept everything myself"; B) "I pressed the aid button and thus gave everything to charity"; C) "I pressed both buttons: I donated a specific amount and kept the rest"; D) "I pressed both buttons: I donated containers of a certain type and kept money from containers of other types"; E) "I do not recycle in Coop stores".

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