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In search of welfare-improving gifts

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ABSTRACT

Gift giving is thought to decrease welfare. Recipients are sometimes stuck with gifts they would not have purchased because the giver does not perfectly know the recipient's preferences and in-kind gifts cannot be costlessly refunded. Such gifts are welfare reducing compared to giving cash if, in addition, recipients possess full information as to which stores carry their desired goods and the ability to reach these stores costlessly. We replace these two latter assumptions with the more realistic assumptions of uncertainty about the location of goods and search costs. In contrast to existing economic models, gifts in our model enhance expected welfare. Moreover, gift giving cannot be replaced by a profit-maximizing trader nor the introduction of nearby specialty stores carrying gift goods. We use our model to explain a number of stylized facts about gift giving, the organization of retail trade and in-kind government transfers.

1. Introduction

Americans spent $137 billion on non-cash gifts to non-household members alone in 2006, accounting for 2.4% of total consumer expenditures, according to the Bureau of Labor Statistics' Consumer Expenditure Survey. For economists gift giving presents a puzzle: It persists despite the claim that non-cash gifts are inefficient and welfare reducing. This claim has spawned theoretical models attempting to account for it (see Camerer, 1988; Carmichael and MacLeod, 1997; Ruffle, 1999; Prendergast and Stole, 2001) as well as empirical tests of the magnitude of the welfare loss of gift giving (see Waldfogel, 1993, 2002, 2005; Solnick and Hemenway, 1996; List and Shogren, 1998; Ruffle and Tykocinski, 2000, along with a more detailed literature review in Section 2).

Gifts are inefficient when recipients are stuck with gifts they would not have purchased. This can happen when the giver does not perfectly know the recipient's preferences and gifts cannot be costlessly returned for cash.[1] For cash to yield higher welfare than gifts, recipients must: (1) Possess full information as to the whereabouts of all goods they desire and (2) be able to reach the stores that carry desired goods costlessly. We replace these two latter assumptions with the more realistic assumptions of uncertainty about the location of goods and search costs, while maintaining the giver's imperfect information about the recipient's preferences and the inability to costlessly return gifts for cash.

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[1] Mercier Ythier (2006) shows that in-kind gifts and cash are welfare equivalent in a frictionless economy.

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Evidence of the importance of search-cost savings in gift giving can be heard in common expressions of gratitude upon receipt of a gift: "Where did you find it? I didn't know such an item existed," "I've looked all over for it, and couldn't find it," or, "I've wanted this for a long time, but never remember to buy it." Moreover, respondents to Solnick and Hemenway's (1996) survey on Christmas gifts cite eight reasons for valuing a gift, four of which concern search costs.[2]

In our model (described in Section 3), the giver and the receiver visit different stores. These stores sell only one kind of good, say good A or good B. Only the person visiting the store knows for sure the type of good sold by the store. The receiver has a unit demand exclusively for good A or good B and zero utility for the other good. The giver knows the receiver's preferred good with probability μ. The giver and receiver visit simultaneously their respective stores. The receiver decides whether to purchase a unit of the good sold by his store for consumption, while the giver, wishing to maximize the pair's expected utility, decides whether to purchase a unit of her store's good as a gift for the receiver.[3] The giver and the receiver then decide independently whether to pay the search cost to visit the other's store at which each has the option of purchasing the good available there.

We characterize how gift giving depends upon search costs, the giver's information about the receiver's preferences (μ), the price and value of the gift good and the likelihood that the two stores stock the same good. The model yields some intuitive comparative-static results. Namely, gift giving increases as either the search cost increases, the receiver's valuation of the good increases or as the price of the good decreases. What is more, we show that for expensive gifts, the better informed the giver is about the receiver's preferences (higher μ), the more likely she is to give. For less expensive gifts, higher μ reduces gift giving. In addition, as the likelihood that the stores carry the same goods increases, gift giving decreases for sufficiently high search costs and, counterintuitively, may increase for sufficiently low search costs.

In Section 4, we show that gifts in our model are welfare improving over autarky. One may ask if there exists a trade equilibrium that could duplicate the welfare of our gift-giving model. In a trade economy, the giver may buy the gift in the hope of selling it to the receiver at a profit. However, we show that there are cases in which gift giving yields a welfare gain over any possible trade equilibrium because the holdup problem precludes trade.

Gifts given at the beginning of a relationship often involve intentionally and visibly high search costs as a way to communicate caring, thoughtfulness, trustworthiness and a willingness to continue to invest in the relationship. The models of Camerer (1988), Carmichael and MacLeod (1997), Ruffle (1999) and Prendergast and Stole (2001) explain well such scenarios. The giver in our model, by contrast, gives a gift because her search costs for the gift are lower than those of the recipient. The reduction of search costs as a motivation for gift giving is appropriate in well-established, close relationships in which altruism come into play. Even in the absence of altruism, the reduction of search costs may still motivate gift giving in repeated interactions. More generally, differential gift-giving opportunities or differential knowledge of the availability and the suitability of certain goods due to, for instance, travel, unequal access to goods in an economy or greater familiarity or experience with a particular good lead to gift giving in our model.

In modern gift giving, unwanted gifts may be returned for exchange, credit or a refund. Section 5 extends our model to allow the gift recipient to return for a refund a gift item he already has or does not want. Adding refunds to our model increases the welfare yield from gifts still further. What is more, we show that a refund policy may increase stores' *net* sales. In Section 6, we demonstrate the robustness of gift giving to the introduction of a specialty store near to the recipient that imports the same good available to the giver. Although this nearby specialty store saves the receiver search costs and saves the giver the uncertainty of buying an unwanted gift, gift giving persists in equilibrium under some circumstances.

In Section 7 we discuss the empirical support for search-cost-related reasons for valuing gifts. We work out some implications of our model for the organization of retail trade. We also examine the ability of our model to account for other stylized facts such as the giving of cash gifts to children and grandchildren and women's dominant role in gift giving. Section 8 concludes.

2. Gift-giving motives in economics

Once a subject studied primarily by sociologists and anthropologists, gift giving has more recently attracted the attention of economists. Economists have attributed a wide range of motives to gift giving. Waldfogel (1993) assumes that gift givers are altruistic (care about the utility of the receivers), while Tremblay and Tremblay (1995) posit paternalistic givers (care about what the receivers consume) to explain why in-kind gifts are usually preferred to cash gifts.

Most of the economics literature on gift giving, however, has been concerned with explaining why gifts are given if they reduce welfare, and estimating the welfare yield of gifts. Camerer (1988) develops a model in which gifts are given in the first stage of a two-stage investment game. The more inefficient the gift, the more credibly it signals the giver's willingness to invest in the relationship in the second stage. Carmichael and MacLeod (1997) use an evolutionary framework to show how the exchange of inefficient gifts at the beginning of a relationship discourages parasites thereby promoting trust necessary for long-term cooperation. In Prendergast and Stole (2001), an in-kind gift is offered only when the giver is sufficiently certain that she knows the recipient's preferences. Although the gifts themselves are welfare reducing in these three models, they enable gains in the longer-term relationship.

[2] In Section 7, we discuss these reasons in the framework of our model.

[3] To distinguish between the giver and the receiver, we adopt the convention that the giver is female, and the receiver is male.

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In Ruffle (1999), the utility from gifts consists of not only the monetary cost and monetary value of the gift but also the emotions associated with the gift as measured by the difference between the gift expected and the gift given. Gift giving improves welfare if the giver's pride and the receiver's surprise from the gift plus the receiver's monetary valuation of the gift exceed the giver's monetary cost.

Apart from emotional and other psychological factors, there appear to be two *economic* sources of welfare-improving gifts. First, gifts may procure a source of insurance for the giver. Parents may give gifts to their children in the hope that the children will care for them in their old age. Posner (1980) discusses the role of gift giving in hunter-gatherer societies as insurance against hunger. Given the high variance in returns from production and the paucity of alternatives on which to spend excess output, surplus was given to another group with the implied obligation of repayment at some future date.

While our model is consistent with the insurance motive for gifts under certain conditions, we focus on a second source of welfare-improving gifts, namely, the giver's superior ability to obtain a suitable gift good for the recipient. For this to occur, the giver must either be able to procure the gift good more cheaply or know more about some aspect of the gift good than the receiver. The good's features, availability, location and price are all potential sources of the giver's superior knowledge of the gift good. The giver may, when traveling abroad, for instance, come across a good not easily found or at a lower price than available to the recipient. The giver's superior information about the gift good may also follow from her own experience with or own consumption of the good. Indeed, the following excerpt offers a colorful example.

> History records that during the reign of Queen Elizabeth the custom of presenting New Year's gifts was carried to great extremes. Gifts of extravagant value were presented to the Queen, and the people made many gifts among themselves ... the least valuable of the gifts which the Queen received was a pair of black silk knit stockings. Such stockings were rare, indeed. Until that time the Queen had worn cloth hose. But the gift so delighted her that she vowed never to wear cloth hose again. Nor did she! (Eichler, 1924, p. 281)

In a similar vein, there are goods for which the recipient needs to make some investment before he begins to enjoy their consumption. For instance, the giver may know that her parents could make good use of a computer or piece of software, if only they knew how to operate it. Likewise, the recipient may learn his preferences only by consuming the good. Goods like classical music or fine wines are an acquired taste or, in the words of Stigler and Becker (1977), require a degree of "consumption capital" before the consumer is able to appreciate them. The giver may recognize the recipient has the potential to enjoy such goods if only he was exposed more regularly to them.

What unifies all of these types of gifts is that the content of the gift is a source of value to the receiver. For gift giving motivated by strengthening social ties or for which the act of giving itself is the source of value, the models of Camerer (1988), Carmichael and MacLeod (1997), Ruffle (1999) and Prendergast and Stole (2001) are appropriate. By contrast, our model does particularly well at explaining valuable or useful gifts. We elaborate on additional examples throughout the paper and especially in Section 7 on stylized facts.

3. Model

3.1. Setup

Suppose there are two stores and two types of goods, A and B. Each store sells one good only, the price of which is p. Suppose that *a priori* each store is as likely to sell good A as it is to sell good B (0.5 probability of selling either good). However, together the stores have a known probability $\alpha \in [0,1]$ of selling the same good. There are two people whom we shall refer to as G and R. The giver, G, decides whether to purchase a gift for the receiver, R. Each person is risk neutral and R derives utility v from the consumption of one unit of his preferred good (exclusively either good A or good B), and zero utility from the other good; the purchase of a unit of either good entails disutility equal to the good's price p ($<v$). G's net expected utility is composed of R's net expected utility from consumption minus G's disutility from gift giving. (We also call this the pair's joint payoffs.) Thus, the giver in our model is motivated by altruism.[4]

The giver receives a signal, A or B, about R's preferences. The giver knows this signal corresponds to the R's preferences with probability $\mu \in (0,1)$. Thus, a signal A with $\mu = 0.25$ has the same information content as a signal B with $\mu = 0.75$, namely, B is the receiver's preferred good with probability 0.75. A signal with $\mu = 0.5$ carries no information. We say that signal A matches good A if $\mu > 0.5$ and signal A matches good B if $\mu < 0.5$ and likewise for good B.

Each person simultaneously visits a different store from the other person (Table 1 displays the joint probabilities that G and R will encounter a particular pair of goods in the first stores they visit). While at the store, each person decides independently whether to purchase a unit of the good that his store sells, R for himself and G as a gift for R. Next, not observing the other's purchase decision, each person decides whether to visit the other store at a cost of c. At the second store, both people again face the same decision, whether to buy the store's good for R. Players G and R later meet and, if G purchased a gift for R, the gift is given. On occasions where G is required to give a gift for R, such as a wedding, birthday or

[4] Becker (1974) shows that family members behave as if they are altruistic when the head of the household is altruistic. Bergstrom (1995) explains altruism among family members as an effort to promote one's genes. Outside the family, for a small enough rate of discount, partners can appear perfectly altruistic in a repeated gift-exchange relationship where no gift triggers a no-gift-giving strategy. Bergstrom (2002) provides an overview of this literature.

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Table 1
The joint probabilities that G and R will encounter a particular pair of goods in the first stores they visit

G\R	A	B
A	$\frac{\alpha}{2}$	$\frac{1-\alpha}{2}$
B	$\frac{1-\alpha}{2}$	$\frac{\alpha}{2}$

the holiday season, not purchasing a gift in our model may be interpreted as giving cash or a small, inexpensive gift rather than a large, expensive one. Furthermore, the cost c in our model can also be interpreted as the giver's superior knowledge about a certain good. The receiver, instead of paying c to visit G's local store, must pay c to acquire knowledge about the good that G knows well. This knowledge may be thought of as necessary to locate the desired good or to figure out whether the good purchased is desirable (learned only after consuming it).

The recipient has three undominated pure strategies: Never buy the good independent of its type and never visit the second store (`zero`); never visit the second store and buy the good in the first store only if it is the desired one (`one`); buy the good if it is the desired one, otherwise visit the second store and again buy the good only if it is the desired one (`two`).

At the first store, G has three pure strategies concerning buying the gift: She never buys a gift (`never`); she always buys a gift independent of the good sold by the store (`always`); or she buys a gift if and only if the good the store sells matches her signal (`if match`).[5] After visiting the first store, G must decide whether to visit the second store. This decision may depend upon whether the good the first store sells matches her signal. At the second store, G has a similar set of gift-giving strategies that again may depend upon whether the good the first store sells matches her signal.[6]

3.2. Equilibrium analysis

We solve this game using the concept of Nash equilibrium. Our assumption that G is altruistic underlies our choice to focus on the Nash equilibrium with the highest social surplus for a given set of parameters. We refer to this Nash equilibrium as the social equilibrium.[7] To find this equilibrium we maximize the sum of the pair's individual expected payoffs over the strategy space. This is a Nash equilibrium since neither G nor R has an incentive to deviate unilaterally: If G is an altruist, a deviation lowers her utility; likewise, whether altruistic or selfish, R will not deviate.

We restrict attention to G's first-store strategies since any social equilibrium will not involve G visiting the second store (as shown below). A comparison of the joint payoffs from all remaining pairs of strategies leads to the paper's main proposition. (The proof of this and all subsequent results appear in Appendix A.) For simplicity of exposition, we define $\tilde{\mu} = \max\{\mu, 1-\mu\}$ (as a measure of the signal's informativeness). Table 2 summarizes these joint expected payoffs.

Proposition 1. *The social equilibrium is*:

(i) (`always`, `one`) *if and only if* $v(1-\alpha)(1-\tilde{\mu}) \geqslant p$ *and* $c \geqslant p(1+\alpha)$;
(ii) (`if match`, `one`) *if and only if* $\tilde{\mu} \geqslant p/(v(1-\alpha)) \geqslant 1-\tilde{\mu}$ *and* $c \geqslant v(1-\alpha)(1-\tilde{\mu}) + \alpha p$;
(iii) (`never`, `one`) *if and only if* $p \geqslant \tilde{\mu} v(1-\alpha)$ *and* $c \geqslant (v-p)(1-\alpha)$;
(iv) (`never`, `two`) *if and only if* $(v-p)(1-\alpha) \geqslant c$, $p(1+\alpha) \geqslant c$ *and* $v(1-\alpha)(1-\tilde{\mu}) + \alpha p \geqslant c$.

From Proposition 1, the last condition on the (`always`, `one`) pair reveals that it can never be an equilibrium if $p > c$. This is so because either G will allow R to buy the good for himself ((`never`, `one`) or (`never`, `two`)) when $\tilde{\mu}$ is close to 0.5, or she will restrict herself to buying a gift when she believes it to be suitable for R, that is, when $\tilde{\mu}$ is close to 1 (`if match`, `one`).

The intuition underlying the `always` equilibrium can be most easily seen for the case of perfectly negatively correlated stores ($\alpha = 0$). In this case, if the price of buying a gift is less than R's search cost, c, then G will always buy R a gift unless she is almost certain of R's type in which case she restricts herself to buying a gift only when her store sells R's preferred good. Put differently, as the price of buying a gift decreases, G is more likely always to buy R a gift since it is cheap to do so compared to R's cost of buying the good himself.

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[5] Explicitly, four possibilities produce a match: When $\mu > 0.5$, either the store sells good A and G's signal indicates that R's desired good is A or the store sells good B and her signal indicates that R desires good B; or, when $\mu < 0.5$, either the store sells good B and G's signal is A or the store sells good A and G's signal is B. We ignore the strategy of G buying a gift if and only if it does not match her signal. G's altruistic preferences imply that this is dominated by `if match`. Although we recognize that in some circumstances one may purposely try to buy a gift that the receiver does not like.

[6] For instance, even if G always buys a good at the first store, she may still visit the second store if the first store's good does not match her signal. She buys the good at the second store only if it matches her signal. As a result, she may purchase both types of goods without duplication. The cost of visiting the second store is justified by the possibility of finding a good that matches her signal.

[7] This can be thought of as the focal equilibrium (Schelling, 1960).

Table 2
The pair's joint payoffs from each of the strategy combinations

G\R	zero	one	two
never	0	$\frac{1}{2}(v-p)$	$\ell \equiv (v-p)(1-\alpha/2)-c/2$
always	$\frac{v}{2}-p$	$v(1-\alpha/2)-\frac{3}{2}p$	$\ell - p$
if match	$\frac{1}{2}(v\tilde{\mu}-p)$	$\frac{1}{2}v(1+\tilde{\mu}(1-\alpha))-p$	$\ell-\frac{p}{2}$

When visiting a foreign country and custom dictates an exchange of gifts between host and guest who may not know each other's preferences well, an inexpensive gift from one's home country that is not readily available in the foreign country is typical. In his popular guidebook for Western business travelers to China, Seligman (1989) recommends the following gifts for Chinese hosts: "Many Americans find that folk and pop music go over extremely well. Foreign liquor, cigarettes, and coffee are also highly appreciated, as are T-shirts with English words on them—it hardly matters what they say." (p. 120). This example captures the following, roughly stated features of our model that lead to purchasing a gift always: A relatively inexpensive gift (low p), items not readily available in China (high c for R), and unfamiliarity with R's preferences ($\tilde{\mu}$ close to $\frac{1}{2}$).[8] While the models of Camerer (1988) and Carmichael and MacLeod (1997) explain why a gift is given, they would incorrectly predict a blatantly inefficient gift to signal the giver's interest in establishing a business relationship with the Chinese recipient. Our model helps explain the choice of particular gift good, namely, one not easily obtained by the recipient.

It is also common to bring home gifts from a trip abroad. Having become somewhat of an obligatory custom, many gifts brought home from abroad are no doubt welfare reducing: A gift of perfume, a souvenir keychain or exotic chocolates to the office secretary or a colleague at work whose preferences are not well known may well be given out of a sense of obligation, a desire not to disappoint (Ruffle, 1999) or to signal thoughtfulness or caring (Camerer, 1988). On the other hand, gifts to closer friends or family members whose preferences are well known may be more tailored to their tastes and selected precisely because of the difficulty in procuring such desired goods at home. For instance, while visiting India you may bring back a doll for a friend whom you know collects dolls because you know that his cost of locating such a doll is prohibitive (`if match`). That is, G may employ `if match` when $\tilde{\mu}$ and c are high and α is low.

If the giver is uncertain whether the recipient really likes dolls, and the particular handmade doll from India is expensive, then the giver does not buy it (`never`, `one`). If one does not have to travel to India to find such a doll, but can readily find it at certain local gift shops (low c and α close to 1), then, uncertain about the receiver's preferences, the giver concludes that if the recipient wants the doll, he can easily buy it for himself (`never`, `two`).

To illustrate these different equilibria, we may fix $v = 100$ and $c = v/4 = 25$, choose a particular value of α, and graph the equilibrium regions as a function of p and μ. Figs. 1, 2 and 3 do this for $\alpha = 0$ (perfect negative correlation between the stores), $\alpha = \frac{1}{2}$ (the goods sold by the stores are uncorrelated) and $\alpha = \frac{2}{3}$ (positive correlation between the goods sold in the two stores), respectively. We chose c sufficiently small so that all four pairs of strategies exist in equilibrium. For c sufficiently large, (`never`, `two`) cannot be an equilibrium since high search costs discourage R from continuing to the second store. To solve for the appropriate c we need to solve simultaneously the conditions under which (`always`, `one`) and (`never`, `one`) are preferred to (`never`, `two`). The solution yields $c \geqslant (v(1+\alpha)(1-\alpha))/2$.[9] Notice that as α increases, the critical value for c decreases since there is an increasing chance that the good sold in the second store is the same one he passed up in the first store.

We now perform comparative-static exercises concerning gift giving. The first three corollaries provide intuitive results that establish the reasonableness of the model's equilibrium. Corollary 4 and the combination of Corollaries 5 and 6 are less straightforward and along with Corollary 1 offer insights unique to our search framework. Let us define gift giving as the expected number of gifts given from G to R.

Corollary 1. *As the receiver's cost of search, c, increases, gift giving increases.*

Loosely speaking, lower search costs mean that G need not take a chance on buying a gift for R that he may not like. By continuing to search at little additional cost, R can buy the good for himself.

If a gift-giving occasion or the nature of a relationship dictates that a gift must nonetheless be given, Proposition 1 suggests that the type of gifts changes as a function of c. Food was once the habitual wedding gift throughout most of the world. Today, however, "food holds a place of lesser importance, because it is ordinarily available to everyone" (Eichler, 1924, p. 278). Since Eichler wrote her 1924 book on the evolution of modern customs, including gift giving, low search costs

[8] The following scenario illustrates another appropriate use of the `always` strategy. It is July and fresh corn on the cob has just come in season. You are on your way to visit a friend when you pass a roadside stand with fresh cobs on sale, 12 for \$5. You do not remember if your friend likes corn on the cob, but since you are right there and it is only \$5, you pick up a dozen corn for your friend.

[9] To obtain this, substitute the expression for p from (8) in (7).

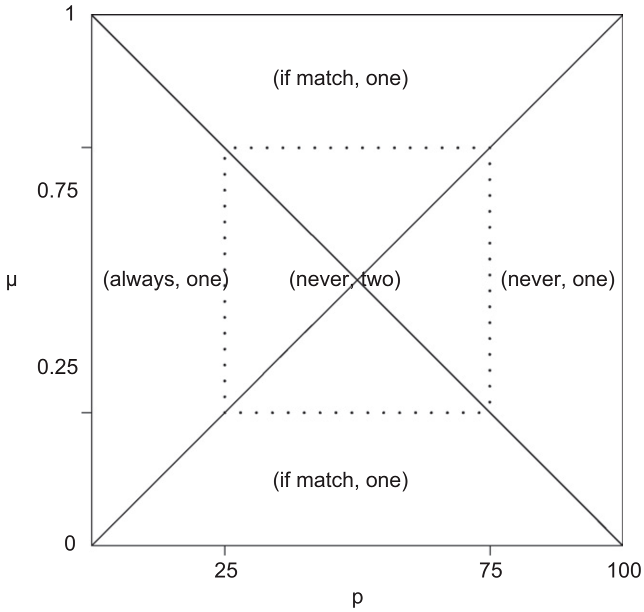

Fig. 1. The equilibrium regions for the four strategy pairs as a function of the price of the gift (p) and the probability (μ) that the giver assigns to the receiver having the same preferences as her signal. The case of perfect negative correlation between the goods sold by the two stores ($\alpha = 0$), $v = 100$ and $c = 25$ is shown here. The dotted line delineates the boundary between the (`never`, `two`) region and the other indicated regions.

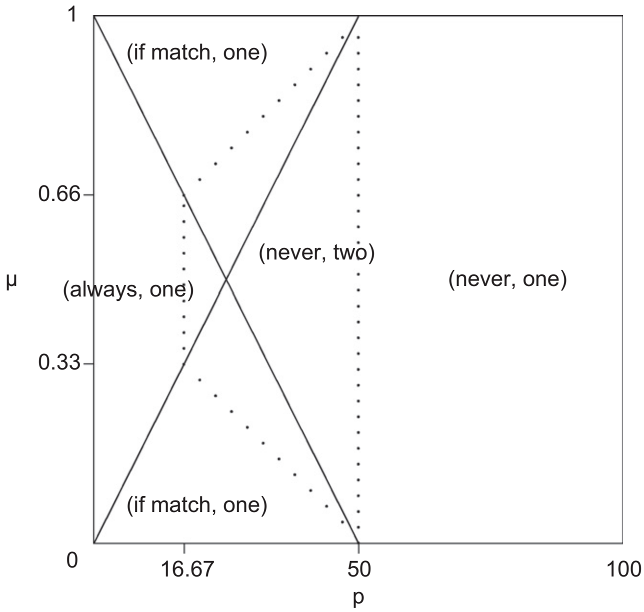

Fig. 2. The equilibrium regions for the four strategy pairs when the goods sold by the two stores are uncorrelated ($\alpha = \frac{1}{2}$), $v = 100$ and $c = 25$.

have rendered food practically extinct as a wedding gift in the Western world. Newlyweds can satisfy all of their grocery needs at the supermarket like everyone else. Similarly, parents tend to replace in-kind gifts with money as their children grow up, one reason being that a child's independence entails decreased search costs for goods.[10]

[10] Section 7 discusses this stylized fact in greater detail.

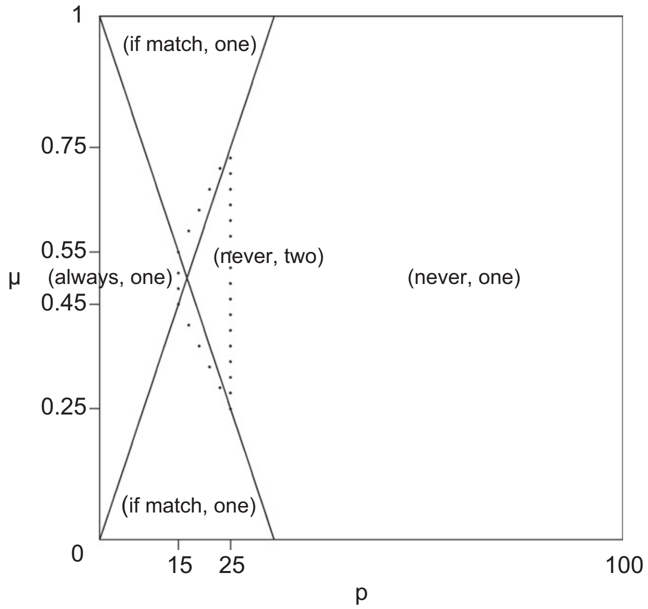

Fig. 3. The equilibrium regions for the four strategy pairs where the goods sold by the two stores are positively correlated (here $\alpha = \frac{2}{3}$), $v = 100$ and $c = 25$.

Corollary 2. *As the utility from consuming a unit of one's desired good, v, increases, gift giving increases.*

Because the gift good is worth more to the receiver, it is more important that he indeed consumes it. Thus, he is more likely to receive it as a gift (Corollary 2) or search for the good himself (and hence (`never`, `two`) increases relative to (`never`, `one`)).

Corollary 3. *As the price of the gift, p, decreases, gift giving increases. In fact, for small enough p, to always give a gift becomes the equilibrium.*

This is simply the law of demand for gift giving. As the price of a gift decreases, G is more likely to buy it, paying less attention to whether the gift may actually suit R's preferences. The suggestion above to give to Chinese hosts associates T-shirts with English words on them, the content of which "hardly matters" (since p is so low relative to v) aptly illustrates this point.

Corollary 4. *There exists a price threshold, $\hat{p}$, such that*

(i) *above this threshold more information about the recipient's preferences increases gift giving; more formally, for $p > \hat{p}$, gift giving increases as $\tilde{\mu}$ increases.*
(ii) *below this price threshold, more information about the recipient's preferences decreases gift giving; more formally, for $p < \hat{p}$, gift giving decreases as $\tilde{\mu}$ increases.*

Corollary 4 illustrates the importance of beliefs about the recipient's preferences in the decision to give and the choice of gift. Below a certain price, $\hat{p}$, more information about R's preferences decreases gift giving: The giver may not always buy the (cheap) gift if she knows that it is not appropriate. While a bottle of perfume or liquor, or a box of chocolates may be an appropriate gift for the office secretary or a colleague at work, you may well know that a best friend would not particularly appreciate such a gift, and therefore not buy it. This implies that fewer gifts are given, although the likelihood that the gift matches R's preferences increases. On the other hand, above this threshold price, gift giving increases with more information about R's preferences. You are not likely to take a chance with a relatively expensive gift unless you know the recipient will like it.

Corollary 5. *For sufficiently high search cost c, as α increases, gift giving decreases.*

Intuitively, the likelihood that R already has the gift good increases with α; therefore G is less likely to buy this good for him as a gift.

Corollary 6. *For sufficiently low search cost c, as α increases, gift giving necessarily increases for a certain set of parameters.*

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At first glance, that gift giving can actually increase as the probability that the two stores sell the same goods increases seems counterintuitive. However, when the cost of search and the gift's price are non-trivial, then in the case of perfectly negatively correlated stores ($\alpha = 0$), if R does not find his preferred good at the first store, he knows that he can obtain it with certainty at the second store. Since $v - p > c$, he will proceed to purchase the good at the second store. G gives no gift, (`never`, `two`). As the correlation between the stores increases, after not finding his desired good at his own store, R becomes less and less certain that the second store sells it. Given the non-trivial search cost and G's partial knowledge about R's preference, G will save R the search cost by buying him the good as a gift.

The following scenario roughly captures the intuition behind this corollary. The recipient may have looked around for something similar, did not find it, and therefore is surprised to receive the item as a gift. Put differently, not having found a particular good, the receiver may conclude that it is not available in the economy, that it does not exist. This source of surprise utility and motive for gift giving are heightened, the higher the α.

4. Welfare implications

Standard economics claims that unless a gift can be costlessly exchanged, in-kind gifts are inefficient and welfare reducing.[11] Cash is the optimal gift because it allows the recipient to allocate the money according to his preferences. Waldfogel (1993) conducts a survey of Christmas gifts received to measure the inefficiency that follows from in-kind gifts. He finds that, on average, recipients value the gifts they receive at 13% less than their estimated costs.[12] In a subsequent study, Waldfogel (2005) finds that consumers value their own purchases at between 10% and 18% higher, per dollar spent, than gift goods.

The tack taken by economists has been to show that gifts serve some (economic) function that compensates for the welfare loss associated with gifts. Camerer (1988) develops a signaling model in which gifts, particularly inefficient ones, serve as costly signals of the giver's intent to invest in a future relationship. Inefficient gifts in Carmichael and MacLeod (1997) evolutionary framework also aid in relationship building where gifts exchanged break down mistrust and permit cooperation.

These models beg the question: Why continue to give gifts in well-established relationships in which signaling plays no role and issues of mistrust are not relevant? The answer may lie in the fact that gifts may not be as inefficient as economists typically assume.

The economic model of gift giving assumes that receivers possess full information as to the whereabouts of all desired goods and are able to obtain these goods costlessly. More realistically, informational asymmetries and search costs exist and differentiate individuals. Our model relaxes the assumption that receivers possess full information and introduces search costs.

By construction, the giver in our model buys a gift if and only if it has positive expected utility for the pair. She chooses the gift-giving strategy that maximizes the pair's net expected utility. Thus, gift giving is welfare improving in our model.

The above conclusion states that gift giving yields higher welfare than autarky. Still, the need for gift giving would not arise if its welfare properties could be duplicated in a trade economy. In the framework of our model, a profit-maximizing giver could speculate on buying a good in order to sell it to the receiver at a maximum negotiated price above her purchase price.

Consider first the case where, as in our model, the good sold in G's store is unobservable to R at the time of the price negotiation between G and R.[13] Independent of observability, whenever the expected negotiated price falls short of the purchase price (a possible outcome due in part to the holdup problem inherent in this setup), G does not purchase the good.[14] On the other hand, if the expected negotiated price exceeds the purchase price, all givers find it profitable to purchase and sell the good to R regardless of the good's suitability. This adverse selection problem hurts welfare compared to similar parameters that lead to a gift-giving equilibrium involving the `if match` strategy. Ironically, this occurs when G has too much bargaining power. Thus, for gift-giving equilibria involving `if match`, only in the unlikely event that the expected negotiated price exactly equals the purchase price (and assuming that only givers with the correct signal purchase the good) is full efficiency maintained.

If R observes the good sold in G's store prior to their price negotiations, then, as before, G must have sufficient bargaining power for the purchase of the good to be profitable and avoid the hold-up problem. Furthermore, the negotiated price is capped by $p + c$ since, having seen that the other store carries his desired good, R can simply visit the store and

[11] The exception is the case in which the gift that costs p dollars exactly matches the way in which the recipient would have spent the p dollars. Waldfogel (1993) provides a useful diagrammatic exposition of the theoretical welfare loss from gifts.

[12] Solnick and Hemenway (1996) replicate Waldfogel's survey and find that Christmas gifts actually produce a 214% welfare gain. Ruffle and Tykocinski (2000) design a series of experiments to account for the two studies' divergent findings. They show that the difference in the wording of the value question between the two surveys produces drastically different valuations of gifts. List and Shogren (1998) conduct a random n-th price auction in which subjects indicate the prices at which they are willing to sell individual gifts received for Christmas. They find that on average subjects value their gifts at about 130% of the estimated costs.

[13] Our model can be interpreted as one of information acquisition. G knows about some aspect of the good, which is unobservable to R. To acquire G's knowledge, R must either incur the cost c or consume the good, corresponding to the case at hand.

[14] An astute reader may notice that if G were perfectly altruistic, she could purchase the good and agree to sell it to R at a price of zero, thereby saving R the search cost. This gift-giving behavior eliminates the hold-up problem, but brings us back to our model.

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purchase it. At the same time, the negotiated price needs to be high enough to permit G to recoup her losses from the cases where she inadvertently purchases a good that does not match R's preferences. The price cap may prevent G from charging such a price rendering trade unprofitable, thereby resulting in an inefficient tradeless outcome.[15] Even when G has full bargaining power, for cases when gift giving would result in (`if match, one`) (and $\mu > \frac{1}{2}$) such duplication by trade would be unprofitable for G whenever $\mu(1-\alpha)\cdot(p+c)<p$. Looking at Fig. 1, one such occurrence is when $p=35$ and $\mu=0.8$ (also $v=100$, $\alpha=0$, and $c=25$).

Let us now calculate the expected welfare gain from our gift-giving equilibria. The expected cost of a gift received is simply p. The expected value of a gift depends on the gift-giving strategy employed. For the strategy `if match`, the expected value is $\frac{1}{2}v(1+\tilde{\mu}(1-\alpha))$. The partial derivative of this expression with respect to $\tilde{\mu}$ is positive: The more informed the giver is about the recipient's preferences, the greater the welfare yield.

The strategy `always` yields $\frac{1}{2}v(1-\alpha/2)$. Notice that the partial derivatives with respect to α for this expression and for the `if match` expression are negative. Namely, the expected welfare gain of gifts is a decreasing function of α. As the correlation between the goods sold by two stores increases, the likelihood that the receiver already owns the gift (and therefore derives zero utility from an additional unit of it) increases.

We will now show that, like the expected welfare of the giver and receiver, the stores' sales also increase as α decreases to zero. To see this, compare the expected cost expressions in Table 2. Among the four equilibrium outcomes, expected sales are maximized for the (`always`, `one`) pair ($\frac{3}{2}$ sales), followed by (`if match`, `one`) (1 sale), (`never`, `two`) ($(1-\alpha/2)$ sales) and (`never`, `one`) ($\frac{1}{2}$ sale), respectively. As α decreases to zero, Figs. 1–3 reveal that all shifts in equilibrium strategies lead to an increase in sales (either through increased gift giving or, in the case of G choosing `never`, R visiting both stores). Thus, if stores could coordinate to choose the measure of correlation between the goods they sell, they would choose maximum product differentiation ($\alpha=0$ for all v, p, μ and c). We will further examine the stores' decisions to stock one good or another in discussing the model's implications for retailing in Section 7.

5. Refunds

In modern societies, unwanted gifts may often be returned for exchange, credit or a refund. In this section, we extend our model to permit returns. If the gift is a good that R already has or does not want, then he may return it. Because we assume that stores sell only one type of good, we exclude the possibility of exchange or credit and focus our attention on refunds. Assume that R pays c to return the good.[16] When returned, R receives a refund in the amount paid for the good, p. We examine how allowing for refunds affects G's optimal gift-giving behavior.

Proposition 2. *The possibility of refunding an unwanted gift increases gift giving and the welfare yield from gifts.*

The increase in gift giving from permitting returns can be seen in Fig. 4: The (`if match`, `one`) region expands (as indicated by the shaded regions) at the expense of (`never`, `two`) and (`never`, `one`).[17]

We now ask whether net sales increase if stores allow refunds. On the one hand, refunds lower the cost of mistakes about preferences and reduce the expense of miscoordination (i.e. buying a gift the receiver already has), resulting in an increase in gift giving. On the other hand, returns lower net sales. The net effect on sales could go in either direction. For example, the point ($p=50$, $\mu=0.8$) in Fig. 4 falls in the (`if match, one`) region with or without returns; permitting returns therefore reduces net sales since some of the items will be returned due to mismatches and $c<p$. Consider now a higher price of $p=85$ and the same signal strength $\mu=0.8$: The strategy pair (`if match, one`) replaces (`never, one`) and net sales increase. This analysis can be summarized by the following.

Remark. For relatively inexpensive gifts, a refund policy may decrease retailers' net sales, while for relatively expensive gifts, a refund policy may increase retailers' net sales.

Retail stores therefore ought seriously to consider offering customers gift receipts for the purpose of refunds. Not all forms of a refund policy are equal: Some givers may be disinclined to include a gift receipt that reveals the purchase price. They could always throw away the receipt. However, without a receipt some givers may not purchase the (relatively expensive) gift they otherwise would have if there is a high probability that the gift will go unused. To circumvent these concerns, many stores print gift receipts without the price.[18]

[15] This scenario also reveals why the presence of Internet shopping and Wal-Mart limit the price full-service retailers can charge. Otherwise consumers will frequent these retailers for their service only, ultimately purchasing elsewhere.

[16] One might argue that with the hassle of returning a good, the cost of returning the gift should, in some cases, be higher than c. Alternatively, the return cost may be lower than the search cost, for instance, in the case that R already bought the same good since he can return it to his local store. When the return cost is zero, (`always, one`) emerges as an equilibrium since, as Mercier Ythier (2006) notes, giving would then entail no welfare loss.

[17] The (`never`, `two`) and (`if match`, `one`) border is described by $\tilde{\mu}=(100-p)/(125-p)$, while the (`never`, `one`) and (`if match`, `one`) boundary are described by $\tilde{\mu}=25/(125-p)$.

[18] For example, upon request, Macy's and other large U.S. department stores provide a printed gift receipt that identifies the store to the receiver, uniquely identifies the product to the store and also informs only the store of the purchase price. Other stores such as Tiffany and Co. allow any good to be exchanged without a receipt. The packaging identifies Tiffany as the place of purchase and (for high-priced items) serial numbers allow Tiffany to match the item with the precise purchase so that information such as the purchase price may be retrieved.

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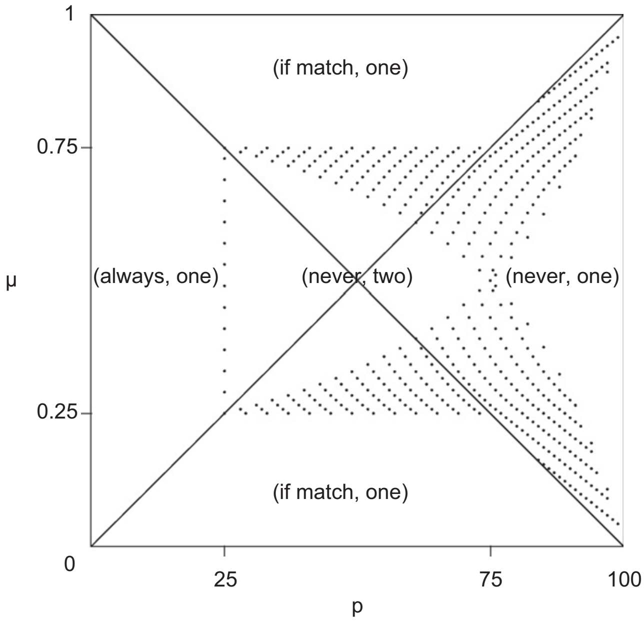

Fig. 4. Refund equilibrium regions for $\alpha = 0$, $v = 100$ and $c = 25$. The shaded regions indicate the increase in gift giving (the region (`if match`, `one`) expands at the expense of (`never`, `one`) and (`never`, `two`)) when refunds are allowed.

6. Specialty shops and gift giving

In this section, we introduce an additional store near the receiver that may import a unit of the good available at G's store. We refer to this store as the specialty store. The recipient may then visit this nearby store costlessly. We ask whether the addition of this specialty store is able to replace gift giving altogether, whether it is unable to penetrate the market or whether gift giving and importing can coexist.

Suppose that G and R's stores always carry different goods and each store sequentially faces a large number of heterogeneous customers. For consistency with our baseline model in Section 3, each customer (equivalently, receiver) has demand for at most one unit of a good, values each good with probability $\frac{1}{2}$, and considers the goods perfect substitutes with probability α.

The specialty store first decides whether to import (I) a unit of the good from G's store, or not (O). The specialty store pays $p+s$ to import the good equal to the purchase price p plus shipping costs s. Next G and R move simultaneously. Assume the specialty store starts with one unit in stock. If R purchases the good sold by the specialty store, then in the next period the store pays $p+s$ to replace this unit. If the unit remains unsold, the specialty store must pay an inventory cost i to maintain the good on the shelf and incurs interest on the import costs $r(p+s)$. The specialty store must set a price for the imported good. We denote R's strategy space as {`zero`, `one`, `spec`, `two`}, where `spec` represents visiting the specialty store after the local store and buying the good if it is desired and `two` now represents going to G's store after the local and specialty stores.

Notice that G, R and the specialty store each has an advantage in some domain. The specialty store's net cost of not selling a good is likely to be lower than G's cost of purchasing an unwanted gift ($i+r(p+s)<p$). The store's extra cost of bringing the good to R is likely to be lower than R's cost of seeking the good at G's store ($s<c$). On the other hand, R knows his own preferences best, while G knows R's preferences better than the store and has the lowest cost of bringing the good to R ($0<s<c$). That each player has a specific advantage over the others suggests that gift giving, importing exotic goods and search may each emerge as an equilibrium outcome, depending on the parameters.

Proposition 3. *Gifts are given in any subgame-perfect equilibrium if and only if*

$$\min\left\{v(1-\tilde{\mu})+\frac{\alpha}{1-\alpha}p,\frac{1+\alpha}{1-\alpha}p\right\}<\frac{1+\alpha}{1-\alpha}[r(p+s)+i]+s.$$

Otherwise, there is a subgame-perfect equilibrium in which the giver gives no gift, the receiver looks for a good he values at his own store and the specialty store imports the good, namely (`never, spec, I`).

For any price $p>0$, there are sufficiently small r, i, and s such that importing will overcome the gift-giving strategy `always` (represented by the right-hand part of the min function). Gift giving may still be preferred to importing through the strategy `if match` if the giver's information about R's preferences is sufficiently informative ($\tilde{\mu}$ sufficiently close to one) and α is sufficiently small since the left part of the min function would tend to 0. Alternatively, for a low enough price p, G will use `always`, since the right-hand part of the min function will tend to zero. Thus, the specialty store cannot replace gift giving altogether.

The main point of this section is to show that even if we introduce a store that has access to the good available to G and saves R on search costs, equilibrium gift giving persists for some parameters and, in some of these cases, gift giving will prevent the specialty store from importing. For other parameters, importing is the best alternative and, again for a subset of these parameters, importing will replace gift giving. Still for other parameters, R prefers to search for the good himself.

7. Stylized facts

1. *Reasons for valuing gifts*: That search costs are an important motivation for gifts finds ample support in studies on modern gift giving. Respondents in Solnick and Hemenway's (1996) survey designed to measure the welfare yield of Christmas gifts cite eight different reasons for valuing a gift, four of which concern search costs. Twenty-two percent of their 155 respondents indicated that "the item is something [they] needed/wanted but never remember to get" (high c). Another 20% "wouldn't have wanted to shop for this gift" (high c, possibly due to α close to 0). Thirteen percent of respondents said the gift "is not readily available where [they] live" (α close to 0 and therefore high c). Finally, 6% of the receivers revealed that they "didn't know this item was available" (a low probability of locating it).[19] It is worth adding that these reasons and the associated percentages concern Christmas gifts. As the next stylized fact points out, search costs and the unavailability of the gift item are even more important factors for informal gift-giving occasions, such as trips abroad.

2. *Retail trade and gift boutiques*: The importance of gift giving for retailers suggests that, to the extent that search costs and uncertainty about the recipient's preferences are important, our model should have reasonable implications for retailers' choices of location and portfolio of goods to stock.

Expensive gift boutiques cater to individuals with a high value of time (i.e. high search costs) or little idea what to buy the recipient (μ close to $\frac{1}{2}$). Large department stores offer too wide a range of goods and thus are too time consuming for the busy gift shopper. Specialized stores (e.g. clothing stores) often carry too many lines of the good in which they specialize, thus complicating the giver's decision. Gift boutiques, by contrast, usually focus on single lines of diverse novelty items (not easily found elsewhere, thus making it unlikely that the recipient already owns the item). The busy person who has even a remote idea of a suitable gift can thus select something quickly. Moreover, the boutique can insure the giver against mistakes by offering refunds. For these time-saving and insurance services, gift boutiques are able to charge high prices.

In today's global economy, one wonders how the custom of bringing home gifts from abroad persists. These gifts are typically local specialty items unavailable ($\alpha = 0$ and high c) or more expensive at home.[20] But why cannot these specialty items be imported and sold at home to replace gift giving? As Section 6 shows, if the giver has good information about the receiver's preferences and importing costs are sufficiently high, gift giving can yield higher social welfare than purchasing these goods at home. Moreover, after having visited the country and learned about the centrality and symbolism of these items in the local culture, the giver can increase the recipient's appreciation of such gifts (higher v), thereby enhancing further the welfare gain from gift giving. Airports have become particularly successful venues for gift shops. Often, the business and vacation traveler have little time to shop during their travels. The airport security requirement that passengers arrive as many as 3 hours prior to departure creates a rare occasion during which travelers' opportunity cost of time is minimal. They can make use of this time to purchase local specialty items at these gift shops. For the giver unfamiliar with the recipient's tastes, these shops also sell more internationally standardized products like perfume, liquor, cigars and chocolates.

3. *In-kind government transfers*: Like gift giving, government transfers would at first glance appear to be dispersed most efficiently as cash. In practice, however, "in-kind transfers, ranging from housing to medical care, are the predominant form of social welfare in developed and in many developing countries" (Jacoby, 1997). Governments prefer in-kind transfers for several reasons. First, the government may have paternalistic preferences, implying it cares about individuals' consumption choices (e.g. Pollak, 1988). Second, by offering cash, the government creates an adverse selection problem, which may be particularly acute when individuals' criteria for deservingness are not easily evaluated. Low-quality, non-transferable in-kind transfers screen out less deserving individuals (Besley and Coate, 1991). Third, cash transfers encourage excessive risk-taking and overconsumption so that the individual will continue to qualify for future assistance. In-kind transfers ameliorate this moral hazard problem (Bruce and Waldman, 1988).

While all three reasons are compelling, we suggest that search-cost savings provide an additional justification for some in-kind transfers. Consider the case of government-sponsored job training. Individuals may know little about the sectors in which workers are, or will be, in short supply. Although the government could inform the public, such announcements may lack credibility. By committing resources to specific job-training programs, the government signals the need to train people in the designated areas. The coverage of certain prescription drugs and medical procedures under health care plans provides a second case in point. Although governments or HMOs do not know the specific needs of every patient, they may

[19] Not knowing an item existed or was available may follow from one of the two scenarios in our model: First, if α is close 1 and the good is unavailable at R's own store, R does not bother to visit the second store. Second, if R expects to find the good at his own store but does not and α is close to 0, R concludes that it is probably unavailable at the second store.

[20] Persian carpets from Turkey, English tea, wooden cuckoo clocks from Switzerland, religious souvenirs from Israel, African art, and fabrics and clothing from India are examples of such commonly purchased gift goods.

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be better informed than the patient of the relative effectiveness of medications and procedures and able to convey this information through their decision to reimburse some but not others.

4. *Cash gifts to children and grandchildren*: While money is widely considered a poor choice of gift (Pieters and Robben, 1999 survey the numerous reasons why this is so, and Waldfogel, 2002 estimates the stigma of cash gifts), there are some notable exceptions. For example, as children grow up, parents tend to substitute money for in-kind gifts (see Camerer, 1988, p. S198; Caplow, 1982, p. 386).

Our model offers two explanations for this stylized fact. First, as children spend less time with their parents and begin to develop their own identities, parents know less well their children's preferences, and therefore tend to give a gift certain to be of use to their children, namely, money. Second, as children become more independent their search costs shrink and along with this so do the parents' previously held informational advantages (the location of a desired good, or its range of available prices). While parents may know what sort of toy would make a suitable gift for their eight-year-old child, and where to find it, they may be at loss when it comes to the music or fashion preferred by their 15-year-old child.

The disappearance of the parents' search-cost advantage over their child culminates with the child's wedding: The child now has a spouse to share in the division of labor, including the search for goods. Cash gifts as a wedding present from parents are thus ubiquitous.

Children receive cash gifts from their grandparents even more frequently and from an earlier age. Caplow (1982) and Waldfogel (1993, 2002) report that grandparents were the most frequent givers of money; about half of the gifts received from grandparents in their studies were money. The grandparents' choice may be motivated by insufficient information about their grandchild's preferences. Indeed, Waldfogel (1993, 2002) shows that in-kind gifts from grandparents have the lowest welfare yield, and that "cash giving is more likely from givers who tend to give unwanted gifts, indicating that givers are concerned with the utility of their recipients" (2002, p. 415). Our model is not only consistent with this explanation for cash gifts (μ close to $\frac{1}{2}$ implies G chooses `never` for p sufficiently high), but also offers an additional one: In spite of a lower opportunity cost of time, grandparents may have higher search costs than other family members either because they have more difficulty locating a gift their grandchild will appreciate or because poor health or limited mobility reduces their ability to search.

5. *The role of gender in gift giving*: Several studies suggest that women are either more involved or better at gift giving than men. Cheal (1988) finds "only 18% of the gifts given by male respondents in Winnipeg were given unaided ... The usual pattern of male giving consists of collaboration with a close female relative who does most of the gift work" (p. 29). Based on 299 in-home interviews on Christmas gift giving, Fischer and Arnold (1990) conclude that women give Christmas gifts to more recipients than men (on average, 12.5 versus 8), start shopping for gifts earlier than men (in October versus November), devote more time to selecting the appropriate gift (2.4 versus 2.1 hours per recipient), and are more successful in finding a desirable gift (10% of women's gifts were returned or exchanged versus 16% of men's gifts). Questionnaire results reported in Komter (1996) confirm that women give (and receive) more gifts than men and are more efficient at gift shopping. Fischer and Arnold propose that women possess greater gift-shopping skills than men because they typically do the regular shopping for the family and are more familiar with the recipients' wants and needs. One woman describes how she shops for her husband as follows: "It takes me a while to figure out what he'd really like. Then I watch for it, to see what market trends are, what goes on sale" (p. 336).

In the language of our model, women have lower search costs than men due to their greater familiarity with the recipient's preferences, their superior knowledge of the availability, location and price of gift goods and, according to traditional gender roles, their lower opportunity cost of time. Our model further predicts that for stay-at-home men and in households in which earned incomes, hours worked and shopping duties are more egalitarian between husband and wife, gift giving will be divided more equally. Fischer and Arnold confirm this prediction: "More egalitarian men are slightly more involved than traditional men, while more egalitarian women are slightly less involved than traditional women" (p. 342).

Yet men may still have a comparative advantage in shopping for some gifts. Caplow (1982, p. 386) finds that, "Women are much more likely than men to give ornaments, craft objects, food, plants and flowers. Men give most of the appliances and sports equipment." Traditional gender roles suggest that the gifts given predominantly by women are items about which they are more knowledgeable, either through personal consumption or shopping for such items. Likewise, men may possess a comparative search-cost advantage about the mechanics of certain household appliances and sports equipment and therefore choose to give them as gifts.

8. Final remarks

In this paper, we develop a model where gift giving can be welfare-enhancing due to search cost savings. In our hi-tech information age, the question arises concerning the continued relevance of search costs in gift giving. On the one hand, if one knows what one wants, e-commerce provides access to a wide range of goods. On the other hand, the baffling and continuously expanding plethora of available goods make it impossible to keep up with the fast growing selection of goods or, more precisely, to know what one wants most. Furthermore, the fast pace of modern society with its ever expanding range of leisure pursuits places a premium on our time. In other words, search costs are high. The rise of the professional gift-buyer who selects gifts for busy, affluent individuals to give provides further evidence of the increased importance of search costs. These individuals gather information about the giver's and receivers' preferences and then make use of their knowledge of available goods to select appropriate gifts. As these trends continue, we can expect gift giving motivated by saving both the giver and the receiver search costs to take on an even more central place in our personal relationships.

Our intent is not to state that all gifts are welfare improving. Many are surely not—recall from the extract in Section 2 the massive volume of gifts given to Queen Elizabeth to mark the New Year. But certain gifts, motivated by reducing search costs, do enhance welfare. And just maybe, on average, gift giving makes people better off than in its absence.

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Appendix A. Proofs

Proof of Proposition 1. Without loss of generality, we assume R's desired good to be good A throughout the analysis. If R chooses the strategy `zero`, then the social surplus from each of G's three strategies is easy to compute. The strategy `never` yields 0 surplus. The strategy `always` yields $v/2 - p$ since half of the time R receives his preferred good as a gift. Since the good the store carries is independent of G's signal, half the time the store carries a good that matches her signal. Thus, the strategy `if match` yields $v\tilde{\mu}/2 - p/2$, since half the time the gift is bought and given it is purchased, it is R's preferred good with probability $\tilde{\mu}$.

If G's strategy is `never` and R chooses the strategy `one`, then with probability $\frac{1}{2}$, the store that R visits sells good A which he purchases yielding the expected social surplus of

$$EU(\texttt{never}, \texttt{one}) = \tfrac{1}{2}(v - p). \tag{1}$$

Notice that the social surplus from $(\texttt{never}, \texttt{one})$ is greater than that from any of the outcomes involving R's strategy `zero`. Thus, no pair of strategies involving `zero` can ever be a social equilibrium. The intuition is that the stores are *ex ante* identical and given the choice between R buying a unit of the good at his store and G perhaps buying a gift at her store, the former yields a higher expected social surplus no matter G's strategy since R has better information about his own preferences and will buy the good if and only if it is his preferred one. This same intuition explains why G's purchase of a gift at R's store cannot be part of a social equilibrium: R buying the good at his own store (`one`) nets a higher social surplus. Thus, we have shown that no matter his strategy, R definitely buys his desired good if the first store he visits sells the good and G never visits R's store.[21]

Next, we turn to R's strategy `one` and consider each of G's strategies in turn. If G follows the strategy `always`, then G and R's total expected cost from purchases equals $\frac{3}{2}p$, since G always buys R a gift and R buys the good for himself half of the time (whenever he visits an A store first). Only when both G and R's stores sell good B does R not receive his desired good. This occurs with probability $\alpha/2$ implying that R's expected utility from the consumption of his desired good is $v(1-\alpha/2)$. Summing these two expressions yields

$$EU(\texttt{always}, \texttt{one}) = v(1 - \alpha/2) - \tfrac{3}{2}p. \tag{2}$$

If G buys R a gift only when she visits a store that matches her signal (`if match`), then p is the expected cost in attempting to satisfy R's unit demand: Half of the time G's store sells the same good as her signal ($\frac{1}{2}p$) and half of the time R's store sells good A ($\frac{1}{2}p$). The recipient values G's gift with probability $\tilde{\mu}$ and only in the case that G visits an A store while R visits a B store ($(1-\alpha)/2$). With probability $\frac{1}{2}$, R purchases his desired good for himself ($\frac{1}{2}v$). Taking these expressions together, we obtain the pair's net expected utility from this strategy pair:

$$EU(\texttt{if match}, \texttt{one}) = \tfrac{1}{2}v(1 + \tilde{\mu}(1-\alpha)) - p. \tag{3}$$

Consider now R's strategy to continue to the second store if the first store he visits does not sell his desired good (`two`). In this case, G would never buy a gift good for R because she knows that R will come to her store (`never`, `two`). R's expected utility from the strategy `two` (which equals the pair's net expected utility since G buys no gift) equals $\frac{1}{2}(v-p)$ in the case that R's first store sells good A, and $\frac{1}{2}(1-\alpha)(v-p) - c/2$ if it does not. Simplifying, we obtain

$$EU(\texttt{never}, \texttt{two}) = (v - p)(1 - \alpha/2) - c/2. \tag{4}$$

[21] In a modified setup not considered herein R's strategy `zero` may be part of an equilibrium outcome. Instead of assuming that the two stores sell the same good with probability α, suppose that there is a high probability, say 0.95, that G's store sells good A and a low probability, say 0.01, that R's store sells good A. For the appropriate parameters, even if R's store sells good A, he will not buy it for himself since he expects to receive it from G.

By comparing the net expected utilities from all strategy combinations (summarized in Table 2), we obtain the following six linear inequalities:

$$(\texttt{if match}, \texttt{one}) \geqslant (\texttt{always}, \texttt{one}) \Leftrightarrow \tilde{\mu} \geqslant 1 - \frac{p}{v} \cdot \frac{1}{1-\alpha}, \tag{5}$$

$$(\texttt{if match}, \texttt{one}) \geqslant (\texttt{never}, \texttt{one}) \Leftrightarrow \tilde{\mu} \geqslant \frac{p}{v} \cdot \frac{1}{1-\alpha}, \tag{6}$$

$$(\texttt{never}, \texttt{one}) \geqslant (\texttt{never}, \texttt{two}) \Leftrightarrow \frac{c}{1-\alpha} \geqslant v - p, \tag{7}$$

$$(\texttt{always}, \texttt{one}) \geqslant (\texttt{never}, \texttt{two}) \Leftrightarrow \frac{c}{1+\alpha} \geqslant p, \tag{8}$$

$$(\texttt{if match}, \texttt{one}) \geqslant (\texttt{never}, \texttt{two}) \Leftrightarrow \tilde{\mu} \geqslant 1 + \frac{\alpha p - c}{v(1-\alpha)}, \tag{9}$$

$$(\texttt{always}, \texttt{one}) \geqslant (\texttt{never}, \texttt{one}) \Leftrightarrow v(1-\alpha) \geqslant p. \tag{10}$$

We can then use these inequalities to determine conditions under which each of the four undominated strategy pairs forms a social equilibrium. Note that we can eliminate (10) by the following logic. If (`always`, `one`) yields higher social surplus than (`if match`, `one`), then the former also necessarily does better than (`never`, `one`). Intuitively, if given R's strategy (`one`), always giving a gift does better than giving a gift only when it matches G's signal about R's preferences, then always giving a gift must also do better than never giving a gift. The reverse logic also holds; namely, if (`never`, `one`) yields higher social surplus than (`if match`, `one`), then it also yields higher social surplus than (`always`, `one`). □

Proof of Corollary 1. From Eqs. (1)–(4), we observe that c affects the expected utility of the (`never`, `two`) strategy pair only. Thus, all other equilibrium regions are affected by a change in c only to the extent that they border on (`never`, `two`). As c decreases, R increasingly prefers to continue to search rather than stop after not finding his preferred good in the first store he visits. Put differently, the (`never`, `two`) region shrinks as c increases. This means that both gift-giving equilibrium regions expand as c increases. Gift giving increases. □

Proof of Corollary 2. From Eq. (7) we see that the (`never`, `one`) shrinks with respect to (`never`, `two`) as v increases. While this involves no change in gift giving, all remaining shifts in equilibrium strategies result in increased gift giving. For instance, Eqs. (5), (6) and (9) reveal that: (i) (`always`, `one`) increases with respect to the gift-giving equilibrium region with which it borders, namely (`if match`, `one`); (ii) (`if match`, `one`) increases with respect to (`never`, `one`); (iii) (`if match`, `one`) expands at the expense of (`never`, `two`). □

Proof of Corollary 3. As Figs. 1–3 reveal, a sufficient decrease in p causes one of four possible changes in the equilibrium outcome: (i) From (`never`, `one`) to (`never`, `two`); (ii) from (`never`, `two`) to (`always`, `one`); (iii) from (`never`, `one`) to (`if match`, `one`); (iv) from (`if match`, `one`) to (`always`, `one`). The change in (i) involves no change in gift giving. All of the other shifts entail an increase in gift giving. □

Proof of Corollary 4. To show (i) in Corollary 4, consider p such that the equilibrium outcome is (`never`, `two`). To this end, choose $\hat{p} = c/(1+\alpha)$. By (7) and (8), (`never`, `two`) is an equilibrium as long as $v - c/(1-\alpha) > p > c/(1+\alpha)$ and, by (9), $\tilde{\mu} < 1 + (\alpha p - c)/v(1-\alpha)$. As $\tilde{\mu}$ increases it crosses the boundary with, and enters, the (`if match`, `one`) equilibrium region, thereby increasing gift giving. To complete the proof of (i), choose $\hat{p} \geqslant v - c/(1-\alpha)$ so that (`never`, `one`) is the equilibrium outcome. Increasing $\tilde{\mu}$ will eventually lead to (`if match`, `one`), an increase in gift giving.

For (ii), choose $\hat{p} = c/(1+\alpha)$. For $p < \hat{p}$ and the appropriate initial beliefs given by (5) and (6), `always` is G's equilibrium strategy, as seen by (8). Increasing $\tilde{\mu}$ eventually shifts her equilibrium strategy to `if match`, a decrease in gift giving. □

Proof of Corollary 5. If c is sufficiently large such that (`never`, `two`) cannot be an equilibrium outcome, namely, $c > v(1+\alpha)(1-\alpha)/2$ (as shown above), then for any given v, p and μ, it is always the case that gift giving (weakly) decreases as α increases. Explicitly, from (5), since $\partial\tilde{\mu}/\partial\alpha > 0$, (`always`, `one`) decreases with respect to (`if match`, `one`). Eq. (6) reveals that (`if match`, `one`) shrinks with respect to (`never`, `one`) since $\partial\tilde{\mu}/\partial\alpha < 0$. □

Proof of Corollary 6. For this corollary to hold, we require that (`never`, `two`) exists as an equilibrium outcome; in other words, $c \leqslant v(1+\alpha)(1-\alpha)/2$. For such a c, fix a $p = \bar{p}$ on the boundary line between (`never`, `two`) and (`if match`, `one`). Consider the $\tilde{\mu}$ that meets this condition, $\tilde{\mu} = 1 + (\alpha\bar{p} - c)/v(1-\alpha)$. Taking the derivative of this expression with respect to α, we obtain $\partial\tilde{\mu}/\partial\alpha = (1/v)(\bar{p} - c)/(1-\alpha)^2$. Hence, if $\bar{p} < c$, then $\partial\tilde{\mu}/\partial\alpha < 0$. Thus, for any α, all points on the boundary between (`never`, `two`) and (`if match`, `one`) fall strictly within the (`if match`, `one`) region as α increases. Furthermore, due to continuity, for small enough ε below this line, there exists a $\delta > 0$ such that if α increases by δ, the points within ε of the line move from (`never`, `two`) to (`if match`, `one`). □

Proof of Proposition 2. Notice that for $p < c$, the recipient will not bother to return the gift. Thus the (`always`, `one`) equilibrium region remains unchanged since $p < c$ is a necessary condition for the existence of this equilibrium. The addition of returns therefore affects the net expected utility of the gift-giving region (`if match`, `one`) only and

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is given below:

$$EU^{\text{refund}}(\texttt{if match}, \texttt{one}) = \frac{v}{2}(1+\tilde{\mu}(1-\alpha)) - p + \max\{p-c, 0\} \cdot \frac{1-\tilde{\mu}(1-\alpha)}{2}. \quad (11)$$

If $p > c$ (i.e. it is worthwhile for R to return unwanted gifts), then this expression is greater than the respective one without returns. □

Proof of Proposition 3. In solving for subgame-perfect equilibria, there cannot be an equilibrium with importing and G choosing either of his gift-giving strategies, `always` or `if match`. With `always`, R has no incentive to purchase the good from the specialty store. If *R* purchases the good from the specialty store, G has an incentive never to give a gift. Similarly, (`never, one, I`) and (`never, two, I`) cannot be equilibria since the specialty store would not import a good if R either does not intend to visit the store (`one`) or plans to visit G's store to obtain the good at a lower price (`two`).

The remaining possible equilibrium involving importing is (`never`, `spec`, `I`). For this to be an equilibrium, none of the parties must wish to deviate: The specialty store must make a profit since the alternative of not importing yields zero profit and among all possible strategies involving importing, $(\cdot, \cdot, \texttt{I})$, the pair G and R must make their highest net expected utility with (`never`, `spec`, `I`).

In the proposed equilibrium the specialty store's expected profit charging price $z \leqslant p + c$ is

$$\tfrac{1}{2}(1-\alpha)[z-p-s] + (1-\tfrac{1}{2}(1-\alpha))[-r(p+s)-i]. \quad (12)$$

The first expression represents the net gain from selling the good. The second expression represents the cost of not selling the good. For the store to make a profit, we must then have

$$z - p - s \geqslant \frac{1+\alpha}{1-\alpha}[r(p+s)+i], \quad (13)$$

where $(1+\alpha)/(1-\alpha)$ is the relative frequency of not selling the object to selling the object and $z-p-s$ is the markup of the specialty store over the direct costs of importing the good. Since R can visit the specialty store and then go to G's store if the good suits him, the upper bound on the specialty store's price is $p+c$. Thus, if $c-s$ is less than the RHS of the inequality, the specialty store will not import in equilibrium. Search will always be a less costly option.

We now look at the incentive for G and R to deviate. Together G and R's net expected utility from this strategy profile is given by

$$\tfrac{1}{2}(v-p) + \tfrac{1}{2}(1-\alpha)(v-z). \quad (14)$$

The first expression represents the utility when R finds his desired good at his local store. The second expression represents the utility from visiting the specialty store. We compare this strategy's net expected utility with that from their other viable options. Since the strategies (`never`, `one`, `I`), (`never`, `two`, `I`), (`if match`, `spec`, `I`) and (`always`, `spec`, `I`) are strictly worse than (`never`, `spec`, `I`), we need to examine only (`if match`, `one`, `I`) and (`always`, `one`, `I`).

For G and R, (`if match`, `one`, `I`) yields the same expected payoff as (`if match`, `one`, `O`), which from (3) equals $\frac{1}{2}v(1+\tilde{\mu}(1-\alpha)) - p$. We can use this to show that

$$(\texttt{never}, \texttt{spec}, \texttt{I}) < (\texttt{if match}, \texttt{one}, \texttt{I}) \Leftrightarrow v(1-\tilde{\mu}) + \frac{\alpha}{1-\alpha}p < z - p. \quad (15)$$

In a similar manner, we obtain

$$(\texttt{never}, \texttt{spec}, \texttt{I}) < (\texttt{always}, \texttt{one}, \texttt{I}) \Leftrightarrow \frac{1+\alpha}{1-\alpha}p < z - p. \quad (16)$$

If either of these are satisfied, then a subgame-perfect equilibrium must involve gift giving. If both are not satisfied, then we have (`never`, `spec`, `I`) as an equilibrium without gift giving. In this equilibrium, if both inequalities do not hold when $z = p + c$, then we have an equilibrium where this is the price that the specialty store charges. Otherwise, the specialty store charges the maximal price z such that both inequalities fail to hold. □

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