

# Comparison of Redemption of Print and Electronic Coupons

*Research in Progress*

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## Abstract

*Promotion via coupons is one of wide-spread marketing tools on Internet. But despite the growth of E-business printed coupons remain in use. We, therefore, compare the performance of printed and electronic coupons as measured by their redemption rates. The coupons come in different set-ups: The consumer can be granted a fixed discount, a certain percentage off the purchase price, or a gift. Therefore, it is also of interest what works better in terms of redemption and, in the case of discount offers, how the size of the discount influences the redemption rate. We estimate response functions based on empirical data of 185 coupon campaigns distributed over various print outlets and web sites. Preliminary results indicate that E-coupons did not perform significantly better than off-line coupons. The inverted U-shape of the redemption curve could be confirmed for print coupons.*

## Keywords

Coupons, e-coupons, e-marketing

## INTRODUCTION

Coupons have been traditionally delivered to potential customers via print media. They have been attached to newspapers, offered on a magazine page, mailed directly to customers, attached to packaged goods, or offered in-store. Nowadays, in addition to these delivery forms, coupons are also delivered via Internet or mobile phones (Dickinger and Kleijnen 2008). They can be also offered with some elements of “social buying” where they only become useable if a certain number of people buy them (Boon et al. 2012). This form will not be considered further in this paper because it functions differently than the other forms.

The use of coupons as a promotional marketing mix factor has been studied extensively in the marketing literature before the advent of electronic business (see (Fortin 2000) for a good review) but the new forms require further research because they change the situation: On one hand, the consumer can actively search for coupons on the internet. There are special websites that serve as a repository of electronic coupons but it is also easy to search for them via popular search engines. On the other hand, coupon issuers or their service providers may be able to better target potential users of coupons. So, although the users did not actively search for them, the coupons may fit their interests more closely than it is usually the case with traditionally delivered print coupons. The redemption of coupons can also be different than in the past, depending on the promoted product or service: E.g., a coupon for an amusement park can still be only used by visiting the park, while a coupon for clothes can be also redeemed on the internet if the store offering them has an e-shop. Therefore, a slowly increasing number of papers started to analyse the effects of the new delivery forms (e.g., Fortin 2000; Suri et al. 2004; Kang et al. 2006; Shor and Oliver 2003 and 2006; Cheng and Dogan 2008; Jung and Lee 2010).

Coupons can be utilized for different purposes: to attract new customers to a shop, to reduce excess inventory (especially in the case of seasonal products), to attract customers to a long binding service contract, to signal a special offer (even if the price has been raised before), to discriminate between price-sensitive and price-insensitive customers (Narashimhan 1984), and so on. The strategic intent can be sometimes inferred from the accompanying descriptions or conditions of redemption but it is not known in general. Therefore, a general and initial measure of success of the coupon campaign is in almost all cases the redemption rate. Further measurements will depend on the purpose of the campaign. These can be the number of returning customers after coupon redemption, size of the market basket of the purchase when the coupon was redeemed, number of customers who cancelled the service contract closed with the use of a coupon after the expiration of the contract binding time, and so on. Displaying of a coupon to a customer may have also a positive advertising effect (Mela et al. 1997) but this is usually more difficult to measure reliably.

The purchase incentive offered to the customer can be in form of a percentage (relative) reduction of the purchase price, as a fixed (absolute) amount reduction, or as a gift, a “freebie” (free product or free service by the coupon issuer or a third party). The redemption is often bound to some non-financial conditions (e.g., just specific product categories or exclusion of specific brands in a department store or exclusion of certain days or times in a restaurant) or to a minimum purchase value.

The paper is structured as follows. The next section reports briefly on some previous research and forms hypotheses on this basis. Then, the method applied in this research is reported. The explanation of the research setting and available data is described afterwards. The paper ends with preliminary results and a short conclusion.

## **PREVIOUS RESEARCH**

Fortin (2000) has grouped research on the use of coupons for promotional purposes in two groups: research on the coupon user and research on the conditions of coupon usage. Our research belongs to the second group. Before, Mittal (1994) similarly classified the research as: modelling of effects of coupon characteristics on redemption and explaining coupon redemption in terms of individual user characteristics. In this classification, our research belongs to the first group. The theoretical lens in one of the early coupon usage studies (Shimp and Kavas 1984) was the theory of reasoned action. This was extended to the theory of planned behaviour in the context of e-coupons (Kang et al. 2006). In both cases, information about users’ attitudes and perceptions is needed which is usually acquired through interviews with users. Besides these and other user characteristics (e.g., demographics), characteristics of the coupon, characteristics of the offered product, competition, and many other factors have been considered in the literature as potential determinants of coupon redemption (Reibstein and Traver (1982) list 22 factors some of which are actually factor groups). Despite of the many potential determinants, most studies use only one or a few independent variables (Fortin 2000). While such models cannot capture the full complexity of the phenomenon, often more data are not available in empirical studies. And in fact, coupon issuers often have to make decisions on coupon characteristics on that limited data basis. This is also the case in our research setting as is described below.

Besides the two mentioned attitude-related studies of e-coupons use, researchers have analysed the following aspects of e-coupons, often in comparison to printed coupons. Suri et al. (2004) study the differential effects of printed and electronic coupons as price communicators. They conduct an experiment which shows that the price perception does depend on the medium of delivery and users’ motivation to process offered information. Shor and Oliver (2003, 2006) show that prompting users for a code found on the e-coupon may have negative overall effects because some users who do not possess the code refrain from shopping. Cheng and Dogan (2008) develop rules to support the decision whether the face value of e-coupons should vary depending on the quality of targeting of customers for coupon delivery. Jung and Lee (2010) compare redemption rates of printed and electronic coupons, analyze how redemption rates change with the discount amount in both cases, and compare redemption rates of discount coupons and gift coupons. Their results indicate that e-coupons lead to higher redemption rates and that there is some support for better performance of gift coupons compared to discount coupons. They did not find differences in face-value-dependent redemption rates with respect to coupon delivery channel but with respect to the type of discount (absolute or relative). To summarize, the research identifies differences between delivery channels and raises new questions that have not been analyzed before the appearance of e-coupons. Some of the latter questions could have been also studied in principle in the context of printed coupons but the implementation of results is much easier in the context of E- or M-Business.

Given the preliminary goals of our research, the paper by Jung and Lee (2010) is most relevant and will be used in the next section to formulate the hypotheses.

## **HYPOTHESES**

Given the limited data availability (see below), we mainly attempt to re-examine the results of (Jung and Lee 2010) in this research-in-progress, but already with enhanced methodology as will be shown in the next section. Therefore, we examine the same hypotheses, partly with slight changes, and give just a short rationale for each hypothesis.

The first hypothesis was not explicitly formulated in (Jung and Lee 2010) but the issue was discussed and corresponding results reported. As indicated above, customers (can) take a more pro-active role in obtaining coupons in electronic media. In particular, having the intention to buy a certain good, they can actively search for coupons for this good itself or its vendors. They, therefore, should be more likely to redeem them than customers who stumble on them in print media. Even people who expect some print coupons to be attached to a newspaper, for example, will usually not do a systematic search (and buy all newspapers sold in a certain time frame and area just to look for specific coupons).

*H1: Redemption rates of e-coupons are higher than those of printed coupons.*

As the value of a coupon rises, the purchase price of the promoted product or service decreases; the redemption rate should, therefore, rise with coupon face value. However, researchers have found that this was not true for printed coupons (e.g., Bawa et al. 1997). Instead, the redemption rate starts to fall at some point if users do not know the price of the promoted product or service (Raghubir 1998) because they assume that the price is high. This leads to the following assumption about the shape of the response curve.

*H2: Redemption rates of printed coupons show an inverted U-shape pattern as face value of the coupon increases.*

In electronic media, it is relatively easy to find out the price of the promoted product or service. Face value does not serve as a price indicator anymore. Consumers only concentrate on the “savings” potential (Jung and Lee 2010) and, possibly, the net price they have to pay.

*H3: Redemption rates of e-coupons increase as face value of the coupon increases.*

Discount promotions are framed by users as reduced losses while non-monetary promotions like gifts are framed as gains (e.g., Campbell and Diamond 1990). Users seem to prefer gains to losses in this context (Diamond and Sanyal 1990). The following hypothesis is formulated independently of the delivery channel.

*H4: Redemption rates of coupons offering a gift are higher than those of the discount forms.*

## METHOD

Redemption rates for printed coupons are usually calculated as

$$\text{Redemption rate} = \frac{\text{number of redemptions}}{\text{number of distributed coupons}}$$

In the case of e-coupons, Jung and Lee (2010) use in the denominator the number of downloaded coupons. They point to the fact that other denominators are possible but that this choice is reasonable in their analysis because users purposely visit the websites in search of coupons. This is, however, not always the situation in the case of e-coupons. They are often spread just as printed coupons, in this case on popular websites. Downloading of coupons already demonstrates a strong interest in the promoted product or service. Comparing redemptions of downloaded coupons with redemptions of distributed print coupons may distort the performance comparison. Therefore, we define two redemption rates:

$$\text{Redemption rate 1 (rr1)} = \frac{\text{number of redemptions}}{\text{number of distributed printed coupons or number of coupon views}}$$

and

$$\text{Redemption rate 2 (rr2)} = \frac{\text{number of redemptions}}{\text{number of downloaded coupons}}$$

whereby the latter obviously only exists for e-coupons.

If we describe the number of redeemed coupons out of all  $n$  distributed coupons by a random variable  $Y$  then  $Y$  follows a binomial distribution such that  $Y \sim \text{Binomial}(n, p)$  where  $p$  denotes the probability of redemption. Denoting the number of actual redemptions by  $y$  (a realization of  $Y$ ), the redemption rate  $\hat{p} = \frac{y}{n}$  is an estimator for  $p$  which, of course, always takes values between 0 and 1. Therefore, we can explain  $p$  by a logit model

$$(1a) p = \frac{\exp(U)}{1 + \exp(U)} \text{ with}$$

$$(1b) U = \beta_0 + \sum_{k=1}^K \beta_k \cdot x^k,$$

where  $x$  is the coupon value (percent-off or face value). The  $\beta$ 's are parameters of the powers of  $x$  for  $k=1, \dots, K$ . The redemption likelihood can be estimated since  $x$ ,  $y$ , and  $n$  are known from observations. The logit model was previously applied in other studies on coupon usage (e.g., Henderson, 1985; Bawa et al. 1997).

Our methodological approach differs from (Jung and Lee 2010) in several ways:

1. We use two different redemption rates for e-coupons. This should allow for a better comparison.
2. We explain redemption probabilities instead of observed redemption rates. This can lead to important differences, e.g., when the denominators in the above equations are low numbers.
3. We use a logit model to explain the redemption probabilities rather than a polynomial trend function. This is preferable to account for the fact that redemption probabilities take only values between 0 and 1.

## DATA

The data for this research were received from a firm in Germany that distributes print and electronic coupons for their customers, the coupon issuers. The distribution of electronic coupons is carried out via various cooperating, mainly small websites which get reimbursed for offering the coupons to their visitors. The reimbursement is based on either downloads of coupons or coupon redemption. The firm carefully chooses the cooperating websites but they do not have any details about individual website visitors (just some overall statistics offered by the websites). Since it runs the ad servers (coupon servers in this case) it knows how often a coupon was displayed, how often it was downloaded, and, from cooperation with coupon issuers, how many coupons were redeemed. All coupons were issued and used in Germany. Absolute incentives were, therefore, expressed in Euro. The data stem from years 2011 and 2012 and cover 185 campaigns in total. Table 1 shows the distribution of campaigns with respect to the coupon delivery channel and the type of incentive offered.

Table 1. Distribution of campaigns by channel and incentive type

		Channel		Total
		print	digital	
Incentive type	absolute	116	19	135
	relative	29	8	37
	gift	11	2	13
Total		156	29	185

Obviously, print campaigns are prevalent in this sample while digital percent-off coupons and gift offers were rarely used. This is mainly due to the fact that the company started the business with the “proven” print channel and is slowly increasing business in the electronic channel. The total sum of all coupons offered which forms the basis for this research was 48,816,505. The distribution of coupon values, coupon circulation, and number of redemptions are given in table 2.

Table 2. Summary statistics by incentive type and total

	Campaigns	Minimum	Maximum	Average	Std. dev.
Absolute incentive	145	3	180	20.82	26.16
Relative incentive	37	7.5%	54%	23.89%	15.52%
Circulation	185	69	4,770,000	263,873	554,437
Redemptions	185	0	23,971	366.76	1,821.41

## PRELIMINARY RESULTS

Table 3 presents the results for redemption rates. These are needed for tests of hypotheses 1 and 4. They show that all redemption rates are relatively low with the exemption of rr2. An average redemption rate of coupons delivered in a Free Standing Insert (most common distribution form) of 0.6% has been reported for the United States for 2013 (NCH 2014). In the non-food segment, which better corresponds to our sample, the rate was 0.5%. Customers in Germany seem to be less used to collect and redeem coupons. One of the reasons may be that discount stores for grocery and household items are very strong in Germany. They never offer coupons but employ a strategy of “every day low prices.”

Table 3. Redemption rates

Redemption rate	Campaigns	Minimum	Maximum	Average	Std. dev.
Print coupons – rr1	156	0%	0.79%	0.11%	0.18%
Electronic coupons – rr1	29	0%	1.19%	0.27%	0.35%
Electronic coupons – rr2	29	0%	58.93%	10.96%	14.99%
All coupons – rr1	185	0%	1.19%	0.13%	0.22%
Discount coupons – rr1	172	0%	1.19%	0.13%	0.22%
Gift coupons – rr1	13	0%	0.55%	0.18%	0.20%

The redemption rates of electronic coupons as measured by rr2 are significantly greater than the redemption rates of print coupons ( $p=0.0088$ ). This is in line with the findings of Jung and Lee (2010) but, as argued earlier, results as an artefact from their measuring method. When measuring both redemption rates by rr1, e-coupons still perform better on average but the difference is no longer significant ( $p=0.1810$ ). In other words, H1 cannot be confirmed when the redemption rate is calculated in the same way for both delivery channels.

To test H2, we first estimated the basic model (1b) with the absolute or relative discount as the only independent variable. We chose  $K=2$  (i.e., included a quadratic term) in order to account for the hypothesized non-linear form of the redemption probability. This did not lead to any significant results. In the case of an absolute discount, it is obviously important to consider how high the minimum order value is, if this is a redemption condition. Therefore, we next restricted the sample to the 33 campaigns with an absolute discount and a known minimum order value (including 0), which we added as a new variable to (1b). We also added campaign duration since the chance to redeem a coupon also may depend on it. This more complex model leads indeed to a confirmation of H2 for absolute incentives. Table 4 presents the results of the estimation.

Table 4. Redemption curve parameters

Variable	Coefficient (Std. error)
constant	-7.8103*** (0.05729)
absvalue	+0.04512*** (0.006034)
absvalue^2	-0.001851*** (0.0001563)
minordervalue	-0.008395*** (0.0009260)
duration	+0.004414*** (0.0001421)

AIC=4,519.3,  
significance (likelihood ratio) is as follows: \*\*\*:  $p < 0.001$ , \*\*:  $p < 0.01$ , \*:  $p < 0.05$

Figure 1 depicts the development of the probability  $p$  as the absolute discount (*absvalue*) varies and while minimum order value and campaign duration are kept constant at the level of their mean values, that is, do not vary with *absvalue*.

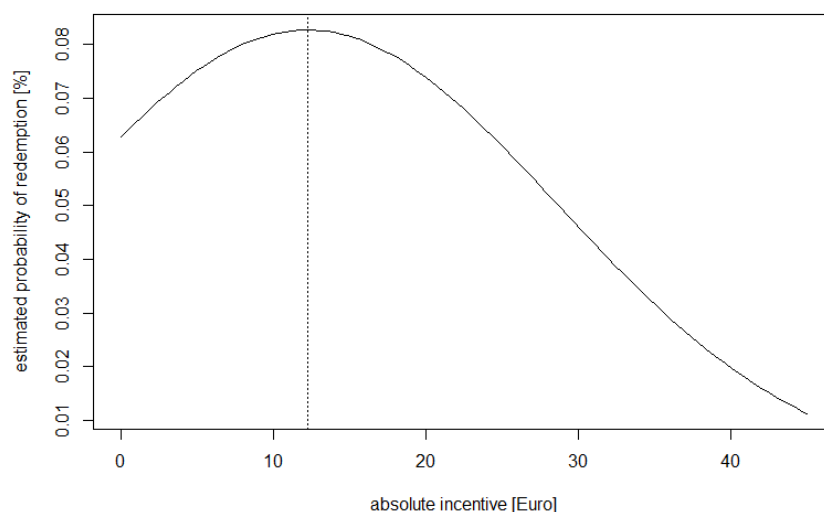


Figure 1: Estimated probability of redemption depending on the absolute incentive (H2)

As can be seen in the figure,  $p$  increases with *absvalue* until *absvalue* reaches the value of Euro 12.19 and decreases afterwards. This shape of an inverted U was posited by H2 and in prior research (Jung and Lee 2010). The maximum amount from at which redemption rates start to fall may appear low but note that the average coupon face value in the United States in 2013 was \$1.62 and \$1.92 in the non-food sector.

When considering minimum order values, the sample sizes of e-coupons ( $n=29$ ) drop to  $n=2$ , so that H3 cannot be tested. We, therefore, do not test H3 in this research-in-progress.

Regarding H4, the redemption rates of all coupons offering a gift are higher on average than the redemption rates of all coupons offering an absolute or relative discount but the difference is not significant ( $p=0.3894$ ). The latter is also true when redemption rates of print coupons offering a gift (mean=0.14%) are compared with redemption rates of print coupons offering an absolute or relative incentive (mean=0.11%,  $p=0.3989$ ). For electronic coupons,

this could not be investigated separately due to a very small number of cases (see Table 1). Thus, H4 could not be confirmed based on the small number of campaigns promising a gift.

## CONCLUSION AND FUTURE WORK

Our preliminary results already show some interesting aspects. The wide-spread use of e-coupons leads to redemption rates (on small websites) that are not significantly higher than redemption rates of print coupons. The observation may be partly due to the still much smaller number of campaigns with e-coupons. Another reason may be that people spend less time on such websites and the websites do not know very much about their visitors compared to Facebook, for example. Therefore, exact targeting is not possible. Good targeting is especially difficult with promotions for items like sunglasses or services like a restaurant visit which can be of interest to many different consumers. Future work can address this issue by examining redemption rates of users who come from a search engine to a website offering coupons with a keyword matching the coupon content (to a certain degree) with those who arrived there in a different way.

The assumption of an inverted U-shaped redemption rate curve has been confirmed for print coupons but in a more complex way than just considering the coupon face value. In fact, considering the relationship between redemption rate and face value without such an important redemption condition as the minimum order value will not lead to reliable results. Future work can investigate other factors possibly influencing redemption rates, e.g., the trustworthiness of the coupon issuer or competition effects.

We will receive data for campaigns in 2013 and 2014 which contain more campaigns with e-coupons by the end of 2014. This will enable us to study the redemption rate curve for e-coupons and then make further comparisons between print and e-coupons. We will be also able to formulate and test further hypotheses with respect to differences of coupon types by delivery channel.

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