



HARVARD Kennedy School
JOHN F. KENNEDY SCHOOL OF GOVERNMENT

Gains from Digitization: Evidence from Gift-Giving in Music

Faculty Research Working Paper Series

Pinar Dogan

Harvard Kennedy School

Marc Bourreau

Telecom ParisTech

February 2018

RWP18-010

Visit the **HKS Faculty Research Working Paper Series** at:

https://www.hks.harvard.edu/research-insights/publications?f%5B0%5D=publication_types%3A121

The views expressed in the **HKS Faculty Research Working Paper Series** are those of the author(s) and do not necessarily reflect those of the John F. Kennedy School of Government or of Harvard University. Faculty Research Working Papers have not undergone formal review and approval. Such papers are included in this series to elicit feedback and to encourage debate on important public policy challenges. Copyright belongs to the author(s). Papers may be downloaded for personal use only.

Gains from digitization: Evidence from gift-giving in music*

Marc Bourreau[†] and Pinar Doğan[‡]

February 2018

Abstract

In this paper, we focus on recorded music gifts during the holiday season and estimate the reduction in deadweight loss due to the transition from physical CD gift-giving to digital music gift-giving with gift cards. Based on our survey data, we find that music CD gifts generate an average deadweight loss between 15 and 38 percent of the price. According to our estimates of gift music album sales which are based on U.S. data, the welfare gains from digitization, in terms of eliminated deadweight loss as a percentage of total spending on music albums, were between 5 to 13 percent during the week when digital sales peak in 2014.

Keywords: Gift-giving; Deadweight loss; Digitization; Music.

JEL Codes: D10; L82; O33.

*Pinar Doğan thanks the Institute of Advanced Study in Princeton, NJ, for its hospitality and Anandi Mani and Eldar Shafir for their valuable suggestions during the early stages of this paper. We also thank Maciej Kotowski, Gergely Dobos and the participants at the Advances in the Economics of Organization and the New Economy Conference held in Toulouse in June 2016. Finally, we thank Edouard Mifsud and Hugo Zylberberg for their research assistance, and Grant Rafter for editorial assistance.

[†]Telecom ParisTech, Department of Economics and Social Sciences, Paris, France. E-mail: marc.bourreau@telecom-paristech.fr.

[‡]John F. Kennedy School of Government, Harvard University, Cambridge, MA. E-mail: pinar_dogan@hks.harvard.edu

1 Introduction

In the past decade, an increasing number of people have been using digital platforms to read their newspapers, magazines, and books, as well as to listen to music, watch movies, and play video games. The switch from physical to digital consumption has been particularly drastic in the music industry. In 2003, when Apple launched iTunes with the first legal digital music catalog, close to 800 million music album CDs were sold in the U.S. By the end of 2015, annual sales were around 125 million units.

As digitization has been changing how individuals enjoy recorded music, it has also been transforming the form of recorded music gift-giving. Unlike physical music albums (such as CDs, vinyl records and cassettes), digital files cannot be wrapped and physically handed over as gifts. Gift-giving of digital music is almost exclusively realized through gift cards. Gift-givers of digital music typically pick the digital music store¹ and the dollar value of the gift, and the recipient redeems it for her own choice of music.² Giving the recipient the freedom to choose the gift may be all the more desirable in the context of recorded music, as individuals may have strong preferences for certain genres of music or particular artists, which may not be necessarily known by the giver. Furthermore, the giver may not necessarily be well-informed about the music catalog the recipient already owns.³

As established by Waldfogel (1993) empirically, non-cash gifts generate deadweight loss when gift recipients attach a lower value to the gifted item than the price paid by the gift-giver.⁴ Inspired

¹The preferences of the recipients are not crucial for the choice of digital store, most of which have identical music catalogs. This is not necessarily true for physical stores for some other consumption goods. Offenber (2007) argues that the giver's knowledge of the recipient's preferences may be important in choosing the appropriate (physical) store for the gift card.

²Some digital stores such as iTunes let the giver pick an album as a gift, which is delivered to the recipient as a non-binding "suggestion." But as iTunes advertises, ultimately "recipients can redeem the gift for exactly what they want."

³Unlike some other consumer goods, such as clothing, a duplicate music album has no value to the recipient unless it is resold, exchanged or regifted.

⁴Based on a survey of undergraduate students, Wadfogel (1993) estimates that 10% to 33% of the price paid for

by Waldfogel’s seminal work, we first use survey data to estimate the deadweight loss from gift CD albums. Similar to Waldfogel, we focus on holiday season gifts. We then use Nielsen’s weekly sales data for recorded music to estimate sales (both digital and CD) that can be attributed as holiday gifts over a period of ten years (2004-2014) in the U.S. Assuming that the digital music gifts substitute for CD gifts, and that own music purchases with gift cards do not create a deadweight loss, we are able to estimate the reduction in deadweight loss as a percentage of total spending in music albums and tracks due to the switching from physical to digital gift-giving. We find that, on average, a gift CD generates a deadweight loss between 15 and 38 percent. According to our estimates of gift music album sales in the U.S., the welfare gains from digitization in terms of eliminated deadweight loss were between 5 to 13 percent as a percentage of total spending on music albums during the single week when digital sales peak in 2014.

Our estimates of deadweight loss of gift CDs are relative to gift cards towards music and are based on survey data we collected in January 2015. The panel for our survey was provided by Qualtrics, and consists of 818 recipients of gift CDs during the 2014 holiday season (December 2014). Along with questions about the title, artist, and the type of the gift CD (single-disc, deluxe, special edition, etc.), the recipients were asked whether they would prefer the CD album (they received as a gift) or a gift card towards music purchases,⁵ where the dollar value of the gift card varied among recipients (\$10, \$8, and \$6), and a distinct set of the recipients were offered an option of \$10 cash.

This first part of our study is closely related to Waldfogel (1993) and subsequent studies that use survey data to estimate deadweight loss of gift-giving.⁶ However, our approach differs from

Christmas gifts constitutes a deadweight loss. In a later study, Waldfogel (2005) focuses on consumer goods such as clothing, books, and CDs and finds that individuals value their own purchases at an average of 18% more (per dollar spent) than they value items they receive as gifts, excluding their sentimental value.

⁵We offer the recipients with an option of gift card towards music purchases (and not cash), as our aim is to estimate the gain from the switching from physical CD gifts to digital gifts (which can only be exchanged with gift cards).

⁶See for example, Solnick and Hemenway (1996) and List and Shogren (1998).

earlier studies in a number of ways. Waldfogel's measure of deadweight loss is "average percentage yield" from gifts, where the yield for any given gift is defined as the ratio of the value of the gift (to the recipient) to the price paid for it (by the gift-giver). To elicit prices paid for the gifts, Waldfogel relies on the recipients' estimate, and the respondents are also asked to report a dollar amount for the value of the gift.⁷ We adopt a more indirect approach to elicit recipients' value for the gift, which requires less cognitive load for the respondents. The respondents in our survey respond to a binary-choice question, which gives us some (but not full) information on their value for the gift. For example, if a recipient reports that she prefers a \$6 gift card to the gift CD she has received, we can infer that she attaches the gift CD a value between \$0 and \$6, but not the exact value. However, by using different dollar values for the gift cards, we are able to estimate upper and lower bounds of percentage deadweight loss generated by gift CDs (relative to gift cards received towards music purchases). To the best of our knowledge, this is a novel approach in this line of literature. We also collect independently the price information on the gift CDs received. This not only generates more reliable price data, but also eliminates potential concerns on referencing, as reporting a price estimate may affect respondents' reporting of the value of the gift.

Notably, despite the decreasing trend in CD sales due to digital consumption including streaming, CD album sales have been consistently showing a significant annual peak prior to Christmas. In our weekly sales data, the two weeks before the holiday consistently account for around 9% of the annual CD sales in the U.S. over the ten years.⁸ Although the increase in sales is partly driven by the release of holiday albums (some of which may be purchased as gifts), the main driver of the increase in sales are non-seasonal music albums, presumably purchased as Christmas gifts.⁹

⁷Waldfogel uses two different wordings for this question, which aims at eliciting "willingness-to-pay" for the gift and "willingness-to-accept" in exchange of the gift, respectively.

⁸More specifically, during weeks 50 and 51. Even though CD sales have been declining between 2004 and 2014, this percentage figure remains stable.

⁹For example, Billboard reports 1.5 million units of holiday albums sales during the week ending December 14 (week 50) in 2014, which accounts for 19% of overall album sales that week (<http://www.billboard.com/articles/6413995/holiday-music-sales-spike-graph-2014>).

Digital music sales, on the other hand, exhibit no significant movement during this time. However, their annual peak occurs shortly after Christmas.¹⁰ Digital sales during the two weeks following Christmas account for around 6% of the annual digital sales.¹¹ We attribute this pattern in digital sales to music gift-card giving for Christmas, as the sales of the digital gift albums/tracks are not registered until after December 25th, when the recipients redeem their choice of music. Our weekly sales data enables us to estimate the sales that can be attributed to gift-giving (both in CDs and digital) over time, and therefore to apply our deadweight loss estimates to establish the gains from digitization of music as gift-givers substitute away physical gifts.

Our paper also contributes to the broader literature on the welfare effects of digitization. A substantial body of literature has focused on how digitization has transformed the way in which information goods are produced, exchanged, and consumed.¹² A series of papers has highlighted possible welfare gains due to digitization of information goods. In the context of music, Aguiar and Waldfogel (2014) estimate welfare gains due to increased cross-border trade within the E.U., while Peitz and Waelbroeck (2006) highlight sampling benefits from digitization.¹³ To the best of our knowledge, the effect of digitization on gift-giving has been overlooked by this literature. Even though gift cards for physical goods have been around for decades, unlike physical goods, gift cards are the only way in which gift-giving can happen for digital goods. To the extent that gift-giving of digital goods is not limited to recorded music, and include other information goods such as books, movies, and games, our paper suggests that digitization may have improved consumer welfare in broader instances of gift-giving.

¹⁰Except for 2004 and 2009, when there are 53 ISO weeks, this happens during week 52 and week 1 (of the following calendar year).

¹¹Note that there are no significant sales of holiday albums during two weeks after Christmas, therefore the increase in sales can be attributed to redemption of gift cards. Furthermore, some gift cards may be redeemed after this two-week window, which implies a larger number of sales through gift cards.

¹²See Peitz and Waldfogel (2012) for a collection of studies in the digital economy.

¹³See also Elberse (2010), who reports negative consequences of unbundling of music (i.e., sales of individual digital tracks within an album—which became possible only after digitization of music) on revenues. One can argue, however, that unbundling may have enhanced consumer welfare, and that the net change in welfare is ambiguous.

The organization of the paper is as follows. We begin with a brief background information on the transition from physical to digital music. In Section 3, we describe our approach to elicit the value of gifts CDs in detail. We then introduce our survey data, followed by our estimation of percentage deadweight loss. In Section 7 we estimate the music sales that can be attributed to gifts, both for physical (CD) and digital albums. In Section 7, we discuss the possibility of a deadweight loss for gift cards and its implication for our results. Finally, we conclude.

2 Background

In 2000, annual CD sales in the U.S. reached their peak with nearly 1 billion CD albums sold. The figure below plots the annual CD and digital sales from 2004 to 2014 using Nielsen Soundscan data.¹⁴

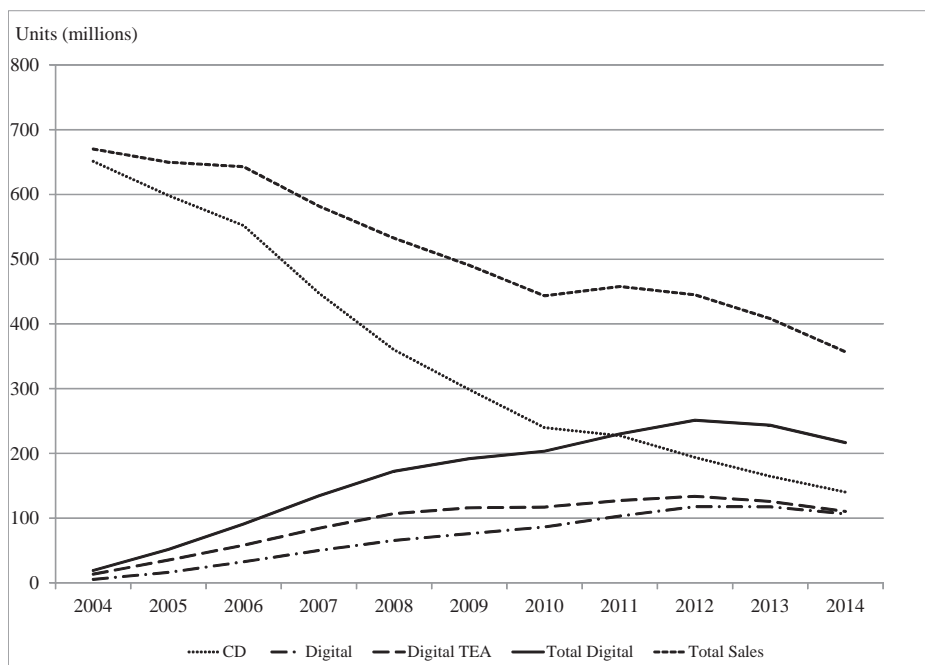


Figure 1: Annual music sales in the U.S. (Source: Nielsen Soundscan)

¹⁴Nielsen Soundscan is the main source of information for recorded music sales in the U.S.

Total digital sales include both digital album and digital Track Equivalent Albums (TEA) sales.¹⁵ As it can be seen from the figure, the CD sales have been declining since 2004 (note that Apple launched iTunes in April 2003). Although earlier streaming platforms, such as Napster/Rhapsody, were launched as early as 2001, the streaming market took off around 2012 (Spotify, for example was not launched until 2011). Therefore, earlier decline in total music sales cannot be fully explained by competition from streaming.

2.1 Recorded music sales around Christmas

We have obtained Nielsen Soundscan's weekly (aggregate) unit sales data of CD albums, digital albums, and digital TEA in the U.S. between 2004 and 2014. The album sales are reported separately for 100 designated market areas (DMAs), which correspond to major metropolitan areas, such as Boston, New York, Los Angeles and Chicago. Note that Nielsen Soundscan uses the ISO week numbering scheme, according to which the definition of a given week number changes each year.¹⁶ During our observation period, week 52 is centered around Christmas.¹⁷

Figure 2 shows both the declining trend in CD sales and the annual peak, which happens during the week prior to Christmas.¹⁸ CD sales during the week 51 alone make between 4.1-5.5% of the annual CD sales in our observation period.¹⁹

¹⁵The TEA measure equates 10 digital track sales from an album to one equivalent album sale.

¹⁶See <http://weeknumber.net/>.

¹⁷See Appendix A, Table A1 for the precise dates for week 52 between 2004 and 2014.

¹⁸Nielsen defines "Holiday music purchases" as the sales obtained between November 9 and December 26.

¹⁹See Appendix A, Table A2 for the ratio of week 51 CD sales to annual CD sales, as well as the ratio of week 52 digital sales to annual digital sales.

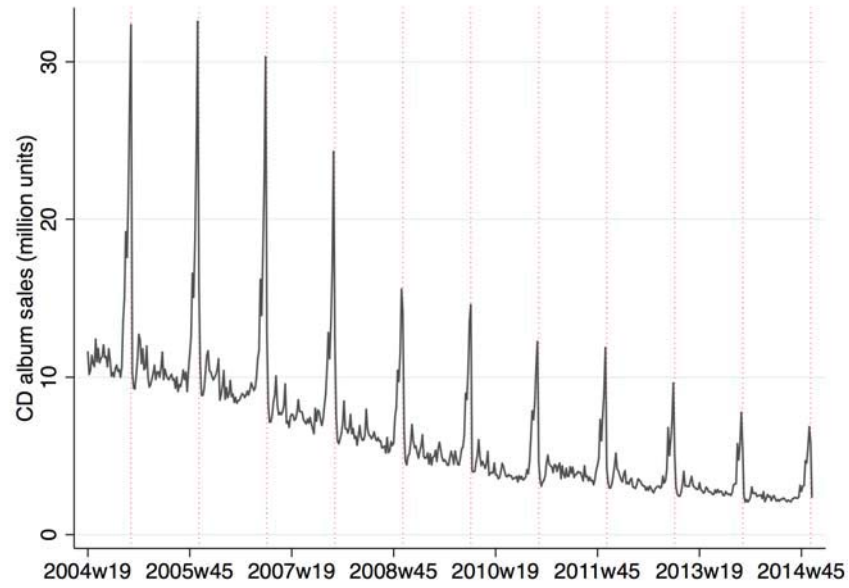


Figure 2: Weekly music CD sales in the U.S. (Source: Nielsen Soundscan)

In contrast, annual digital sales peak after Christmas, during week 52 (see Figure 3). During our observation period, digital sales during week 52 alone account for 3.3-13.3% of the annual digital sales.

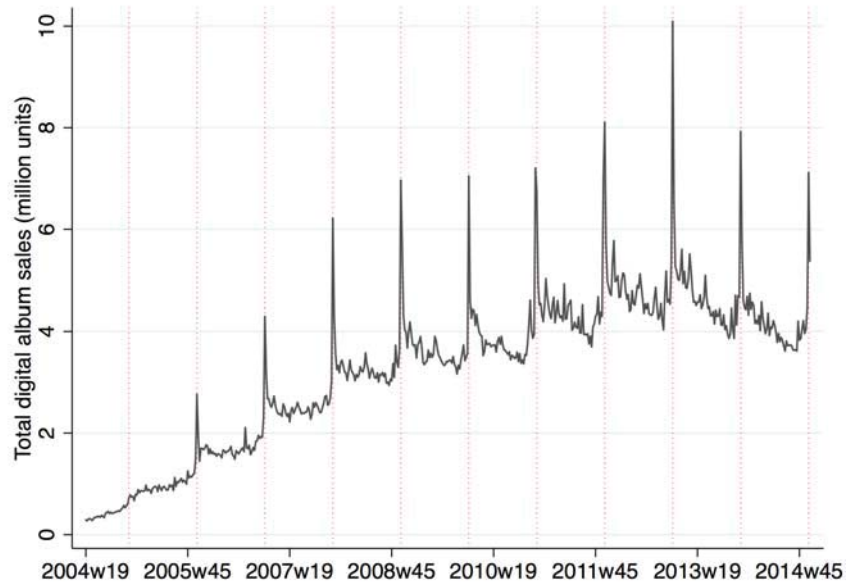


Figure 3: Weekly digital music sales in the U.S. (Source: Nielsen Soundscan)

Figure 4 provides a close-up of weekly music sales around the holiday season in 2013 for both CD and digital albums. Unlike with music CD gifts, which are purchased and recorded in the sales data prior to Christmas, the digital music gifts are recorded once the recipient of the gift card redeems a particular album (or track) with the gift card. For gift cards purchased as Christmas gifts, this necessarily happens after Christmas, which explains the time gap between the peak in CD and digital sales.

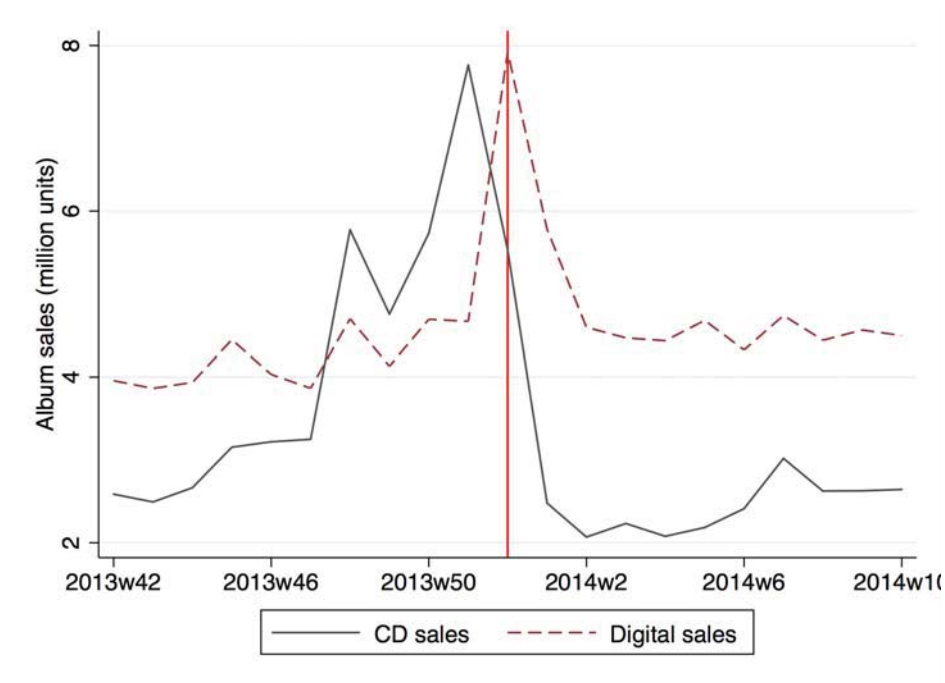


Figure 4: Holiday Season CD and digital music sales (vertical line at week 52)

The sharp increase in digital sales following Christmas suggests that most of the gift cards that are received on the holiday are redeemed during the week following Christmas.²⁰ The online search pattern reported by Google Trends for "iTunes gift card," which peaks every year in the month of December (see Figure 5), supports the hypothesis that the peak in digital sales is largely driven by gift cards.²¹ Furthermore, during the decade we observe, digital sales reach their highest peak following Christmas in 2013, which is consistent with the Google Trends data; the highest volume of searches for "iTunes card" and "iTunes gift card" between 2004 and 2014 happens in December 2013.²²

²⁰Nielsen Soundscan data does not distinguish the sales of music through gift cards.

²¹Google Trends analyzes a percentage of Google web searches to figure out how many searches were done over a certain period of time. See https://support.google.com/trends/answer/4355213?hl=en&ref_topic=4365599

²²iTunes is the dominant digital music store in the U.S., and its market share in 2013 was 63% (in 2006 it was 88%).

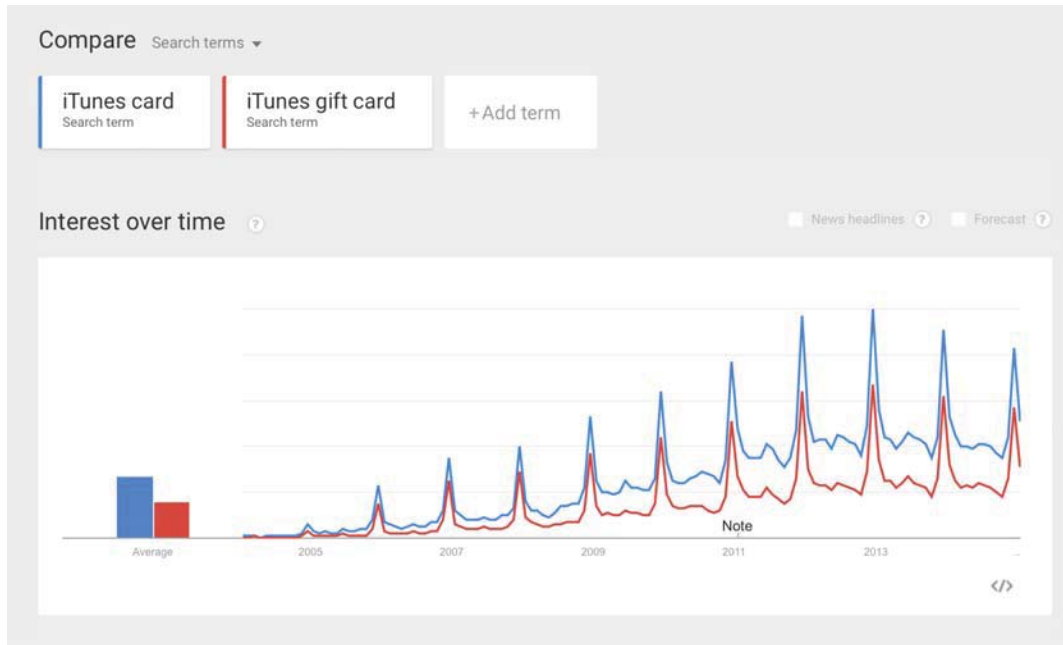


Figure 5: Interest over time for "iTunes card" and "iTunes gift card" between 2004 and 2014 in the U.S (Google Trends).

2.2 Recorded music gifts

Just like any other non-monetary gift, a "successful" music gift requires the giver to be well-informed about the recipient's preferences (for different genres of music and artists).²³ One can argue that information on preferences are even more crucial for recorded music than some other consumption goods that may be functional (e.g., a toaster, coffee-maker). Furthermore, people vary according to how they listen to music. In the absence of the complementary good (CD players for CDs, MP3 players or smartphones for digital music), a music album gift may simply be useless to a recipient. Finally, givers should have some information about the catalog of music the recipient has already. A duplicate music album, once again unlike some other consumption goods, creates no economic

²³According to Prendergast and Stole (2001), agents may derive utility from how well they are believed to know the preferences of others. In such instances, (inefficient) non-monetary gifts may be offered in lieu of cash in order to signal the giver's quality of information on the recipient's preferences.

value unless it is resold, exchanged or regifted.

As Waldfogel (2005) puts, if consumers are perfectly informed, and presumably better informed than givers, then it is impossible for givers to do better than recipients at choosing the recipients' consumption bundle. In the context of music gifts, however, the gift may generate an "informational" value.²⁴ Granted that the recipient holds superior information on her own music tastes/preferences, the giver may have superior information on the music catalog and be able to pick a "better fit" music for the recipient's taste. Waldfogel (1993, 2005) also acknowledges these cases where the givers have more information than the recipients. In such cases, however, the gift-giver can make a "suggestion" to the recipient, along with the gift card, instead of offering the physical CD.

Finally, as earlier studies demonstrate, eliciting the economic value of the gift for the recipient can be challenging empirically. This difficulty arises because the recipient's willingness to pay for the gift item and the value she derives from it may be different, in particular, due to the sentimental value of the gift.²⁵ The surveys we have conducted with the music CD gift recipients do not account for such differences.

3 Deadweight loss of CD gifts: A binary-choice approach

Waldfogel (1993) is the first to provide both a theoretical framework and an estimate of deadweight loss of Christmas gifts. The measure he proposed, *average percentage yield*, was adopted by all subsequent studies. Letting v denote the recipient's value for a given gift,²⁶ and p denote the price

²⁴See Ruffle and Kaplan (2009), for example, for a gift-giving model where the gift recipient does not hold full information and locating goods involves a search cost.

²⁵This may be also be true for "indulgence" gifts; givers may give recipients something they would highly enjoy (e.g., a luxury spa treatment), but wouldn't buy for themselves. Music albums, however, would be hardly in this category, with the exception of perhaps, rare and special editions of music albums.

²⁶In order to elicit this value, Waldfogel uses different questions in two surveys. The values reported in his Survey 1 and Survey 2 correspond to willingness-to-pay and willingness-to-accept, respectively, and are used to estimate the upper-bound and lower-bound of deadweight loss. Subsequent studies vary in terms of wording or methodology to

paid (by the giver) for it,²⁷ v/p defines the yield of the given gift. With this measure, an average yield below 1 implies a deadweight loss of gift-giving. For example, Waldfogel's estimate of average yield of gifts between 0.87 and 0.66 suggests a lower-bound and upper-bound deadweight loss of 13 and 34 percent. Likewise, a yield higher than 1 suggests a welfare gain from gift exchange. For example, List and Shogren (1998) estimate the average yields of gifts to be between 1.21 and 1.35 and conclude that gift-giving generates a welfare gain of 21 to 35 percent.

As pointed out by Waldfogel (1998), these studies and some others use "a potentially inappropriate benchmark," which is yield of one on cash. If a gift-recipient receives an equivalent cash instead of the gift and makes an inframarginal purchase, then the benchmark is no longer 1.²⁸ This means that the studies using this measure underestimate the deadweight loss. For example, the average yields that are above 1, as in List and Shogren (1998), can also indicate a deadweight loss.

Furthermore, even if we take a yield of 1 as a benchmark, with certain distributions of individual yields the average yield may not be very appropriate. For example, consider ten individuals who received a holiday gift CD, each priced at \$10. Assume that nine of the recipients attach a zero value to the gift CD, and that one attaches a value of \$100. All but one gift CD generates a yield of 0, and yet the average yield for all gifts equal 1, which implies no deadweight loss of gift-giving.

Finally, eliciting the valuation of the recipient, which is crucial for this approach is not an easy task. As Ruffle and Tykocinski (2000) have shown, the wording of the question can have a significant impact on the reported values. Reporting a value for a commodity—whether a gift or not—involves a heavy cognitive load. With these caveats in mind, we introduce an alternative approach to estimate the deadweight loss of (CD) gift-giving.

In order to elicit the value for the gift CDs, we ask recipients their choice between the gift

elicit valuation, yielding different results.

²⁷The price paid by the giver is estimated by the respondents (recipients) to the surveys.

²⁸In a subsequent study, Waldfogel (2005) makes the same point, and with a new survey data, compares the yields between own-purchases and gifts received.

CD they received and a gift card toward music purchases. The face value of the gift card varies among the random groups of respondents, with the face values of \$10, \$8, and \$6. For example, if a recipient reports a preference over a \$6 gift card, then we infer that her value for the gift CD should be between \$0 and \$6. We believe that the responses to such binary-choice questions are more reliable than value reports. Even though we don't have the exact value of the recipients, we are able to estimate a range for the deadweight loss.

Finally, one major advantage of our survey data, which includes detailed information on the gift CDs received (artist name, title, type of CD –deluxe, single-CD, etc.), is that it enables us to collect the price of gift CDs independently. Almost all earlier studies rely on recipients' estimates of prices paid for the gifts. Collecting the price data independently has two main advantages: (i) recipients may not necessarily have a good estimate of the price actually paid for the gift,²⁹ and (ii) reporting such estimates may influence recipients' reporting of valuations.³⁰

4 The survey data

Our data consists of 818 individuals who had received at least one music album CD as a gift during the 2014 holiday season (December) and were surveyed during the period January 9-28, 2015.³¹ Qualtrics provided our sample panel of U.S. consumers, with the following age distribution: (i) 20 and under: 7%, (ii) 21-29: 25%, (iii) 30-39: 25%, (iv) 40-49: 14%, (v) 50-59: 16%, and (vi) 60 and over: 13%. Female respondents constitutes 64% of the sample.³²

²⁹In Ruffle and Tykocinski (2000), for example, price estimates for a 800 shekels wooden mask greatly varied by respondents, and also by respondents' profession. On average, both psychologists and economists underestimated the price, but economists average estimate (228 shekels) was significantly lower than that of psychologists (603 shekels).

³⁰For example, in Ruffle and Tykocinski (2000), reported valuations were weakly greater when respondents were asked only for valuations (and not price estimates) than when the question was paired with price estimates.

³¹The total number of surveyed individuals is 1,138. We eliminated respondents who did not pass the attention filter and those who submitted incomplete and/or inconsistent answers.

³²The relevant population for our survey is the U.S. consumers of 18 years-old and older who have received at least one CD album in the holiday season of 2014. As we don't have the demographics information for this population, we cannot assess the representativeness of our sample. However, it is very likely that our sample is biased towards female participants, as there is no reason to believe that more female consumers have received music CD gifts than

With the aim of eliciting information on the value of the gift CD, we provided the respondents with a binary choice between the music album they received as a gift and a gift card toward music purchases:³³

Suppose you had not received this music album as a gift. If we offer you one of the two below, which one would you choose?

this music album \$ x gift card toward music purchases

The Dollar value of the gift card, \$ x , varied for three groups of random respondents with approximately equal sizes, with $x = 10$ ($n = 189$), 8 ($n = 216$), and 6 ($n = 224$). We also used the identical set of questions to survey a fourth group replacing the gift card toward music purchases option with \$10 ($n = 189$) cash.³⁴

All respondents were asked to report the name of the artist/album they had received as well as the type of the CD (single disc, double disc, limited/deluxe edition, etc.), which enabled us to independently collect the price information for each gift CD.³⁵ In our sample, 72% of the recipients received a single-disc music album, with an average price of \$10.62.³⁶

Among all recipients of music CDs in past holidays, a significant proportion of the gift CD recipients (61%) reported a mode (digital, streaming, etc.) other than CDs as their primary method of listening to music. Table 1 below shows the distribution of major modes of music consumption for single-disc recipients as well as all CD recipients, with the breakdown with respect to age group.

male consumers in the holiday season of 2014.

³³See Appendix B for the complete set of survey questions.

³⁴In addition to these four groups of respondents, we surveyed a fifth group of gift-receivers ($n = 186$), and similar to Waldfogel (1993), we required them to report a dollar amount for their valuation of the gift. We present the findings for this group separately at the end of Section 4.

³⁵We have constructed the price data from the listed prices at Amazon.com between March 24, 2015 and April 9, 2015. In rare cases when there was an ambiguity on the album name, we computed the average price of the artist's 3 best selling albums.

³⁶In the remainder of the paper, we make a distinction between single-disc CD recipients and others, as this distinction will prove useful for our estimate of deadweight loss.

Table 1– Major mode of music consumption

	Recipients of single-disc CDs		Recipients of all types of CDs	
	Number	Proportion	Number	Proportion
CD	234	0.40	317	0.39
Digital	125	0.21	178	0.22
Streaming	137	0.23	200	0.24
Radio-TV	87	0.15	113	0.14
Other	6	0.01	10	0.01
Total	589	1.00	818	1.00

As Figure 6 shows, the proportion of recipients who listen to music mainly with CDs increases with age group (with the exception of ages 60 and over).

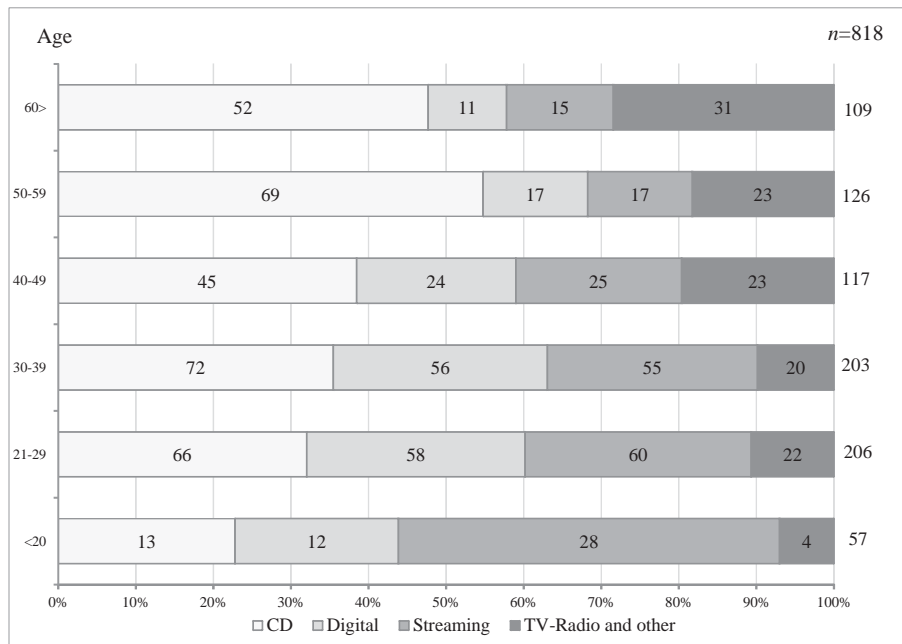


Figure 6: Recipients' age group and major mode of music consumption

According to our sample, people receive gift CDs mostly from their friends (30%), significant others (26%), and siblings (21%). Table C1 in Appendix C shows the number and proportion of the gift-givers' relationship to the recipients.³⁷

Our data shows that CD gifts generate some informational value to the recipients. About 10% of the recipients have reported that they had not heard of the music album prior to receiving it, and 11% already possessed the gift CD.

5 Empirical analysis

The following table shows the percentage of receivers that prefer to have the CD they received as a gift rather than the gift card for music purchases with a given amount.³⁸ Note that the percentage of single-disc CD recipients who prefer the CD to the gift card is almost identical when we include the other (deluxe/limited edition) CD recipients, even though single-disc CDs are sold at a lower price on average. Not surprisingly, the percentage of recipients who prefer the gift card increases

³⁷The table is for single-disc CDs recipients, but the proportions are very similar when other CDs are included.

³⁸Within each survey, approximately half of the respondents were asked the same questions with a different order, so that respondents were first asked about their own purchases and then the gift CD. Our analysis shows no statistically significant difference in the proportion of recipients who choose the gift card in lieu of the gift CD.

with the value of the gift card.

Table 2– Choice between the gift CD and gift card for music										
Alternative to the CD	Single-disc CDs					All CDs				
	CD		Gift Card		Total	CD		Gift Card		Total
\$10 gift card	75	0.58	54	0.42	129	109	0.58	80	0.42	189
\$8 gift card	107	0.69	49	0.31	156	152	0.70	64	0.30	216
\$6 gift card	118	0.72	47	0.28	165	162	0.72	62	0.28	224
Total	300	0.67	150	0.33	450	423	0.67	206	0.33	629

To estimate the deadweight loss we focus on single-disc CDs, with an average cost of \$11, as the price of single-disc CDs does not vary as much as the price of deluxe/limited edition CDs.³⁹ We consider the average price for all single-disc CD gifts. We assume that each survey is a random sample of the full population, that is, if the respondents had answered a different survey with a different hypothetical gift amount being offered, our results would remain unchanged. Given this assumption, Figure 7 below shows the area that can be attributed as deadweight loss based on Table 2 (single-disc CDs).

With binary-choice questions, we know if the recipient attaches a lower value to the gift CD than the gift card with $\$x$ value. We do not know, however, the difference $(x - v_i)$ for recipient i who has stated preference over the gift card with $\$x$. Therefore, the most conservative estimate for deadweight loss is represented with the light gray shaded area in Figure 7, which assumes $v_i = x$ for recipients who choose the gift card in lieu of the gift CD. The ratio of the light shaded area to \$11 equals 0.15, which is our lower-bound estimate for deadweight loss.⁴⁰

³⁹The average price for deluxe/limited edition CDs is \$19.19 in our sample.

⁴⁰More precisely, the surface of the light-shaded area on Figure 7 equals to $0.28 \times 5 + 0.03 \times 3 + 0.11 \times 1 + 0.58 \times 0 = 1.6$. That is, the lower-bound deadweight loss relative to the average CD price, \$11, is equal to 0.15.

The dark (solid) gray shaded area on Figure 7 represents potentially additional deadweight loss. The sum of all shaded areas over the price, therefore, gives us the upper-bound deadweight loss, which is 0.38.⁴¹ Note that, for the upper bound, we consider the lowest possible willingness to pay for the gift CD for each survey.⁴²

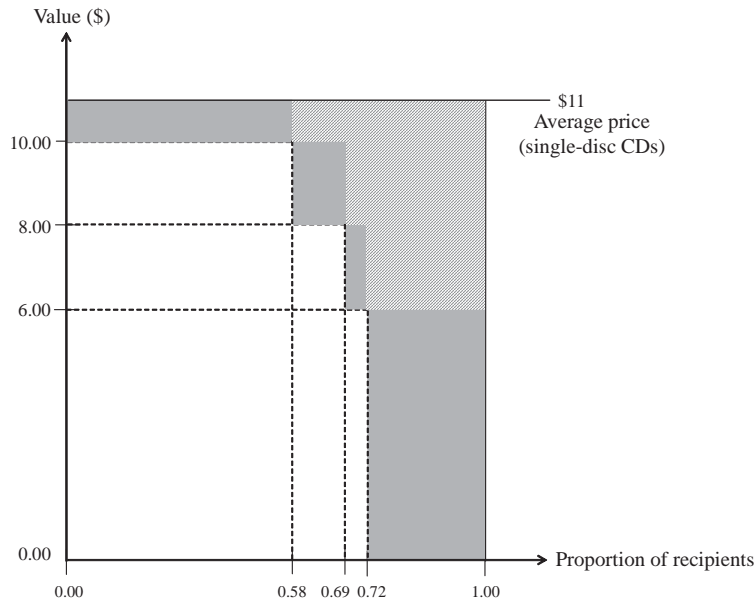


Figure 7: Lower-bound and upper-bound of deadweight loss

We ran a Probit regression with the probability of deadweight loss as dependent variable and characteristics of the recipient and giver as explanatory variables. We found that older recipients are more likely to experience a deadweight loss, as well as recipients who have bought music for themselves in the last three months. We also regressed the amount of yield on the same independent variables, and found that the yield is lower (i.e., deadweight loss is larger) for recipients who listen

⁴¹Note that we do not have data for $x = \$11$, therefore, a more conservative estimate for the upper-bound would exclude the dark shaded rectangular between \$10 and \$11. The upper-bound for deadweight loss would then be 0.32.

⁴²That is, the surface of all shaded areas, and is equal to $0.28 \times 11 + 0.03 \times 5 + 0.11 \times 3 + 0.58 \times 1 = 4.14$, which implies that the upper-bound deadweight loss relative to the average price is 0.38.

to music with digital files or streaming, and therefore for whom there is a mismatch between the type of music gift (CD) and the preferred way of listening to music (digital).⁴³

To sum up, we find the average deadweight loss generated by a gift CD in the holiday season (as a percentage of the price of the CD) to be between 15 to 38 percent.

Cash *versus* music gift card

In our "cash survey" we provided the respondents a choice between the gift CD they had received and \$10 cash. The table below compares the choices when a music gift card equivalent value is provided as an alternative.

Table 3– Choice between the gift CD and cash										
	single-disc CDs					All CDs				
Alternative to the CD	CD	Cash/GC	Total			CD	Cash/GC	Total		
\$10 cash	96	0.69	43	0.31	139	126	0.67	63	0.33	189
\$10 gift card	75	0.58	54	0.42	129	109	0.58	80	0.42	189

The average price of all types of CDs in the \$10 cash sample is \$11.35, whereas it is \$10.26 for single-disc CDs.

We find that a higher proportion of single-disc CD recipients opt for \$10 gift card than \$10 cash, and the difference is significant at 5% level. Interestingly, although cash is fungible (one could buy \$10 music gift card with \$10 cash), gift card is preferred to cash (with the equivalent dollar amount). This may suggest that there is some "gift premium," which makes gift cards more attractive than cash when they are provided as an option to the gift CDs they have received.⁴⁴

⁴³The estimation results are available upon request from the authors.

⁴⁴The presence of this gift premium may be due to the stigma attached to cash. It could also be related to the recipients' preference to remain within the broader gift choice of the giver.

This, however, may only be true for relatively small amounts of cash and equivalent value gift cards.

The average yield measure

In addition to the 818 gift CD recipients, we have surveyed 171 additional recipients with an identical survey, except for the valuation question, in which recipients were asked to report their valuation for gift CDs.⁴⁵ Similar to our main analysis, we collected the price information for all gift CDs independently.

In this sample, 54 of 171 respondents (32%) have reported a lower value than the price of the gift CD they have received, implying a yield of gifts lower than one. Receivers who attach a relatively low value to the gift CDs seem reluctant to exchange/sell the CDs they have received. When asked explicitly, 47 respondents out of 54 who report a lower valuation than the price of the gift CD have reported that they have not exchanged/sold—and were not considering to exchange/sell—the gift CD. Reluctance to exchange/sell gift CDs may be due high transaction costs relative to the market value of the CDs and/or the sentimental value of the gift CDs to the recipients.

Unlike Waldfogel (1993), we find the average percentage yield for single-disc CDs and all CDs to be greater than one, with 1.59 and 1.53 respectively (see Table D in Appendix D, which is the replication of Table 1 in Waldfogel’s study). However, for reasons we discussed in Section 3, the appropriate benchmark for welfare assessment is greater than one, and therefore, we cannot conclude that CD gift-giving is welfare improving.

Similar to Waldfogel (1993), we regressed the logarithm of the reported value on the logarithm of price, the identity of the giver, and age difference, but we found no significant relationship except for the logarithm of price. We also ran a regression to include other variables in our survey; the mode of music consumption, own-music purchases, and the age group of the recipient, and found

⁴⁵See Appendix D for the Survey question, which corresponds to the one in Survey 1 in Waldfogel (1993) that elicits willingness-to-pay, and therefore establishes the upper-bound deadweight loss.

no significant relationship with any of them.

6 Gains from switching to digital gift-giving

In this section, we begin with estimating the size of gift sales during holidays in order to determine (i) the deadweight loss of gift CDs, and (ii) the gains from the switch to digital music gifts (in terms of eliminated deadweight loss) in the U.S.

6.1 Estimating holiday gift sales

In estimating the gift sales, we only focus on the week when sales peak within the holiday season, which is also the peak for annual sales. This is week 51 (approximately the week before Christmas) for CDs and week 52 (approximately the week after Christmas) for digital music.

First, using our weekly sales data at the DMA level for the period 2004-2014, and controlling for time trends and seasonality, we confirm that CD sales peak on week 51 and digital sales on week 52. In particular, we regress $\log(Sales)_{dt}$, the logarithm of the total (CD albums, digital albums) sales in DMA d at date t , with the following estimation equation:

$$\log(Sales)_{dt} = \beta_0 + \beta_1 Week50_t + \beta_2 Week51_t + \beta_3 Week52_t + \beta_4 Week01_t + \delta year_t + \gamma month_t + \xi DMA_d + \epsilon_{dt}. \quad (1)$$

The variables of interest are the four dummy variables $Week50_t$, $Week51_t$, $Week52_t$ and $Week01_t$.

The dummy variable $Weekn_t$ equals 1 if date t corresponds to a week of number n , and 0 otherwise.

We also introduce year and month fixed effects ($year_t$ and $month_t$, respectively) and DMA fixed effects (DMA_d). Finally, ϵ_{dt} is the error term. We estimate this model with OLS, for CD album sales and digital album sales (including TEA). The results of this regression are shown in Table E1 in Appendix E.

The sales in our weeks of interest, week 51 and week 52, may contain both own purchases and gift purchases. In order to obtain a better estimate of the sales attributable to gifts in these two weeks, we estimate a yearly baseline for CD and digital sales. This is done by regressing weekly sales (aggregated over all DMAs) in logarithm on year dummies and week dummies with the following equation:

$$\log(Sales)_t = \beta'_0 + \beta'_1 Week01_t + \beta'_2 Week02_t + \dots + \beta'_{51} Week51_t + \beta'_{52} Week52_t + \delta year_t + \epsilon'_t. \quad (2)$$

The dependent variable, $\log(Sales)_t$, is the logarithm of the total (CD albums, digital albums) sales at date t , aggregated over all DMAs. The variables of interest are the two dummy variables $Week51_t$ and $Week52_t$. Similar to equation (1), the dummy variable $Weekn_t$ equals 1 if date t corresponds to a week of number n , and 0 otherwise,⁴⁶ and we introduce year fixed effects ($year_t$). The estimated sales for week n are then obtained by taking the exponential of the sum of the year baseline and the dummy for week n .

We attribute our estimate of the additional CD sales obtained during week 51 relative to the year baseline to holiday gifts,⁴⁷ and similarly we attribute the additional digital sales in week 52 to gift cards. Our estimations can be found in Table E2 in Appendix E. Note that we consider only our estimates for additional digital sales in week 52 as gifts. It is very likely that some recipients redeem their music after this one week window, as most gift cards do not expire until a year or two from purchase.⁴⁸

⁴⁶The reference week is week 11.

⁴⁷We assume that gift purchases during the holiday season do not crowd-out own music purchases during the same period so that the year baseline is an accurate estimate of own music purchases. Note that, if this assumption does not hold, then the own CD purchases during the holiday season would be overestimated, implying an underestimation of gift CD purchases.

⁴⁸For example, iTunes gift cards "expire on the later of, two years from the date of issuance, and two years from the date of last activity if applied to an iTunes Store Account."

6.2 Reduction in deadweight loss of gift-giving

In this section, we first apply our various estimates from the previous section and report the deadweight loss of CD gifts over time as a percentage of total spending in music albums and tracks. Second, assuming that (i) the digital gifts substitute the CD gifts, and (ii) own-purchases with gift cards do not create a deadweight loss, we compute the reduction in deadweight loss as a percentage of total spending in music albums and tracks due to the switching to digital gift-giving.

Table 4 below shows our estimates of gift CD sales during week 51 between 2004-2014.

DWL_L and DWL_U denote the lower and upper bound estimates of deadweight loss, respectively, as a percentage of total spending on music albums and tracks (CD and digital). Note that our deadweight loss estimate is based on single-disc gift CDs, which cost \$11 on average in the sample. In applying the lower and upper bound estimates to the gift CD sales, we use \$11, which yields a more conservative estimate.⁴⁹

⁴⁹The average price for deluxe/limited edition CDs is higher than the average price for single-disc CDs, and the proportion of respondents who prefer the gift card is similar when we include all CDs. Therefore, the average deadweight loss for other types of CDs is higher than for single-disc CDs.

Table 4 – Deadweight loss from Christmas gift CD sales

Gift CD sales (w51)		DWL	
Year	units	DWL _L (%)	DWL _U (%)
2004	20,728,074	11.1	28.0
2005	18,841,712	8.3	21.0
2006	17,352,912	8.0	20.2
2007	14,096,724	7.8	19.6
2008	11,408,450	8.9	22.6
2009	9,360,993	8.2	20.8
2010	7,473,011	5.8	14.6
2011	7,145,852	5.7	14.3
2012	6,078,652	6.1	15.4
2013	5,196,228	6.3	15.9
2014	4,379,997	5.8	14.7

Note: deadweight loss in percentage of total spending in music albums and tracks.

Table 4 shows a reduction over time of the deadweight loss from Christmas CD gifts. This is partly due to the overall decline of CD sales, and partly to the substitution of CD gifts by gift cards. Assuming all gift cards substitute CD gifts, Table 5 shows the reduction in deadweight loss due to the switch from CD gifts to digital gifts, again as a percentage of total spending in music albums and tracks.

Table 5 – Reduction in deadweight loss due to digitization

	Digital gift sales (w52)	$-\Delta DWL_L$	$-\Delta DWL_U$
	units	(%)	(%)
2004	442,179	0.2	0.5
2005	1,044,347	0.8	2.1
2006	1,860,599	1.6	4.1
2007	2,761,529	2.2	5.6
2008	3,556,324	2.5	6.4
2009	3,957,183	2.7	7.0
2010	4,184,798	5.5	14.0
2011	4,744,516	5.8	14.6
2012	5,176,905	5.1	13.0
2013	5,022,407	5.6	14.2
2014	4,475,367	5.2	13.1

Note: reduction in deadweight loss in percentage of total spending in music albums and tracks.

According to our estimates, the reduction in deadweight loss due to digitization was limited in the first years, but it became of larger magnitude from 2010 on. These findings provide evidence that the switch from physical gifts to digital gifts or gift cards can significantly reduce the deadweight loss from gift-giving.

In estimating the reduction in deadweight loss, we assumed that digital music gift cards substituted music CD gifts. It is conceivable that digital music gift cards have replaced other types of gifts than music. If that is the case, this would imply further welfare gains from digitization. This is because, digital music gift cards make gifting music as convenient as offering gift cards for other types of goods and services. Therefore, gift-givers, who value convenience, and who would not have

offered music gifts in the absence of digital music gift cards, may switch to music gifts if they see a better-fit for the recipient.

7 Discussion: Welfare loss from gift cards for digital music

Gift-giving through gift cards can also involve a welfare loss. The existence of a secondary market for gift cards (such as on eBay) is a strong evidence for this.⁵⁰ As we discuss the potential reasons why recipients may value gift cards lower than their face value (i.e., the price paid for them), we argue that such reasons are less likely to apply to gift cards for digital music (such as iTunes Gift Cards) than to gift cards for physical goods issued by certain stores (such as Home Depot, Starbucks, GAP, etc.)

Inconvenience At least some of the gift card for physical goods (such as those for coffee shops or restaurants) requires a recipient's physical presence for consumption, which may be a source of inconvenience. For example, if a recipient of a Starbucks gift card does not live/work to a close by shop, she may have to incur a cost to redeem it (whereas she would not have incurred that cost if the gift card was from the nearby Peet's).⁵¹ Based on data on resale of gift cards, Offenberg (2007) shows that recipients attach a higher value⁵² to gift cards if the issuing store has a larger number of locations, as well as those provide an option of shopping online. This suggests that gift cards for digital music, which are exclusively redeemed online, do not impose such inconvenience.

Givers can get it wrong A recipient, who has strong preference for Peets' coffee over Starbucks, will have a lower valuation for a Starbucks gift card (than an equivalent value gift card from Peet's).

⁵⁰See Offenberg (2007) for a detailed discussion on the deadweight loss of gift cards. As Offenberg argues, the secondary markets for gift cards are likely to reduce the size of the welfare loss.

⁵¹This is true, in particular, if spending the card requires multiple trips.

⁵²Measured as the sale price of the gift card as a percentage of the face value.

The same can be true for recipients of gift cards issued by apparel stores of certain brands. Such mismatches, however, are less likely to happen in the context of digital music, as all digital music stores offer an almost identical music catalogue.

Size of gift cards Offenberg (2007) argues that gift cards with smaller amounts are less likely to create a deadweight loss. For example, if a recipient of an iTunes gift card of \$20 has already budgeted to spend (at least) \$20 for recorded music (say, over the course of a year), then \$20 can be shifted to other purchases. Although we don't have data to support this, the gift cards for music tend to be in relatively small amounts.⁵³

Cards partially redeemed, unredeemed, or lost In redeeming gift cards, it is unlikely for recipients to find items that match the exact value of the cards. This means that recipients may spend additional money, or leave some unspent value on the card. Some gift cards may not be redeemed at all. For example a recipient of an iTunes gift card may not have an access to a smart phone or a computer. If the recipient cannot resale the card (or perhaps re-gift it), then she does not enjoy any surplus out of it. Gift cards can also get lost.⁵⁴ Even though lost/unredeemed cards do not generate a surplus for the recipients, just like unspent values on the gift cards, they are hardly a source of welfare loss; an unredeemed \$20 iTunes gift cards is simply an unintended transfer from the gift-giver to Apple Inc.

In sum, there may be various reasons why the recipient may attach a lower value to the gift card than its face value (the price paid for it). This implies an underestimation of our lower-bound deadweight loss, as we offer the recipients of gift CDs with an alternative of a gift card towards music purchases (and not cash). Consider a recipient, for example, who has expressed a preference

⁵³Online purchases for iTunes gift cards, allow for a maximum of \$200, and according to Offenberg (2007), the average gift card sold on eBay has a face value of \$192.

⁵⁴Gift cards for digital music come in both in digital and physical forms. One could argue that cards in digital form may be harder to lose than the physical cards.

for the \$6 gift card over the gift CD. We then infer that her valuation for the gift CD can be at most \$6 (and we consider the value as \$6 in calculating the lower-bound deadweight loss). Now, if we consider that her valuation for the \$6 gift card is lower than its face value (say it is \$5), then her choice of the card over the gift CD reveals that her valuation for the gift CD is lower than \$6, which is the face value of the card (in this example, it can be at most \$5).

Loss of informational value Granting recipients with the flexibility to choose the music they like to own comes with a potential informational cost. As Kaplan and Ruffle (2009) show, when gift-givers are better informed (about the existence of certain goods) than the recipients, gift giving may improve welfare due to savings from search costs. Indeed, physical CD gifts embed information that is absent in a gift card. More specifically, they can inform the recipient of the existence of a particular artist and/or album. In cases when the recipient is aware of the artist and/or the album, but would not have purchased it herself, the gift may still convey the information that the giver perceives the album as a good fit for recipients music taste. To the extent that the information embedded in the selection of the music gift is valuable, the switch to music gift cards may entail some welfare loss. As we mentioned in Section 2, major digital music stores allow gift-givers to pick an album, while giving the recipients the option to redeem the gift card with different music if they prefer to do so. If the gift-givers make such suggestions more often than not, then loss of informational value with digital music gifts may not be a major concern.

8 Conclusion

The digitization of music has led to a significant shift away from physical music album consumption. As a result, recorded music gift-givers have been substituting away physical gifts (as digital music can only be offered through gift-cards). Using a novel approach in eliciting recipients' valuations

for gift CDs, we find that music CDs offered as holiday gift generate a deadweight loss between 15 to 38 percent (relative to gift cards for music purchases). According to our estimations based on U.S. weekly sales data in 2014, the deadweight loss generated by the CD gifts purchased during the week prior to Christmas as a percentage of total spending on music albums and tracks that week was between 6% and 15%. In the same year, the gains from switching to digital gift cards (in terms of eliminated deadweight loss) is similar to this figure, between 5% and 13% of total spending on music albums and tracks.

In our sample, 11% of the gift CD recipients reported that they already had the same music album. And yet, an overwhelming majority of these recipients were reluctant to return, exchange, or resell the duplicate album, generating a pure deadweight loss. This is most likely due to high transaction costs relative to the value of the music CD, which is around \$11 for single-disc CDs in our sample.

Our estimation of the reduction in the deadweight loss driven by digitization is based on the assumption that digital music gift cards do not entail any deadweight loss. As we have discussed in the previous section, this assumption may not necessarily hold for all gift cards for digital music (e.g., if the card is lost, or unredeemed for another reason), which would imply a smaller welfare gain from digitization.

Music gifts do not exclusively happen during holidays, neither are they restricted to the single week of sales prior to Christmas, which we have focused on in this paper. Furthermore, the aforementioned shift in gift-giving resulting from digitization is hardly limited to music. Other information goods such as books, movies, video games are also susceptible to welfare improvements due to the switch from physical gifts to digital gifts.

Interestingly, even though gift cards are not fungible as cash, we find that gift-recipients perceive gifts cards (of \$10 value) as more attractive than equivalent cash (\$10). Although unlikely to be

true for larger dollar values, this suggests that gift-recipients attach some premium on gift cards.

There are many other potential sources of welfare gains of digitization, such as sampling and reduced costs of distribution, which are beyond the scope of this paper. Switching from physical to digital (whether for gifts or own purchases) also generates an additional welfare benefit in the context of music. Digitization enables consumers to purchase unbundled pieces (tracks) rather than the entire bundle (album). If sellers use an optimal pricing strategy, this necessarily enhances welfare, at least in the weak sense. In the context of gift-giving, for the equal dollar amount spent for a physical music album, the recipient of a digital gift card can create her own bundle, by choosing tracks that generate the highest consumer surplus. In this paper, we do not account for such benefits of digitization of music, which can accrue not only through gift-giving, but also purchases for own consumption.

Finally, in this paper we have focused on gift recipients and ignored gift givers. An interesting avenue for future research would be to study the potential effects of digital gift-giving on gift givers' welfare.

References

- Aguiar, L. Waldfogel, J., 2014. Digitization, Copyright, and the Welfare Effects of Music. European Commission, JRC Technical Papers, Institute for Prospective Technological Studies Digital Economy Working Paper 2014/05.
- Elberse, A., 2010. Bye-Bye Bundles: The Unbundling of Music in Digital Channels. *Journal of Marketing*, Vol. 74, pp. 107–123.
- Kaplan, T.R. and Ruffle, B.J., 2009. In search of welfare-improving gifts. *European Economic Review*, Vol. 53(4), pp. 445-460.

- List, J. A. and Shogren, J. F., 1998. The Deadweight Loss of Christmas: Comment. *American Economic Review*, Vol. 88(5), pp. 1350-1355.
- Offenberg, J. P., 2007. Gift Cards. *Journal of Economic Perspectives*, Vol. 21(2), pp. 227-238.
- Peitz, M. and Waelbroeck, P., 2006. Why the music industry may gain from free downloading—The role of sampling. *International Journal of Industrial Organization*, Vol. 24(5), 907-913.
- Peitz, M. and Waldfogel, W. (Eds), 2012. *The Oxford Handbook of the Digital Economy*. Oxford University Press.
- Prendergast, C. and Stole, L., 2001. The non-monetary nature of gifts. *European Economic Review*, Vol. 45, pp. 1793-1810.
- Ruffle, B. J. and Tykocinski, O., 2000. The Deadweight Loss of Christmas: Comment. *American Economic Review*, Vol. 90(1), pp. 319-324.
- Solnick, S. J. and Hemenway, D., 1996. The Deadweight Loss of Christmas: Comment. *American Economic Review*, Vol. 86(5), pp. 1299-1305.
- Waldfogel, J., 1993. The Deadweight Loss of Christmas. *American Economic Review*, Vol. 83(5), pp. 1328-1336.
- Waldfogel, J., 1996. The Deadweight Loss of Christmas: Reply. *American Economic Review*, Vol. 86(5), pp. 1306-1308.
- Waldfogel, J., 1998. The Deadweight Loss of Christmas: Reply. *American Economic Review*, Vol. 88(5), pp. 1358-1360.
- Waldfogel, J., 2005. Does Consumer Irrationality Trump Consumer Sovereignty? *Review of Economics and Statistics*, Vol 87(4), pp. 691-696.

Appendix

Appendix A: Music CD sales during weeks 51 and 52

Table A1 – Week 52 dates

Year	Week 52 (ISO)
2004	December 20 – December 26
2005, 2011	December 26 – January 1
2006	December 25 – December 31
2007, 2012	December 24 – December 30
2008, 2014	December 22 – December 28
2009	December 21 – December 27
2010	December 27 – January 2
2013	December 23 – December 29

Table A2– CD and digital sales during weeks 51 and 52

	w51 CD sales	w52 digital sales
Year	% of annual CD sales	% of annual digital sales
2004	4.1%	13.3%
2005	5.4%	5.4%
2006	5.5%	4.7%
2007	5.4%	4.6%
2008	4.3%	4.0%
2009	4.5%	3.7%
2010	5.1%	3.3%
2011	5.2%	3.5%
2012	5.0%	4.0%
2013	4.7%	3.3%
2014	4.9%	3.3%

Source: Nielsen Soundscan

(*) The annual sales figures for 2004 are borrowed from Nielsen's end-of-year report.

Note: the 2004 ratio for digital sales is high due to the high growth rate of digital sales in this period.

Appendix B: Survey Participants and Questions

B.1. Survey Participants

We asked Qualtrics to recruit respondents from their "US population 18+" panel who had received a gift CD in the past holiday season, and we have not set any target (e.g., age, gender, or any other characteristics) for the sample composition. Qualtrics recruited respondents randomly both from

its online panels and also through a "river sample", that is, participants invited via social media. Respondents received incentives such as points to use towards coupons, mobile games, etc., and were randomly assigned to one of the surveys.

B.2. Survey Questions

Q1 Did you receive any music CD music album as a gift in this past holiday season?

No (1) | Yes, I received one CD music album (2) | Yes, I received more than one CD music album (3) |

If No Is Selected, Then Skip To End of Block

Answer If Did you receive any music CD album as a gift in this past holiday season? Yes, I received more than one music album CD Is Selected

Q2 Please pick any one of the CD music albums you have received to answer the following questions.

Q3 The name of the music album is:

Q4 The name of the artist is:

Q5 The music CD album you received is

a CD music album with one disc (1) | a CD music album with two discs (4) | a deluxe or limited edition of a music album (2) | other (3) _____

Q6 Had you heard of this music album before receiving it as a gift?

Yes (1) | No (2)

Answer If Had you heard of this music album before receiving it as a gift? Yes Is Selected

Q7 Did you already have this music album?

Yes (1) | No (2)

Q8 Did you exchange or resell the CD music album?

No (1) | No, but I am considering exchanging / selling it (2) | Yes, I exchanged it (3) | Yes, I sold it (4)

Answer If Did you exchange or resell the CD music album? No Is Not Selected

Q9 What is the reason?

I have the same album (1) | I do not like this genre of music (2) | I do not like this artist (3) | I do not have a CD player / I do not listen to CDs (4) | Other (5) _____

Answer If Did you exchange or resell the CD music album? Yes, I sold it Is Selected

Q10 How much money did you receive by selling the CD music album? Please state the amount in U.S. dollars:

Q11 Who offered you this music CD album as a gift?

Parent (1) | Sibling (2) | Uncle / Aunt (3) | Grandparent (4) | Significant other (5) | Friend (6) | Other (7) _____

AF1 For quality purposes, please select "Friend."

Parent (1) | Sibling (2) | Uncle / Aunt (3) | Grandparent (4) | Significant other (5) | Friend (6) | Other (7) _____

If Friend Is Not Selected, Then Skip To End of Block

Q12 [Valuation question. Please refer to Table B1 for different versions of this question.]

Q13 Did you buy any music album in the last three months?

Yes, I bought at least one CD music album (2) | Yes, I bought at least one digital music album (3) | Yes, I bought both CD and digital music albums (4) | No (1)

If No Is Selected, Then Skip To End of Block

Answer If Did you buy any music album in the last three months? Yes, I bought at least one music CD album Is Selected

Q14 Please pick any one of the CD music albums you have bought to answer the following questions.

Answer If Did you buy any music album in the last three months? Yes, I bought at least one digital album Is Selected

Q15 Please pick any one of the digital music albums you have bought to answer the following questions.

Answer If Did you buy any music album in the last three months? Yes, I bought both CD and digital albums Is Selected

Q16 Please pick any one of the CD music albums you have bought to answer the following questions.

Q17 The name of the music album is:

Q18 The name of the artist is:

Q19 Suppose you did not have this music album. If we offer you one of the two below, which one would you choose?

this music album (2) | \$10 gift card toward music purchases (1)

Q20 How do you listen to music most of the time?

CD albums (1) | Digital albums or digital tracks (2) | Streaming (Spotify, YouTube, ...) (3) | Radio / TV (4) | Other (Vinyl, DVD, ...) (5) | I don't listen to any music (6)

Q21 Are you a male or female?

Male (1) | Female (2)

Q22 What is your age?

17 or younger (1) | 18-20 (2) | 21-29 (3) | 30-39 (4) | 40-49 (5) | 50-59 (6) | 60 or older (7)

Q23 In what ZIP code is your home located? (enter 5-digit ZIP code; for example, 00544 or 94306)

Q12 Valuation Questions (Surveys # 2–9)

Q12 Suppose you had not received this music album as a gift. If we offer you one of the two below, which one would you choose?

Table B1–Valuation questions

Survey #	<i>n</i>	Options
2 and 3**	189	this music album (1) \$10 gift card toward music purchases (2)
4 and 5**	189	this music album (1) \$10 (2)
6 and 7**	216	this music album (1) \$8 gift card toward music purchases (2)
8 and 9**	224	this music album (1) \$6 gift card toward music purchases (2)

(**) The order of questions in Surveys 3, 5, 7, and 9 are altered so that Q12 appears as Q19 to the responder.

Appendix C: Summary Statistics

Table C1 – Gift-givers (single-disc CD recipients)

Relation	Number	Proportion
Friend	178	0.30
Significant other	150	0.26
Sibling	121	0.21
Parent	88	0.15
Children	30	0.05
Grandparents	8	0.01
Other family	14	0.02
	589	1.00

Table C2—Single-disc CD recipients

Recipients	Number	Proportion
who had heard of the music album before	531	0.90
whose major way of listening to music is not CDs	355	0.60
who bought music album(s) in the past 3 months	470	0.80
at least one CD	314	0.53
at least one digital album	56	0.10
both CD and digital	133	0.17
Total	589	1.00

Table C3—"Unwanted" CDs (single disc)

Recipients, who ...	Number	Proportion
already possessed the same music album	61	0.10
has exchanged or sold the gift album	18	0.03
is considering to exchange or sell	33	0.06
Reason:		
has the same album	26	0.51
don't like the genre or the artist	14	0.27
don't listen to CDs	3	0.06
other	8	0.16

Appendix D: Average percentage yield measure

In addition to the 818 gift CD recipients, we have surveyed 171 additional recipients⁵⁵ with an identical survey, except for the valuation question. In order to elicit recipients' valuations for gift CDs, Q12 was replaced with the following:⁵⁶

Q12 Suppose you had not received this music album as a gift. If you were purchasing it yourself, what would be the maximum amount of money you would be willing to pay for it?

This question on willingness-to-pay corresponds to Survey 1 in Waldfogel (1993), and therefore will establish the upper-bound deadweight loss. Similar to our main analysis in the paper, we

⁵⁵The total number of respondents is 223 for this survey. We cleaned up the data to eliminate incomplete or inconsistent responses.

⁵⁶These are Surveys #1 and #10 in our data. In Survey #10, the order of questions altered so that Q12 (valuation question) appears as Q19 to the responder.

collected the price data for each gift CD independently. Table D below reports the replication of Waldfogel's analysis reported in Table 1 for single-disc CD and all types of CDs.

Table D— Yield of Gift CDs

	Single-disc CDs	All types of CDs
Amount paid (\$)	11.02	11.66
Value (\$)	15.17	15.95
Percentage ratio of average value to average price	1.39	1.33
Average percentage yield	1.59 (1.58)	1.53 (1.44)
Number of recipients	135	171

Standard error in parentheses.

Appendix E: Gift sales during the holiday season

Table E1– CD and Digital Sales

	(1)	(2)
	$\ln(CDSales)$	$\ln(DigitalTotalSales)$
Week 50	0.2047*** (31.19)	0.0168** (2.55)
Week 51	0.4743*** (72.26)	0.2247*** (33.97)
Week 52	-0.0123* (-1.87)	0.7539*** (113.97)
Week 01	0.1035*** (19.01)	0.2032*** (37.05)
Constant	14.37*** (1922.7)	10.55*** (1400.3)
Year fixed effects	Yes	Yes
Month fixed effects	Yes	Yes
DMA fixed effects	Yes	Yes
N	55,500	55,500
Adj. R^2	0.97	0.98

t statistics in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table E2 – Estimated additional CD and digital sales (in units)

Year	Additional CD sales	Additional digital sales
	Week 51	Week 52
2004	20,728,074	442,179
2005	18,841,712	1,044,347
2006	17,352,912	1,860,599
2007	14,096,724	2,761,529
2008	11,408,450	3,556,324
2009	9,360,993	3,957,183
2010	7,473,011	4,184,798
2011	7,145,852	4,744,516
2012	6,078,652	5,176,905
2013	5,196,228	5,022,407
2014	4,379,997	4,475,367

(*) Annual sales for 2004 is from Nielsen end-of-year report