



Office of Inspector General | United States Postal Service

RARC Report

Advertising Mail: Mail Mix Matters

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Table of Contents

- Cover
- Executive Summary 1
 - Results of Analysis..... 1
- OIG Synopsis..... 3
 - Introduction..... 3
 - What Influences How Customers Treat Advertising Mail?..... 4
- Findings..... 4
 - Mail Mix Matters..... 4
 - Demographics Influence Advertising Mail Effectiveness..... 5
 - Who Sends the Mail Influences Advertising Mail Effectiveness..... 7
 - Mailpiece Features Matter 7
- Business Implications 9
- Conclusion 10
- RCF Report 11
- Appendix: Management’s Comments 48
- Contact Information 49

Executive Summary

Advertising mail is a significant source of revenue for the Postal Service.¹ At \$20 billion in fiscal year (FY) 2017, advertising mail represented 29 percent of total Postal Service revenue.² It was approximately 58 percent of total mail.³ Its importance to the Postal Service's financial success cannot be overstated.

Previous work by the U.S. Postal Service Office of Inspector General (OIG) has shown that advertising mail has many inherent strengths — qualities like the ability for the sender to receive direct feedback on its effectiveness, higher response rates than other direct marketing channels, memorability, and privacy — that make it still relevant in the digital age.⁴ In other words, advertisers use it because it works.

Given how important this type of mail is to both the Postal Service and marketers, we analyzed what factors enhance the three “R’s” of advertising mail effectiveness — reading, reaction and response.⁵ Chief among the factors studied was how various types of mail (in other words, the “mail mix”) a household receives interact with one another. Simply put, does the presence of non-advertising mailpieces enhance the value of advertising mail? We studied additional factors that drive advertising mail effectiveness. These include demographic factors, past business relationship, presence of a coupon, and the shape of the advertising mailpiece. Specifically, we used three separate regression models to explain the effect of these factors on the probability that 1) a piece of advertising mail was read; 2) the piece generated a positive reaction (for example the recipient found it useful or interesting); and 3) the household is considering responding to the mailpiece.⁶

Highlights

Mail mix matters — the presence of a non-advertising mailpiece enhances the likelihood that a household will read, positively react to, and respond to a piece of advertising mail.

Increases in First-Class Mail and Periodicals as shares of total mail received were both equally important in driving increases in reading, reaction to, and response to advertising mail.

Our analysis shows that other factors like demographics, existence of a past business relationship, and coupons had a positive effect in the reading, reaction, and response to advertising mail.

Results of Analysis

- Mail mix matters. A higher non-advertising share, including both First-Class Mail and Periodicals, is associated with an increased likelihood that the household will read, have a positive reaction to, and respond to the advertising mail they receive.
- We found that mail mix matters even when the other factors influencing the likelihood of the three Rs are controlled for in our analysis. In other words, a household that is similar to other households in terms of age, education,

¹ Total advertising mail is composed of Marketing Mail and First-Class advertising mail.

² FY 2018 Household Diary Study data were not available when this report was written. OIG calculation based on the Postal Service's Cost, Revenue and Analysis Reports (CRA). U.S. Postal Service, *Cost and Revenue Analysis Report FY 2017*, <https://about.usps.com/who-we-are/financials/cost-revenue-analysis-reports/fy2017.pdf> and U.S. Postal Service, *The Household Diary Study: Mail Use & Attitudes in FY 2017*, March 2018, https://www.prc.gov/docs/105/105134/USPS_HDS_FY17_Final%20Annual%20Report.pdf, p. 2.

³ Ibid.

⁴ U.S. Postal Service Office of Inspector General, *Advertising Mail: Past and Present*, Report No. RARC-WP-16-006, March 28, 2016, https://www.uspsoig.gov/sites/default/files/document-library-files/2016/RARC-WP-16-006_0.pdf, pp. 12-13.

⁵ Marketing Mail comprises the bulk of the Postal Service's advertising mail volume. For example, in 2017, Marketing Mail constituted approximately 90 percent of advertising volume. As such, we use the terms advertising mail and Marketing Mail interchangeably. OIG calculation based on U.S. Postal Service FY 2017 CRA and U.S. Postal Service FY 2017 HDS.

⁶ For this analysis, the OIG worked with RCF Economic and Financial Consulting, a firm with deep expertise in postal economics.

technology, or race will be more likely to read advertising mail when there is a greater share of non-advertising mail found in the mailbox.

- Within First-Class Mail, we found that transactions mail (for example bills and statements) was a more important driver of household reading, reaction, and response to advertising mail than was correspondence mail (for example personal letters).
- Demographic factors play influential roles in the household treatment of advertising mail. Consistent with previous OIG studies, we found that older people are more receptive to the mail than younger people. However, younger people are not entirely uninterested in mail and, therefore, are potential new customers for marketers.
- Households headed by a college graduate are less likely to read, have a positive reaction to, and respond to a piece of advertising mail than households with only a high school degree.
- Existence of a past business relationship between the mailer and the household has a strong impact on household reading of advertising mail, a stronger impact on household reaction, and an even stronger impact on the likelihood of response.
- The presence of a coupon is found to significantly raise the reading, positive reaction, and response rates, with the strongest impact on the response rate.
- The shape of the mailpiece has a significant impact on household reading, reaction, and response. Flats, for example, are significantly more likely than letters to be read, create a positive reaction, and generate a response.

OIG Synopsis

Introduction

In a departure from the past, most of the recent volume growth in postal products has been in the Shipping and Packages business.⁷ However, this does not mean that letter and flat mail are relics of the past. Indeed, this type of mail continues to be a viable channel of communication throughout the United States. In 2017, 95 percent of the Postal Service's total volume was letter and flat mail (First-Class Mail, Marketing Mail, and Periodicals Mail).⁸ As shown in Figure 1, advertising mail — defined as the total of Marketing Mail and advertising mail in First-Class — is still a \$20 billion business, accounting for 58 percent of the Postal Service's volume in FY 2017.⁹

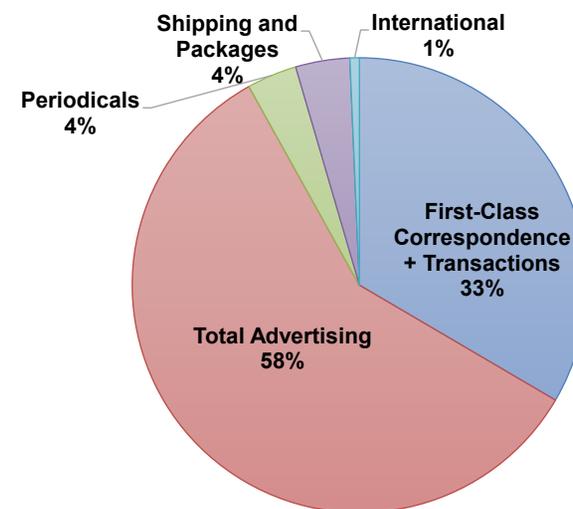
Letters and flats are extremely important elements of the Postal Service's mail mix. In 2017, letters and flats comprised 95 percent of the Postal Service's total mail volume.

Given the significance of advertising mail, what factors influence the “three R’s” of advertising mail effectiveness — reading, reaction, and response? We posed this question to RCF Economic and Financial Consulting (RCF), experts in postal economics.¹⁰ Using regression analysis, RCF analyzed data from the Postal Service's annual Household Diary Study (HDS) from 2013 to 2017 to determine how mail mix and other factors affect the probability that 1) a piece of advertising mail was read by someone in the household; 2) the advertising mailpiece generated a positive reaction (for example, it was found useful or interesting); and 3) the household is considering responding to the mailpiece.¹¹

Figure 1: Total Postal Service Volume in 2017

TODAY, MAIL CONTINUES TO BE A VIABLE AND PROFITABLE CHANNEL OF COMMUNICATION THROUGHOUT THE UNITED STATES

The Postal Service delivered 149 billion pieces of mail in 2017. Fifty-eight percent of total volume is advertising mail, making this mail segment vital to Postal Service's current financial survival and future success.



Sources: U.S. Postal Service 2017 Report on Form 10-K and The Household Diary Study Mail Use and Attitudes in FY 2017. FY 2018 HDS data were not available when this report was written. Note: First-Class Mail advertising is excluded from First-Class Mail volume. Total advertising is comprised of Marketing Mail and advertising in First Class Mail.

7 During the 11-year period from 2007 to 2017, First-Class Mail volume fell 38 percent, Marketing Mail 24 percent, and Periodicals 40 percent. Shipping and Packages volume increased 181 percent. OIG calculation based on FY 2007 and FY 2017 CRA reports.

8 OIG calculation based on FY 2017 CRA and FY 2017 HDS. The FY 2018 HDS data were not available when this report was written.

9 OIG calculation based on U.S. Postal Service, *Form 10-K FY 2017*, November 2017, <https://about.usps.com/who-we-are/financials/10k-reports/fy2017.pdf>, p.19 and FY 2017 HDS. First-Class Mail and Marketing Mail total volume exclude parcels. Shipping and Packages total volume include Priority Mail, Priority Mail Express, USPS Retail Ground, Parcel Select Mail, Parcel Return Service Mail, Marketing Mail Parcels, Package Service Mail, First-Class Mail Parcels, First-Class Package Service, and Priority Mail Express. It excludes International packages.

10 RCF Economic and Financial Consulting, <http://www.rcfecon.com/>.

11 This analysis cannot predict when an advertising mail piece will actually be read. The purpose of this model is to identify certain characteristics that may influence the probability that a household will read, positively react, or respond to a piece of advertising mail. In addition, it should be noted that the HDS reports on intended rather than actual responses of the survey participants. For the technical analysis, see [RCF's report](#).

What Influences How Customers Treat Advertising Mail?

A number of factors will affect the effectiveness of advertising mail. We looked at two main issues in our analysis. The first is whether the mix of mail — defined as the share of a household’s weekly mail that is non-advertising — affects household reading, reaction, and response to advertising mail. For the purposes of this analysis, First-Class correspondence, First-Class transactions, and Periodicals Mail are considered non-advertising mail. Packages are not included in the household mail mix because they are sometimes received separately from other mail, at a different time of day, or even via a different carrier. As a result, their impact on the advertising mail reading, reaction, and response rate is likely to operate in a different manner from that of letters and flats. Therefore, their effect is beyond the scope of this paper.

Next, to isolate the effect of mail mix only, we controlled for other influencing factors that affect reading, reaction, and response.¹² These other factors are: 1) household demographics; 2) mailer characteristics; and 3) features of the individual advertising mailpiece. We also look at whether the different components of non-advertising mail (First-Class correspondence mail, First-Class transactions mail, and Periodicals Mail) have separate impacts on household treatment of advertising mail.¹³

Findings

Several factors were found to strengthen the value of advertising mail. We found the following:

- Variation in the mail mix enhances the likelihood that the household will read, positively react to, and respond to an advertising mailpiece.

The existence of non-advertising mail increases the effectiveness of advertising mail.

- Demographic factors are relevant in explaining the likelihood that a piece of advertising mail will be read, generate a positive reaction, and lead to a response.
- Existence of a past business relationship with the household enhances the effectiveness of an advertising mailpiece.
- The presence of a coupon was found to be the most important, significantly raising the reading, positive reaction, and response rates, with the strongest impact on the response rate.
- Shape matters when it comes to an advertising mailpiece’s effectiveness. Flats — items like large envelopes, newsletters, and magazines — for example, are significantly more likely to be read, create a positive reaction, and generate a more likely response than letters.

Mail Mix Matters

The presence of non-advertising mailpieces enhances the effectiveness of advertising mail, increasing the probability that households will read, favorably react, and respond to an advertising mailpiece.

In addition, the impact of mail mix on advertising mail varies from component to component of non-advertising mail as shown in [Table 1](#).¹⁴ We found that increases in both First-Class Mail and Periodicals Mail increase the effectiveness of advertising mail.¹⁵ Surprisingly, within First-Class Mail, transactions mail (for example bills and statements) is a more important driver of household reading and reaction to advertising mail than is correspondence mail (for example personal letters and business correspondence).¹⁶

The presence of First-Class Mail increases the value of advertising mail in a measurable way, as highlighted by the results in our study.

¹² By doing this, we know that when we observe the impact of mail mix on, say, the reading rate of advertising mail, we know we are not mixing in the impact of some other factor, like education or age, that might be correlated with the mail mix.

¹³ [Table 7](#) in the RCF Report describes the variables used in the models.

¹⁴ A positive sign indicates the factor has a statistically positive response. For example, we found an increase in transactions mail has a positive impact on the probability the household will read, react, and respond to advertising mail. A negative sign shows the opposite — the presence of the factor has a statistically negative impact. For example, if the advertising piece is from a financial sender (as will be discussed later), it is less likely to be read, reacted to, or responded to. No impact means that the result was not statistically significant. For the detailed mail mix results of each regression model, see [Tables 8-10](#) and [29](#) in the RCF Report.

¹⁵ See [Table 28](#) in the RCF Report for the results on the separate impact of First-Class Mail and Periodicals on advertising mail.

¹⁶ See [Table 29](#) in the RCF Report for the results on the separate impact of First-Class correspondence and transactions mail.

Table 1: A Healthy Mail Mix Positively Contributes Toward Advertising Mail Effectiveness

We found that a favorable mail mix enhances the likelihood that the household will read, positively react to, and respond to an advertising mailpiece.

		Reading	Reaction	Response
First-Class Mail	Correspondence	+	No impact	No impact
	Transactions	+	+	+
Periodicals		+	No impact	No impact

Source: RCF analysis of U.S. Postal Service Household Diary Study, Mail Use & Attitudes.

These findings demonstrate the importance of defending all segments of mail. From the perspective of the Postal Service, these results suggest that efforts to increase the volume of advertising mail will work better if they are accompanied by efforts to increase (or slow the decrease in) the volume of First-Class and Periodicals Mail. This combined effort will help maintain a more favorable mail mix and strengthen the value of advertising mail, thereby further encouraging its use. As such, the Postal Service should continue to defend First-Class Mail volume. But we acknowledge that this is challenging, as previous OIG work has shown.¹⁷

Demographics Influence Advertising Mail Effectiveness

We analyzed how demographic factors influence advertising mail effectiveness. These results are presented in Table 2.¹⁸

Table 2: Demographics Matter

Demographic factors help in explaining the likelihood that a piece of advertising mail will be read, generate a positive reaction, and response.

		Reading	Reaction	Response
Age <i>Base: 18-24</i>	25-34	-	-	-
	35-44	No impact	No impact	No impact
	45-54	No impact	+	No impact
	55-64	+	+	+
	65-74	+	+	+
	75+	+	+	+
Education <i>Base: High School or less</i>	Some College or Tech School	-	-	-
	At Least College Graduate	-	-	-
Technology Use	HH receives bills and statements online	-	-	-
Race <i>Base: Caucasian</i>	Hispanic	+	+	+
	African American	+	+	+
	Asian	+	+	No impact
	Other (non-white)	+	+	+

Source: RCF Analysis of U.S. Postal Service Household Diary Study, Mail Use & Attitudes.

Note: Where noted the results are the relative impact as compared to a base group.

¹⁷ U.S. Postal Service Office of Inspector General, *A New Reality: Correspondence Mail in the Digital Age*, Report No. RARC-WP-18-004, March 5, 2018, <https://www.uspsoig.gov/sites/default/files/document-library-files/2018/RARC-WP-18-004.pdf> and U.S. Postal Service Office of Inspector General, *Transactional Mail: Implications for the Postal Service*, Report No. RARC-WP-18-007, April 16, 2018, <https://www.uspsoig.gov/sites/default/files/document-library-files/2018/RARC-WP-18-007.pdf>.

¹⁸ The positive (+) and negative (-) signs in Table 2 are relative measures in that they are relative to the omitted category. For example, for Age, the impact is relative to the 18-24 category; for Education, the impact is relative to a high school degree or less; for Race, the impact is relative to white households. For the detailed results on how demographic factors influence advertising mail effectiveness, see *RCF Report*.

Age of Household Head

Households headed by someone who is older are more likely to read advertising mail, with the likelihood of a piece of advertising mail being read increasing as the age of the household increases, as shown in Table 2.¹⁹ Age also affects household reaction and response with younger households less likely and older households more likely to have a positive reaction and respond to advertising mail.²⁰ This finding is consistent with previous OIG findings that older people tend to rely on mail more than younger people.²¹

Education of Household Head

In contrast to age, education has a negative impact on the effectiveness of advertising mail. Households headed by a college graduate, for example, are significantly less likely to read, respond or react to a piece of advertising mail than households with only a high school degree or less (see Table 2).²² For marketers, these negative impacts need to be balanced against the advantages of targeting higher education households that are also likely to have higher incomes and purchase more goods and services than less educated households.

Technology Use – Online Bill Presentment

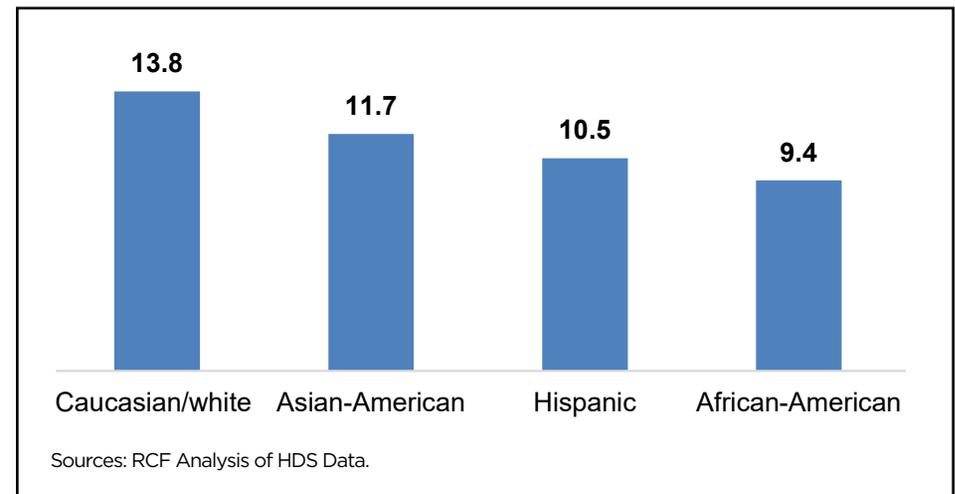
Households that receive online bills or statements are less likely to read, positively react, or respond to advertising mail as shown in Table 2.²³ All of these results are consistent with the idea that these households are less connected to their mail than households that rely exclusively on the mail for the receipt of their bills and statements.

Ethnicity and Race

The ethnicity of the household appears to influence the effectiveness of advertising mail. As can be seen in Table 2, the non-Caucasian households are more likely to read and react to advertising mail than Caucasian households, and all but Asian-households are more likely to respond.

Of all the ethnic groups in the HDS, Hispanic households are more likely to read, positively react, and respond to advertising mail than are non-Hispanic households.²⁴ It is meaningful that Hispanic and non-white households are more receptive to advertising mail because these households receive less advertising mail than white households, as shown in Figure 2.²⁵ Our analysis indicates that non-white households may be an untapped market for direct mail marketers.

Figure 2: Pieces of Advertising Mail Received per Week



19 See Tables 8-10, 14 in the RCF Report for the detailed technical results.

20 See Tables 8-10, 14 in the RCF Report for the detailed technical results. All these coefficients are measured relative to the youngest age group (18 – 24) and are consistent with view that older people are generally more receptive to the mail than younger people.

21 See for example, U.S. Postal Service Office of Inspector General, *A New Reality: Correspondence Mail in the Digital Age* and U.S. Postal Service Office of Inspector General, *Transactional Mail: Implications for the Postal Service*.

22 See Tables 8-10, 16-17 in the RCF Report for the detailed technical results.

23 See Tables 8-10, 20-21 in the the RCF Report for the results.

24 See Tables 8-10, 18-19 in the RCF Report for the detailed technical results.

25 Although non-white and Hispanic households may have a different mail mix than white non-Hispanic households, the impact of any difference in mail mixes is already accounted for within the regression equation.

Who Sends the Mail Influences Advertising Mail Effectiveness

We also looked at what impact sender characteristics — things like past business relationship, nonprofit mailings, and financial sender mailings — had on the effectiveness of advertising mail. The findings are summarized in Table 3.²⁶

Table 3: Mailing Type Influences Reading, Reaction, and Response of Advertising Mail

Mailing type influences how customers perceive advertising mail. For example, our analysis shows that when there is a past business relationship, households are far more likely to read, react positively, and respond to an advertising mail piece.

	Reading	Reaction	Response
Past Business Relationship	+	+	+
Nonprofit	+	+	+
Financial Sender	-	-	-

Source: RCF analysis of U.S. Postal Service Household Diary Study, Mail Use & Attitudes.

Past Business Relationship

Existence of a past business relationship has a strong impact on the effectiveness of advertising mail as shown in Table 3.²⁷ In fact, advertising mail sent by a business that has a past business relationship with the recipient is more than twice as likely to be read and generate a positive reaction and is six times as likely to get a response than mail sent by businesses with no past relationship.²⁸

²⁶ See Tables 8-10 in the RCF Report for the results.

²⁷ See Tables 8-10, and 22 in the RCF Report for the results.

²⁸ See Table 23 in the RCF Report for the results.

²⁹ See Tables 8-10 and 22-23 in the RCF Report.

³⁰ Ibid.

³¹ Ibid.

³² See Tables 8-10 and 24-25 in the RCF Report.

³³ Within the regression the omitted shape category is "letter," so the coefficients reflect differences in the reading, reaction, and response rates of non-letter pieces relative to letters.

Yet, it is important to recognize that companies must send mail to households with which they have not had yet a past relationship to generate new customers. While this "prospecting" mail is far less likely to be read, it can be an important first step to creating new customers and future business relationships.

Nonprofit Postage

Households are also significantly more likely to read, react positively, and respond to mail sent using nonprofit postage as seen in Table 3.²⁹ These pieces are used by nonprofit and other social agencies that qualify for the reduced postage rate. The strongest effect is on reaction suggesting that even when households do not respond to nonprofit mailings (most of which are requests for donations) they still view these mailings positively.³⁰

Financial Industry Sender

In contrast to mail from nonprofit senders, households are significantly less likely to read, react positively, and respond to mail sent by the financial sector as shown in Table 3.³¹ Many of these mailings are solicitations from credit card companies. Perhaps, one reason for this result is that the decision to get an additional credit card is a bigger decision than one to use a coupon.

Mailpiece Features Matter

Mailpiece features, such as shape, whether it is addressed to recipient (i.e. targeted mailpiece), presence of a coupon, and presence of a return envelope were also analyzed to see whether they had any impact on the effectiveness of advertising mail. The findings are summarized in Table 4.³²

Our analysis finds that the shape of the advertising mailpiece does impact its effectiveness. We looked at seven different mailpiece shapes: letter, flat, catalog, detached label card (DAL), postcard, flyer, and newsletter.³³ The results are shown in both Table 4 and in Figure 3 below.

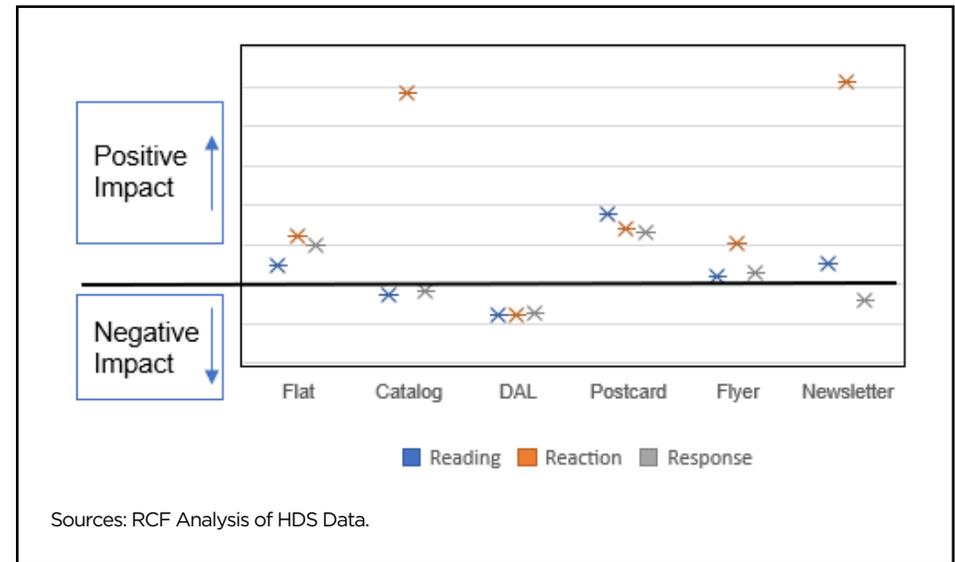
Table 4: Several Mailpiece Features Impact Consumers' Perception of Advertising Mail

Other factors impact advertising mail effectiveness. Specifically, a flat-shaped piece is more likely to be read, create a positive reaction, and generate a response than a letter. Similarly, the presence of a coupon positively influences the three Rs of advertising mail.

		Reading	Reaction	Response
Specifically Addressed to HH member		+	+	+
Has Coupon		+	+	+
Return Envelope <i>Base: Response 'No'</i>	No Postage	-	+	+
	Postage Paid	-	-	+
Shape <i>Base: Letters</i>	Flat	+	+	+
	Catalog	-	+	-
	Detached Label Card	-	-	-
	Postcard	+	+	+
	Flyer	+	+	+
	Newspaper/ Newsletter/ Magazine	+	+	-

Source: RCF analysis of U.S. Postal Service Household Diary Study, Mail Use & Attitudes.
Note: Where noted the results are the relative impact as compared to a base group.

Figure 3: Shape of the Advertising Mail Piece Impacts Its Effectiveness



We found that a flat-shaped mailpiece — an item like a large envelope, newsletter, and magazine — is significantly more likely to be read, create a positive reaction, and generate a likely response than letters.³⁴ It follows then, that a household that gets more flats will have a higher reading rate (all else being equal) because household members are more likely to read those flats.

Catalogs have an interesting relationship with households. The results suggest that they are no more likely to be read or responded to, but they create a significantly strong positive reaction as Figure 3 shows.³⁵ One element of catalogs that needs to be noted here is that they are not likely to be read immediately; instead, they are often set aside for later reading. As measured in our study, “read” measures the mailpiece being read as soon as it is received. However, “set aside for later” is one of the responses households can give to the reading question and catalogs have a high “set aside” rate.³⁶ Thus, our analysis suggests that people enjoy receiving catalogs even if they do not immediately read them.

³⁴ The Postal Service uses the word “flats” to refer to large envelopes, newsletters, and magazines. Flats must: have one dimension that is greater than 6-1/8 inches high OR 11-1/2 inches long OR 1/4 inch thick. Additionally, they may be no more than 12 inches high x 15 inches long x 3/4 inch thick. U.S. Postal Service, “Sizes for Large Envelopes and Flats,” <https://pe.usps.com/businessmail101?ViewName=Flats>. See Table 24 in the RCF Report for the results.

³⁵ See Table 24 in the RCF Report for the results.

³⁶ RCF analysis of HDS data.

Similar to flats, postcards are more effective advertising mailpieces than letters.³⁷ The same holds true for flyers, though the impact is not as strong as for postcards.³⁸ Newsletters are more likely to be read, and like catalogs are far more likely to generate a positive reaction.³⁹

The impact of four other mailpiece features are examined: (1) whether the mailpiece was specifically addressed to a household member; (2) whether it contained a coupon; (3) whether it came with a return envelope without paid postage; and (4) whether it came with a return envelope with paid postage.⁴⁰ Of these, the presence of a coupon is found to be the most important, significantly raising the reading, positive reaction, and response rates, with the strongest impact on the response rate.⁴¹ A previous OIG study found that Millennials are enthusiastic coupon clippers and they strongly appreciate receiving coupons in the mail.⁴²

Business Implications

The effectiveness of advertising mail increases if the Postal Service can increase, or even maintain, the share of non-advertising mail — both First-Class Mail and Periodicals Mail. Within First-Class Mail, transactional mail has a more positive effect on advertising mail than correspondence. This important finding suggests that the Postal Service has even more reason to fight for all segments of the mail: First-Class Mail, Marketing Mail, and Periodicals Mail.

Our study shows that coupons have a notable positive impact by increasing the likelihood that a piece of advertising mail will be read, create a positive reaction, and generate a response.

An important implication suggested by these results is that the continued declines in First-Class Mail and Periodicals Mail volumes could have a negative spill-over effect on advertising mail. As these non-advertising portions of the mail decline, households would likely respond by reducing the reading of advertising mail and lowering their overall perception of this mail. This in turn could reduce the effectiveness of advertising mail as an advertising medium and reduce the volume of direct mail sent. On the other hand, policies that slow the decline in First-Class Mail and Periodicals Mail would have a secondary positive impact of maintaining a more favorable mail mix and stabilizing (or even increasing) the effectiveness and use of advertising mail.

This paper finds that certain mail characteristics are important in driving reading, reaction, and response to advertising mail. The Postal Service could play a significant role by working with advertisers to ensure direct mail has characteristics that increase its effectiveness. For example, the Postal Service could consider offering temporary incentives to mailers that use a flat mail piece, such as a newsletter, or postcard. The Postal Service could furthermore work with advertisers to incentivize the use of coupons, especially when the advertising mailpiece is targeting Millennials. Additionally, as our study has shown, minority households may be an untapped market. The Postal Service could collaborate with advertisers to study how to better target these households to ensure they receive content that is relevant to them and therefore increase advertising mail effectiveness.

The decline in First-Class Mail may have a negative impact on the effectiveness of advertising mail. This negative impact has the potential to cause mailers to look for alternatives to advertising.

³⁷ See [Table 24](#) in the RCF Report for the results.

³⁸ Ibid.

³⁹ Ibid.

⁴⁰ [Table 7](#) in the the RCF Report discusses variables used in the regression models.

⁴¹ See [Tables 8-10](#) and [26-27](#) in the RCF Report.

⁴² U.S. Postal Service Office of Inspector General, *Millennials and the Mail*, Report No. RARC-WP-18-011, July 30, 2018, <https://www.uspsog.gov/sites/default/files/document-library-files/2018/RARC-WP-18-011.pdf>, p. 7.

Conclusion

With continued declines in First-Class correspondence and transactions mail and Periodicals Mail, the Postal Service not only risks a loss of revenue from these types of communications, but also risks a loss of revenue if advertising mail becomes less effective. As such, what this analysis shows is that the Postal Service's ongoing efforts to maintain other mail, especially First-Class Transactions mail, benefits the Postal Service in two ways. The first is through the revenue from the mail itself. The second is through the benefit of increasing the effectiveness of advertising mail. In other words, the benefit of what is in the mailbox is greater than the value of its independent parts.

RCF Report

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for

**The Office of Inspector General (OIG) of
The United States Postal Service**

The Impact of Mail Mix on Household Reading, Reaction and Response to Marketing Mail

I. Introduction

A 2016 study of Swiss households “Mail Composition and Recipients Reaction to Direct Mail”⁴³ found that there was a relationship between the mix of mail received by a household and the household’s reaction to advertising mail. The authors studied 544 recipients during a single week in March 2016 and found that a higher share of non-advertising mail was associated with more positive reactions to advertising mail. The purpose of this study is to test whether that relationship also holds true in the U.S. We use Household Diary Study (HDS) data from 2013 to 2017 to analyze the impact of the mix of mail received by households on 1) the probability that a given piece of Marketing Mail will be read by someone in the household; 2) the probability that the household will have a positive reaction to the mail piece; and 3) the probability that the household indicates that they are likely to respond to the advertising.

The HDS is an annual survey conducted by the U.S. Postal Service, administered by NuStats of Austin, Texas. RCF has years of experience analyzing this data which has been collected annually since 1987. Each year, approximately 5,000 households complete a weekly diary of mail received, with about 100 households completing the diary each week of the year. From 2013 to 2017, the HDS recorded nearly 350,000 pieces of Marketing Mail received by over 25,000 households, creating a sample size for this study far larger than the Swiss study.

Households report information about each piece of mail received during the week thereby providing information on their weekly mail mix. Households also report detailed information about each mail piece including such things as the content and shape of the mail piece and the industry of the sender. For Marketing Mail, households report whether the piece was read, whether the piece generated a positive reaction, and whether they are likely to respond to the advertising. In a companion survey – known as the Recruitment Survey – households provide demographic information such as age and education as well as information about their use of various technological alternatives to the mail such as online bill presentment.

43 “Mail Composition and Recipients’ Reaction to Direct Mail,” *T. Geissmann*, C. Jaag, U. Trinkner and M. Maegli. 2017. Mail Composition and Recipients’ Reaction to Direct Mail. Topics in Regulatory Economics and Policy: The Changing Postal and Delivery Sector. Cham: Springer, 271-282*

Therefore, in addition to testing the relationship between mail mix and household reading, reaction, and response to Marketing Mail, the data also allow for analysis of the other factors which influence the relationship between households and advertising mail. The results of this study provide valuable information to the Postal Service and to marketers regarding ways to increase the value of direct mail. The results also provide a basis for thinking about the inter-relation between the different types of mail in the mailbox and more broadly, about the role of the Postal Service in the daily life of Americans.

Our report is organized as follows: Following this introduction, Section II discusses the HDS study and data used in this report and presents key summary statistics. In Section III, the logistic model used to estimate the impact of different variables is explained. Section IV discusses the results of the analysis.

II. Overview of Household Diary Study Data

The Household Diary Study is an annual survey of approximately 5,200 households conducted by the Postal Service and administered by NuStats of Austin, Texas. Each week about 100 households record information about every piece of mail they receive that week, including information on the sender, the physical characteristics of the mail piece and, for advertising mail, how they interacted with the mail piece. In an initial recruitment survey, households also provide demographic information about themselves including the age, ethnicity, race, and educational attainment of the household head and their use of various technological alternatives to the mail such as online presentment of bills and statements.

The HDS's full account of the mail households receive in a week allows the household's weekly mail mix to be calculated, including the share of mail that is non-advertising, and, more specifically, the share that is correspondence, transactions or periodicals. [Table 1](#) reports the average number of pieces of various kinds of mail received in a week by households included in this study. The table also shows the shares of non-package mail accounted for by the different types of mail received by households. As can be seen from the table, about 36% of pieces recorded in the HDS were non-advertising and 64% were advertising. Packages are recorded in the HDS but excluded from most of the analysis because they are often not received at the same time as other mail. A later section presents results for packages and their share of the mail mix is presented separately there as well.

Table 1: HDS Volumes of Mail Received by Households, 2013-2017

Type of mail	Pieces received per household per week, among household used in the reading model	Share of all non-package mail
Non-advertising	8.03	35.8%
Periodicals	1.27	5.6%
Correspondence	2.82	12.6%
Transactions and other	3.94	17.6%
Advertising	14.41	64.2%
First Class ads	0.72	3.2%
Marketing Commercial	11.03	49.2%
Marketing Nonprofit	2.66	11.8%
All mail	22.44	100.0%

Households that completed the HDS from 2013 to 2017 reported receiving nearly 350,000 pieces of Marketing Mail and recorded information on all the variables used in this study for more than 290,000 of those pieces.

Households completing the HDS record whether household members read the Marketing Mail they received, whether they thought it was useful or interesting, and whether anyone in the household was considering responding to it. [Table 2](#) below reports the number of pieces of Marketing Mail for which each answer choice was selected for reading, reaction and response. Answer choices in bold were counted in this study as indicating that a mail piece was read, reacted to positively or likely to be responded to, respectively. It should be noted that the average “yes” response rate of 12.3 percent is much higher than actual response rates to direct mail, which are typically 3 percent or less. However, the HDS question merely asks if someone in the household is considering responding. Nonetheless, considering responding is likely a necessary first step to actually responding.

Table 2: Reading, Reaction, and Response Rates to Marketing Mail, 2013-2017

Reading: was the mail piece...	Observations for which reading was recorded	
	Observations recorded	Observations used
Read by a member of the household	124,308	112,389
Read by more than one member of the household	21,993	19,556
Looked at but not read	64,341	58,350
Discarded without being read	96,821	87,437
Set aside for reading later	18,409	16,390
Total	325,872	294,122
Reading rate	44.9%	44.9%

Reaction: would this mail piece be described as...	Observations for which reactions were recorded	
	Observations recorded	Observations used
Useful information we like to receive	134,646	121,912
Interesting or enjoyable, but not useful	50,756	45,866
Neither interesting, enjoyable, nor useful	137,311	123,788
Objectionable or offensive	2,587	2,244
Total	325,300	293,810
Positive reaction rate	57.0%	57.1%

Response: is anyone in your household considering responding?	Observations for which intent to respond or not respond was recorded	
	Observations recorded	Observations used
Yes	40,007	36,078
No	228,060	206,654
Maybe	55,382	49,956
Total	323,449	292,688
Response rate	12.4%	12.3%

The total number of observations is smaller for reaction than for reading because households answered the question on reaction less frequently than the question on reading. The number of observations for response is smaller still for the same reason. The number of observations used in the model is always smaller than the number for which reading, reaction, or response was recorded because observations were dropped when other important information about them was left out of the HDS.

Age, income, education, ethnicity, race and use of technological substitutes to the mail could potentially determine the household members' propensity to read, react positively to, and respond to Marketing Mail independently of mail mix. Households completing the HDS provide information about themselves on all these characteristics, though many decline to provide income information. In its many years analyzing HDS data, RCF has found the education level of the household head—a question more often answered—to be a reasonable proxy for income. Receipt of online bills or statements was selected as a measure of household members' use of technological substitutes to the mail.

From 2013 to 2017, 26,304 households completed the HDS: 22,580 of which reported receiving at least one piece of Marketing Mail during their HDS week for which they provided a full set of information. The number and share of these households having the various demographic characteristics included in this study is reported in Table 3 below. In some cases, the questions in the HDS are more detailed than the categories used in this study. In those cases, the categories used in the study are presented in the bold, shaded rows of the tables. In all cases, the number of households recorded is the number used in the reading model.

Table 3: Household Demographics, 2013-2017

Age of household head	Households in reading model	Share of households
18-24	331	1.5%
18-21	58	0.3%
22-24	273	1.2%
25-34	2,639	11.7%
35-44	3,115	13.8%
45-54	4,013	17.8%
55-64	5,323	23.6%
65-74	4,562	20.2%
65-69	2,661	11.8%
70-74	1,901	8.4%
75+	2,597	11.5%
All households	22,580	100.0%

Educational attainment of household head	Households in reading model	Share of households
High school or less	4,530	20.1%
8th grade or less	132	0.6%
Some high school	438	1.9%
High school graduate	3,960	17.5%
Some college or technical school	5,800	25.7%
Some college	4,479	19.8%
Technical school graduate	1,321	5.9%
At least college graduate	12,250	54.3%
College graduate	6,821	30.2%
Post graduate work	5,429	24.0%
All households	22,580	100.0%

Did the household report receiving any bills or statements online in the past month?	Households	
	in reading model	Share of households
No	7,397	32.8%
Yes	15,183	67.2%
Total	22,580	100.0%

Is the household head of Spanish/Hispanic/Latino origin?	Households	
	in reading model	Share of households
No	21,649	95.9%
Yes	931	4.1%
Total	22,580	100.0%

Which of the following does the household head consider themselves to be?	Households	
	in reading model	Share of households
White/Caucasian	20,203	89.5%
Black/African American	1317	5.8%
Asian	544	2.4%
Other	516	2.3%
<i>American Indian and Alaska Native</i>	<i>106</i>	<i>0.5%</i>
<i>Native Hawaiian and other Pacific Islander</i>	<i>55</i>	<i>0.2%</i>
<i>Other, specify</i>	<i>355</i>	<i>1.6%</i>
Total	22,580	100.0%

For each piece of Marketing Mail it receives, a household records whether someone in the household knows or has done business with the sender, as well as the industry of the sender. Additionally, households report Marketing Mail sent with a nonprofit discount separately from other Marketing Mail. Variables were included in the model based on this information, and [Table 4](#) below reports the number and share of observations used in the reading model exhibiting each characteristic. Although slightly different numbers of

observations are used in the reaction model and the response model, the distribution of those observations is virtually identical to what is shown below for the reading model.

Table 4: Characteristics of Senders of Marketing Mail, 2013-2017

Sender characteristic	Observations in reading model	Share of observations
No past business relationship	102,697	34.9%
Unknown if there is a past business relationship	29,779	10.1%
Past business relationship	161,646	55.0%
Nonprofit sender	57,924	19.7%
Financial sender	63,575	21.6%
Total observations	294,122	100.0%

For each piece of Marketing Mail, the household also records information on the shape of the mail piece, whether a return envelope or card was included and whether the postage was paid, whether the piece was specifically addressed to household members (as opposed to “current occupant” for example) and whether the piece contained a coupon. Variables were included in the model based on this information, and [Table 5](#) below reports the number and share of observations used in the reading model exhibiting each characteristic.

Table 5: Features of Marketing Mail Pieces, 2013-2017

Mail piece characteristic	Observations in reading model	Share of observations
In a letter size envelope	123,258	41.9%
In an envelope larger than letter size (not catalog)	9,550	3.2%
Catalog	38,507	13.1%
Detached label card	2085	0.7%
Postcard	6,763	2.3%
Addressed flyer/circular/folded piece	102,106	34.7%
Newspaper/magazine/newsletter	11,853	4.0%
Pre-stamped or postage paid return envelope or card included	211,491	71.9%
Return envelope or card that needs a stamp included	36,099	12.3%
No return envelope or card included	46,532	15.8%
Addressed to specific members of the household	241,079	82.0%
Contains a coupon	69,141	23.5%
Total observations	294,122	100.0%

These HDS data will be used to estimate how household reading, reaction, and response to Marketing Mail are affected by the mix of mail received by the households, as well as household demographics, mailer characteristics, and mail piece features.

III. Econometric Approach

1. The Logit Regression Model

The effect of mail mix and other variables on the three household treatments of advertising mail was estimated using the logit model which is a commonly used econometric method for binary dependent variables. As shown in [Table 1](#) above, the values of the dependent variable in all three models are binary meaning they only take on values equal to either 0 (e.g., the household did not read the mail piece) or 1 (the household did read the mail piece). Unlike commonly used linear regression models, the logit model forces the predicted values (or \hat{y} values) of the dependent variable to fit between 0 and 1 by estimating the

variable parameters through the common s-shaped logistic curve which is presented below in Equation 1.

$$Prob(y = 1|x) = f(\beta X) = \frac{1}{1 + e^{-(\alpha + \beta X)}} \quad \text{Equation 1}$$

In order to present the results as a linear combination of parameters and variables, the logit identity, also known as the log-odds, is used. First, the odds calculation is made by dividing the probability that the dependent variable is equal to one by the probability that it is not equal to one (Equation 2). Second, the log-odds calculation is made by taking the natural log of both sides shown in Equation 3. It is notable that logit is the inverse function of Equation 1 meaning the presentation in terms of log-odds sets the x variables as a function of y . While this is useful for presenting results, parameters are estimated through Equation 1

$$Odds = \frac{Prob(y = 1)}{1 - Prob(y = 1)} = e^{(\alpha + \beta X)} = e^\alpha e^{\beta X} \quad \text{Equation 2}$$

$$Logit (Log Odds) = \ln\left(\frac{Prob(y = 1)}{1 - Prob(y = 1)}\right) = \alpha + \beta X \quad \text{Equation 3}$$

Because the model is nonlinear, commonly used linear methods to estimate the equation parameters such as ordinary least squares (OLS) are not applicable. This is because OLS assumes the dependent variable is a linear function when estimating the parameters by minimizing the vertical distance between the observed dependent variable and the predicted value of a linear function.⁴⁴

Maximum likelihood estimation (MLE) is commonly used for estimating parameters of nonlinear models. MLE is based on the principle that out of all possible parameter values for the function, the value that makes the likelihood of the observed data largest should be chosen.⁴⁵ In other words, MLE involves calculating the joint probability of obtaining the sample of data and what parameter values maximize the likelihood of obtaining this sample.

For a binary dependent variable, the likelihood function takes the form of the probability distribution function shown in Equation 4. For y equal to 1, the function is equal to the probability P . For y equal to 0, the function is simply equal to 1 minus P .

$$f(y|P) = P^y(1 - P)^{1-y}; \quad y = 0,1 \quad \text{Equation 4}$$

⁴⁴ Wooldridge, Jeffery. 2006. *Introductory Econometrics: A Modern Approach*, third edition. South-Western College Publishing. Cincinnati, OH.

⁴⁵ *Ibid.*

The likelihood function is the joint probability distribution of all observations (Equation 5). As shown in Equation 5, by plugging in Equation 1 for P and taking the log of both sides, parameter values (β) can be obtained.⁴⁶ Following the MLE principle, the parameter values that are chosen are the ones which maximize the likelihood function in Equation 5.

$$\mathcal{L}(\beta) = \sum y_i \ln\left(\frac{1}{1 + e^{-(\alpha + \beta X)}}\right) + (1 - y_i) \ln\left(1 - \frac{1}{1 + e^{-(\alpha + \beta X)}}\right); \quad y_i = 0,1 \quad \text{Equation 5}$$

2. Model Output – Coefficients, Odds-Ratios and Predicted Probabilities

The logit regression produces coefficients that are measured in log-odds, that is, the amount by which a unit change in an explanatory variable changes the log of the odds of a positive event (e.g. reading the mail piece) occurring. As shown in Equation 3, the relationship between the explanatory variables and the log-odds of reading, etc., is linear, with a positive value indicating that the variable increases the likelihood log odds of reading, etc., and a negative value indicating that the variable reduces the likelihood.

Taking the anti-log of the log-odds coefficients produces odds-ratios, which can be more intuitively understood though must be interpreted carefully (see next paragraph). These represent the multiplicative change in the odds of reading, etc., as a result of a unit change in the explanatory variable (see Equation 2). Odds-ratios are always positive, with an odds-ratio greater than 1 meaning that an increase in the value of the explanatory variable increases the likelihood of the event occurring, while an odds ratio less than 1 means that an increase in the value of the variable decreases the likelihood of the event. For example, an odds-ratio of 2 in a model of reading means that a one unit increase in the explanatory variable doubles the odds of reading. An odds-ratio of 0.5 would cut the odds of reading in half for a unit increase in the value of a variable. Since odds-ratios are multiplicative, a value close to 1 implies that the factor neither increases nor decreases the likelihood of the event occurring. The statistical significance of the odds-ratio coefficient is measured relative to a value of 1.

When interpreting odds-ratios it is important to keep in mind the difference between probabilities and odds. If a mail piece has a 50% probability of being read, its odds of being read are 1-to-1. A doubling of the odds due to an increase in the value of a variable with an odds-ratio of 2 would change those odds to 2-to-1, which is probability of 67%, not 100%.

⁴⁶ *Ibid.*

While the modeled effect of a variable on the odds of reading is constant—that is, an odds ratio of 2 means the odds of reading will always increase by 100% per unit increase in that variable—the effect on probability of reading changes depending on the initial probability of reading. As we have seen, a unit increase in a variable with an odds-ratio of 2 will increase the probability of reading from 50% to 67%, for a change of about 17 percentage points. A further unit increase, however—from odds of 2 to 1 to odds of 4 to 1—would bring the probability of reading to 80%, a change of only 13 percentage points. Further increases would have even smaller effects on probability as it approaches 100%. Decreases in this variable would also have smaller and smaller effects on probability as it approaches 0%. This produces the well-known s-shape of the logit model.

The fact that the change in probability depends on the initial probability creates a challenge for assessing the effects of a variable on probability. For each variable of interest, this study addresses this issue by presenting predicted probabilities at different values of that variable when all other variables are held constant at their observed values.

For example, the predicted probability that a piece of mail is read for a household age 18 – 24 years of age is computed by plugging into Equation 1 the estimated coefficients with the following X values: 0 for the age of household head dummy (because age 18 – 24 is the omitted age category), and for all other X variables, their estimated coefficients (β) multiplied by the observed value for each observation. This results in a predicted probability for each observation assuming the head of the household is 18 – 24 years of age. Finally, the predicted probabilities for all the observations are then averaged together.

This calculation generates a predicted reading rate for 18 – 24 year-olds of 41.1%. The calculation of the reading rate for other groups follows the same process except for each group the estimated age dummy coefficients are also included in the calculation. The predicted reading rates for each age group are shown in Table 6.

Table 6: Predicted Reading Rates for Different Age Groups

Age of HH Head	Coefficient (Log-Odds) <u>Reading</u>	Odds-Ratio <u>Reading</u>	Predicted Value <u>Reading</u>
18-24 (omitted/base category)	-	-	41.1%
25-34	-0.127	0.881	38.4%
35-44	-0.012	0.988	40.8%
45-54	0.074	1.077	42.6%
55-64	0.161	1.174	44.5%
65-74	0.303	1.353	47.5%
75+	0.451	1.570	50.7%

3. Assessing Goodness of Fit

As previously discussed, the model parameters are estimated using MLE and, therefore, traditional goodness-of-fit statistics such as the R^2 from OLS cannot be used.

A receiver operating characteristic curve (ROC curve) is a graphical plot that is commonly used for determining the model fit for logistic regressions. ROC measures how well a model discriminates between observations that are 0 and 1 based on two measures of classification known as 'Sensitivity' and 'Specificity'.⁴⁷ Sensitivity measures the percentage of observations that are 1 and have been classified by the model as '1'. Specificity measures the percentage of observations that are 0 and have been classified by the model as '0'. While observed data for the dependent variable is either 0 or 1, the predicted probabilities will lie somewhere between 0 and 1. Therefore, in order for the model to discriminate between 0 and 1, a cut-off value needs to be assigned. A common default cut-off value is 50% meaning observations are classified as '1' if the predicted outcome (\hat{y}) is greater than or equal to 50%. Observations are classified as '0' if the predicted outcome (\hat{y}) is less than 50%. However, it is arguable that using a cut-off value of 50% for classifying observations as 0 or 1 is only appropriate for models in which 50% of the observations are equal to 1.⁴⁸

The ROC curve overcomes this issue by examining the probability of detecting a true positive (Sensitivity) against a false positive (one minus Specificity) for an entire range of possible cut-off values between 0 and 100%.⁴⁹ ROC then plots Sensitivity (true positive) against one minus Specificity (false positive) relative to a 45-degree angle. The area under the ROC curve (AUC) captures the entire space in which the model is detecting true positives against false positives. AUC can be interpreted as the probability that a randomly chosen observation with value of 1 is classified with a higher predicted probability than a randomly selected observation with value of 0. An AUC of 0.5 would correspond to the 45-degree angle and be considered a poor model that classifies the data no better than random. Based on an industry paper published by Deloitte, an AUC of 0.7 or higher is considered to be an acceptable model (Deloitte, 2016).⁵⁰

47 Hosmer, D. W., Jr., S. A. Lemeshow, and R. X. Sturdivant. 2013. Applied Logistic Regression. 3rd ed. Hoboken, NJ: Wiley.

48 Wooldridge, Jeffery. 2006. Introductory Econometrics: A Modern Approach, third edition. South-Western College Publishing. Cincinnati, OH.

49 Hosmer, D. W., Jr., S. A. Lemeshow, and R. X. Sturdivant. 2013. Applied Logistic Regression. 3rd ed. Hoboken, NJ: Wiley.

50 Skantzios, Nikos; Castelein, Nicolas. 2016. Credit scoring - Case study in data analytics. Deloitte. Available online at: <https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Financial-Services/gx-be-aers-fsi-credit-scoring.pdf>.

There are some measures that attempt to present goodness-of-fit similar to an R^2 from an OLS regression such as the McFadden R^2 shown in Equation 6 below. The McFadden R^2 compares the log-likelihood calculation from the model $(\mathcal{L}(0))$ with only an intercept to the final log-likelihood with all parameters estimated $(\mathcal{L}(\beta))$ from Equation 5.⁵¹ Log-likelihood is strictly negative; therefore, the final log-likelihood of the fitted model will be smaller in absolute value than the log-likelihood of the unfitted model. By subtracting the ratio of the two from 1, the value will be greater than 0 and a larger R^2 can be interpreted as a better 'fit'. As $\mathcal{L}(\beta)$ grows smaller in absolute value relative to $\mathcal{L}(0)$, the McFadden R^2 increases. Similar to traditional R^2 , the McFadden R^2 is bounded between 0 and 1. If the variables in the model have no explanatory power, then the ratio of the two log-likelihoods will be 1 and the McFadden R^2 will be zero which follows a similar intuition as traditional R^2 from OLS.

$$McFadden R^2 = 1 - \frac{\mathcal{L}(\beta)}{\mathcal{L}(0)} > 0 \quad \text{Equation 6}$$

4. Variables Included in the Model

The effect of the mail mix and other variables on the household's treatment of advertising mail was modeled using three separate logistic regression models. The three models were developed to explain the probability that 1) a piece of advertising mail was read; 2) the piece generated a positive reaction (i.e., was found useful or interesting); and 3) the household is considering responding to the mail piece. The basic structure of the model, shown for the reading, is as follows:

$$Prob(\text{Reading}) = f(\text{mail mix, household demographics, sender characteristics, mail piece features})$$

Each observation describes a piece of Marketing Mail a household received and what the household did with that piece of mail. The primary mail mix variable used in this report is the share of non-package mail a household receives that is not advertising mail. Additional analysis decomposed the non-advertising share of mail into separate shares for First-Class and Periodicals Mail, and also a further decomposition of First-Class Mail into correspondence mail and transactions mail. To control for other factors that might influence or determine how a household treats advertising mail, several household demographic variables, sender characteristics, and mail piece features were also included. The same

⁵¹ Wooldridge, Jeffery. 2006. Introductory Econometrics: A Modern Approach, third edition. South-Western College Publishing. Cincinnati, OH.

variables were used in the equations for reading, reaction, and response. Table 7 describes the variables and Tables 8 through 10 present the regression output for the reading, reaction, and response models. Table 11 presents regression diagnostics for each of the three logistic regression models. These models use the non-advertising share of mail as the mail mix variable. Models using alternative mail mix measures are presented in Section IV of this report.

Table 7: Variables Used in the Logistic Regression Models

Variables	Description	Type	Values
<u>Dependent Variables</u>			
Reading	Was the mail piece read by one or more members of the household?	Binary Dummy	Yes = 1, No =0
Reaction	Does the respondent describe the mail piece as useful or interesting?	Binary Dummy	Yes = 1, No =0
Response	Are household members considering responding?	Binary Dummy	Yes = 1, Maybe or No =0
<u>Explanatory Variables – Mail Mix</u>			
Non-advertising	Share of non-packages the household received in a week that were not advertising	Continuous	0% to 100%
Correspondence	Share of non-packages the household received in a week that were correspondence	Continuous	0% to 100%
Transactions	Share of non-packages the household received in a week that were transactions	Continuous	0% to 100%
Periodicals	Share of non-packages the household received in a week that were periodicals	Continuous	0% to 100%

Variables	Description	Type	Values
<u>Explanatory Variables – Household Demographics</u>			
Age	Age of household head	Categorical Dummy	Base category =0 - age 18-24 Dummy Variables = 1,0 otherwise - age 25-34 - age 35-44 - age 45-54 - age 55-64 - age 65-74 - age 75+
Education	Educational attainment of household head	Categorical Dummy	Base category =0 - High school or less Dummy Variables = 1,0 otherwise: - Some college / technical school - College degree or more
Presentment	Does the household receive bills and statements online?	Binary Dummy	Yes = 1, No =0
Hispanic	Is the head of household Hispanic?	Binary Dummy	Yes = 1, No =0
Race	What is the race of the head of household?	Categorical Dummy	Base category =0 - Caucasian Dummy Variables = 1,0 otherwise: - African American - Asian - Other

Variables	Description	Type	Values
<u>Explanatory Variables – Sender Characteristics</u>			
Past Business Relationship	Was the mail piece from an organization someone in the household has done business with?	Scale	Yes = 1 Unknown =0 No = -1
Financial Sender	Was the sender in the financial industry?	Binary Dummy	Yes = 1, No =0
Nonprofit	Is the mail piece Nonprofit?	Binary Dummy	Yes = 1, No =0
<u>Explanatory Variables – Mail Piece Features</u>			
Specifically Addressed	Was the mail piece specifically addressed to household members?	Binary Dummy	Yes = 1, No =0
Shape	What was the shape/type of mail piece	Categorical Dummy	Base category =0 - Letter Dummy Variables = 1,0 otherwise: - Flat - Catalog - Detached label card - Postcard - Flyer Newspaper/Magazine/Newsletter
Coupon	Did the mail piece contain a coupon?	Binary Dummy	Yes = 1, No =0
Return Envelope	Was a return envelope or card included?	Categorical Dummy	Base category =0 - No Dummy Variables = 1,0 otherwise: - Yes, stamp needed - Yes, postage paid

Table 8: Logit Regression Results for Reading Rate

VARIABLES	Estimated Coefficient (Log-Odds)		Odds Ratio	
	Coefficient	Std. Error	Coefficient	Std. Error
<u>Mail Mix</u>				
Non-Advertising Share	0.498***	(0.029)	1.645***	(0.048)
<u>Household Demographics</u>				
<i>Age of household head (base age '18-24')</i>				
25-34	-0.127**	(0.053)	0.881**	(0.047)
35-44	-0.012	(0.052)	0.988	(0.052)
45-54	0.074	(0.052)	1.077	(0.056)
55-64	0.161***	(0.052)	1.174***	(0.061)
65-74	0.303***	(0.052)	1.353***	(0.070)
75+	0.451***	(0.052)	1.570***	(0.082)
<i>Educational attainment of household head (base education level 'High school or less')</i>				
Some college or technical school	-0.136***	(0.013)	0.873***	(0.011)
At least college graduate	-0.371***	(0.011)	0.690***	(0.008)
<i>Technology Use</i>				
Household receives bills & statements online	-0.218***	(0.009)	0.804***	(0.007)
<i>Race/ethnicity of head of household (base head of household 'Caucasian')</i>				
Hispanic head of household	0.325***	(0.023)	1.385***	(0.033)
African American head of household	0.552***	(0.020)	1.737***	(0.035)
Asian head of household	0.483***	(0.028)	1.621***	(0.045)
Other (nonwhite) head of household	0.212***	(0.032)	1.236***	(0.040)
<u>Sender Characteristics</u>				
Past Business Relationship	0.705***	(0.005)	2.025***	(0.009)
Nonprofit	0.183***	(0.012)	1.201***	(0.015)
Financial Sender	-0.387***	(0.012)	0.679***	(0.008)

VARIABLES	Estimated Coefficient (Log-Odds)		Odds Ratio	
	Coefficient	Std. Error	Coefficient	Std. Error
<u>Mail Piece Features</u>				
Specifically addressed to HH members	0.332***	(0.012)	1.394***	(0.017)
Contains coupon	0.468***	(0.011)	1.597***	(0.018)
<i>Shape of Mail Piece (base shape 'letters')</i>				
Flat	0.212***	(0.023)	1.237***	(0.028)
Catalog	-0.143***	(0.014)	0.867***	(0.013)
Detached label card	-0.487***	(0.050)	0.615***	(0.031)
Postcard	0.633***	(0.029)	1.883***	(0.054)
Flyer	0.097***	(0.012)	1.102***	(0.013)
Newspaper/newsletter/magazine	0.238***	(0.021)	1.269***	(0.027)
<i>Return Envelope (base response 'No')</i>				
Return envelope without postage	-0.111***	(0.015)	0.895***	(0.013)
Postage paid return envelope	-0.344***	(0.013)	0.709***	(0.009)
Constant	-0.682***	(0.055)	0.505***	(0.028)

*** p<0.01, ** p<0.05, * p<0.1

Table 9: Logit Regression Results for Reaction Rate

VARIABLES	Estimated Coefficient (Log-Odds)		Odds Ratio	
	Coefficient	Std. Error	Coefficient	Std. Error
<u>Mail Mix</u>				
Non-Advertising Share	0.214***	(0.031)	1.239***	(0.039)
<u>Household Demographics</u>				
<i>Age of household head (base age '18-24')</i>				
25-34	-0.158***	(0.055)	0.854***	(0.047)
35-44	0.023	(0.054)	1.023	(0.055)
45-54	0.123**	(0.053)	1.131**	(0.060)
55-64	0.188***	(0.053)	1.207***	(0.064)
65-74	0.339***	(0.053)	1.403***	(0.075)
75+	0.525***	(0.054)	1.691***	(0.092)

VARIABLES	Estimated Coefficient (Log-Odds)		Odds Ratio	
	Coefficient	Std. Error	Coefficient	Std. Error
<i>Educational attainment of household head (base education level 'High school or less')</i>				
Some college or technical school	-0.062***	(0.014)	0.940***	(0.013)
At least college graduate	-0.209***	(0.012)	0.812***	(0.010)
<i>Technology Use</i>				
Household receives bills & statements online	-0.209***	(0.010)	0.812***	(0.008)
<i>Race/ethnicity of head of household (base head of household 'Caucasian')</i>				
Hispanic head of household	0.251***	(0.025)	1.285***	(0.033)
African American head of household	0.633***	(0.022)	1.884***	(0.042)
Asian head of household	0.173***	(0.029)	1.189***	(0.035)
Other (nonwhite) head of household	0.173***	(0.035)	1.189***	(0.041)
<u>Sender Characteristics</u>				
Past Business Relationship	0.875***	(0.005)	2.400***	(0.011)
Nonprofit	0.452***	(0.013)	1.572***	(0.021)
Financial Sender	-0.588***	(0.013)	0.556***	(0.007)
<u>Mail Piece Features</u>				
Specifically addressed to HH members	0.261***	(0.012)	1.298***	(0.016)
Contains coupon	0.672***	(0.012)	1.958***	(0.024)
<i>Shape of Mail Piece (base shape 'letters')</i>				
Flat	0.478***	(0.024)	1.612***	(0.039)
Catalog	1.231***	(0.017)	3.424***	(0.057)
Detached label card	-0.508***	(0.049)	0.602***	(0.029)
Postcard	0.529***	(0.030)	1.697***	(0.051)
Flyer	0.417***	(0.012)	1.517***	(0.018)
Newspaper/newsletter/magazine	1.270***	(0.026)	3.560***	(0.091)
<i>Return Envelope (base response 'No')</i>				
Return envelope without postage	0.099***	(0.016)	1.104***	(0.018)
Postage paid return envelope	-0.134***	(0.014)	0.874***	(0.012)
Constant	-0.570***	(0.057)	0.566***	(0.032)

*** p<0.01, ** p<0.05, * p<0.1

Table 10: Logit Regression Results for Response Rate

VARIABLES	Estimated Coefficient Log-Odds		Odds Ratio	
	Coefficient	Std. Error	Coefficient	Std. Error
<u>Mail Mix</u>				
Non-Advertising Share	0.253***	(0.044)	1.288***	(0.056)
<u>Household Demographics</u>				
<i>Age of household head (base age '18-24')</i>				
25-34	-0.244***	(0.085)	0.783***	(0.067)
35-44	-0.013	(0.083)	0.987	(0.082)
45-54	0.122	(0.082)	1.130	(0.093)
55-64	0.157*	(0.082)	1.170*	(0.096)
65-74	0.176**	(0.082)	1.192**	(0.098)
75+	0.269***	(0.083)	1.309***	(0.109)
<i>Educational attainment of household head (base education level 'High school or less')</i>				
Some college or technical school	-0.045**	(0.019)	0.956**	(0.018)
At least college graduate	-0.220***	(0.016)	0.802***	(0.013)
<i>Technology Use</i>				
Household receives bills & statements online	-0.173***	(0.013)	0.841***	(0.011)
<i>Race/ethnicity of head of household (base head of household 'Caucasian')</i>				
Hispanic head of household	0.099***	(0.035)	1.104***	(0.038)
African American head of household	0.471***	(0.027)	1.602***	(0.043)
Asian head of household	-0.019	(0.047)	0.981	(0.046)
Other (nonwhite) head of household	0.117**	(0.048)	1.124**	(0.054)
<u>Sender Characteristics</u>				
Past Business Relationship	1.053***	(0.011)	2.867***	(0.030)
Nonprofit	0.237***	(0.019)	1.268***	(0.024)
Financial Sender	-0.691***	(0.023)	0.501***	(0.012)

VARIABLES	Estimated Coefficient Log-Odds		Odds Ratio	
	Coefficient	Std. Error	Coefficient	Std. Error
<u>Mail Piece Features</u>				
Specifically addressed to HH members	0.081***	(0.018)	1.084***	(0.020)
Contains coupon	1.087***	(0.015)	2.966***	(0.046)
<i>Shape of Mail Piece (base shape 'letters')</i>				
Flat	0.406***	(0.032)	1.500***	(0.048)
Catalog	-0.103***	(0.022)	0.902***	(0.020)
Detached label card	-0.462***	(0.098)	0.630***	(0.062)
Postcard	0.511***	(0.037)	1.668***	(0.062)
Flyer	0.131***	(0.018)	1.140***	(0.020)
Newspaper/newsletter/magazine	-0.234***	(0.035)	0.792***	(0.028)
<i>Return Envelope (base response 'No')</i>				
Return envelope without postage	0.446***	(0.021)	1.562***	(0.033)
Postage paid return envelope	0.074***	(0.022)	1.076***	(0.024)
Constant	-2.972***	(0.087)	0.051***	(0.004)
*** p<0.01, ** p<0.05, * p<0.1				

Table 11: Regression Equation Diagnostics

	Reading	Reaction	Response
Number of Observations	294,122	293,810	292,688
Area Under ROC Curve (AUC)	0.7191	0.7838	0.7732
McFadden R-squared	0.109	0.189	0.144

The ROC curves for each model measure an AUC greater than 0.7 which indicates that each model has an acceptable predictive power. The R-squares for these regressions are not high which is typical of cross-sectional data. There are a wide range of idiosyncratic characteristics of households that are not reported in the HDS which impact household treatment of advertising mail. Nevertheless, the large sample size and statistical significance of many of the variables demonstrates that the model reliably estimates how individual factors impact household reading, reaction, and response to advertising mail.

IV. Analysis of Econometric Results

Logistic models are estimated to determine which factors affect the probability that a household will 1) read a specific piece of Marketing Mail; 2) have a positive reaction to the mail piece, defined as finding it interesting or useful; and 3) indicate that someone in the household is likely to respond to the advertising.

Two issues are investigated. The first is whether the mix of mail, defined initially as the share of a household's weekly mail that is non-advertising, affects household reading, reaction, and response to Marketing Mail. Advertising mail includes Marketing Mail and First-Class advertising mail but our study only looks at household treatment of Marketing Mail. Non-advertising mail includes other First-Class Mail (e.g., correspondence and transactions mail) and Periodicals Mail. Packages are not included in the household mail mix because they are often received separately from other mail. For the purposes of this discussion we refer to a greater share of non-advertising mail as a more favorable mail mix. The hypotheses are that a more favorable mail mix increases the likelihood that households will read their Marketing Mail, react favorably to this mail, and be more likely to respond to the advertising.

The second issue investigated is what other factors, besides mail mix, affect household reading, reaction, and response. These other factors are categorized as: 1) household demographics; 2) mailer characteristics; and 3) features of the individual Marketing Mail pieces. We also look at whether the different components of non-advertising mail (First-Class correspondence mail, First-Class transactions mail, and Periodicals Mail) have separate impacts on household treatment of Marketing Mail. Lastly, we look at the impact of receiving packages. The impact of each of these variables on household reading, reaction, and response to Marketing Mail are discussed in turn.

A. Mail Mix

The logistic regression results show that a favorable mail mix has a significantly positive impact on the probability of reading Marketing Mail. Mail mix also affects household reaction and response to Marketing Mail with a higher non-advertising share of mail being associated with a generally more positive view of the advertising mail that is received and a higher probability of responding to any individual mail piece. The impacts of mail mix on the reaction and response rates are not as large as the impact on the reading rate but are statistically significant at the 99 percent confidence level.

Table 12: Mail Mix Odds-Ratios

	<u>Reading</u>	<u>Reaction</u>	<u>Response</u>
Non-Advertising Share	1.645*** (0.048)	1.239*** (0.039)	1.288*** (0.056)

Standard error in parentheses *** p<0.01, ** p<0.05, * p<0.1

In Table 13, the predicted reading, reaction, and response rates at different mail mix percentages are presented. These predicted rates are calculated using the regression coefficients, evaluating all the other variables in the regression at their observed values and calculating the impact of discreet 10 percent changes in the non-advertising share of mail received by the household.

Table 13: Predicted Reading, Reaction, and Response Rates at Different Mail Mixes

Percent of Household Mail that is non-advertising	Predicted Value <u>Reading</u>	Predicted Value <u>Reaction</u>	Predicted Value <u>Response</u>
0%	41.5%	55.8%	11.6%
10%	42.5%	56.2%	11.8%
20%	43.6%	56.6%	12.0%
30%	44.7%	57.0%	12.3%
40%	45.7%	57.4%	12.5%
50%	46.8%	57.8%	12.8%
60%	47.8%	58.2%	13.0%
70%	48.9%	58.6%	13.3%
80%	50.0%	59.0%	13.5%
90%	51.0%	59.4%	13.8%

As shown in Table 13, increases in the non-advertising share of mail are associated with increases in household reading, positive reaction, and response to advertising mail. For example, moving from a non-advertising share of 40 percent to a share of 50 percent increases the reading rate from 45.7 percent to 46.8 percent, the positive reaction rate from 57.4 percent to 57.8 percent, and the potential response rate from 12.5 percent to 12.8 percent. Although these increases are relatively small, they are statistically significant. They are also likely to be important in terms of the overall value of advertising mail as even small increases in response rates can be important to direct mail marketers.

B. Household Demographics

Age of Household Head

Reading of Marketing Mail is strongly correlated with the age of the household head, with the odds-ratio coefficients increasing as age increases, and with the coefficients on the oldest age groups being statistically significant. Age also affects household reaction, with older households being more likely to have a positive reaction to Marketing Mail. Finally, the odds-ratio coefficients on the likelihood of response are also highly correlated with age and statistically significant for the older households. All these coefficients are measured relative to the youngest age group (18 – 24) and are consistent with the view that older people are generally more receptive to the mail than younger people.

Table 14: Age Odds-Ratios

<i>Age of household head (base age = 18 -24)</i>	<u>Reading</u>	<u>Reaction</u>	<u>Response</u>
25-34	0.881** (0.047)	0.854*** (0.047)	0.783*** (0.067)
35-44	0.988 (0.052)	1.023 (0.055)	0.987 (0.082)
45-54	1.077 (0.056)	1.131** (0.060)	1.130 (0.093)
55-64	1.174*** (0.061)	1.207*** (0.064)	1.170* (0.096)
65-74	1.353*** (0.070)	1.403*** (0.075)	1.192** (0.098)
75+	1.570*** (0.082)	1.691*** (0.092)	1.309*** (0.109)

Standard error in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 15 shows that households headed by someone under the age of 35 read about 40 percent of their Marketing Mail. Beyond that age, household reading increases uniformly with the age of the household head. Increases in household age beyond the 25-34 year age group also uniformly increase the likelihood that a household will have a positive reaction and to indicate that they are likely to respond. For example, households headed by someone aged 75 or over are about 1.5 times more likely to respond to advertising mail than are households headed by someone aged 25 to 34 (13.8 percent vs 9.1 percent).

Table 15: Predicted Reading, Reaction, and Response Rates and Age of Household Head

Age of Household Head	Predicted Value <u>Reading</u>	Predicted Value <u>Reaction</u>	Predicted Value <u>Response</u>
18-24	41.1%	53.1%	11.1%
25-34	38.4%	50.1%	9.1%
35-44	40.8%	53.6%	11.0%
45-54	42.6%	55.5%	12.3%
55-64	44.5%	56.7%	12.6%
65-74	47.5%	59.5%	12.8%
75+	50.7%	62.9%	13.8%

Education of Household Head

Education has a negative impact on reading, reaction, and response. Households headed by a college graduate, for example, are significantly less likely to read a piece of Marketing Mail, less likely to have a positive reaction to it, and less likely to respond to it. For marketers, these negative impacts need to be balanced against the advantages of targeting higher education households that are also likely to have higher incomes than less educated households.

Table 16: Education Odds-Ratios

Educational attainment of head of household (base education level 'High school or less')

	<u>Reading</u>	<u>Reaction</u>	<u>Response</u>
Some college or technical school	0.873*** (0.011)	0.940*** (0.013)	0.956** (0.018)
College degree or more	0.690*** (0.008)	0.812*** (0.010)	0.802*** (0.013)

Standard error in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 17: Predicted Reading, Reaction, and Response Rates and Education of Household Head

Education of Household Head	Predicted Value <u>Reading</u>	Predicted Value <u>Reaction</u>	Predicted Value <u>Response</u>
High School Degree or less	50.4%	59.7%	13.7%
Some College or Technical School	47.5%	58.6%	13.3%
College Degree or more	42.4%	55.9%	11.6%

Ethnicity and Race

The logistic regression results show that Hispanic households are more likely to read Marketing Mail, have a positive reaction to the mail, and respond to the advertising, than are non-Hispanic households. In all cases, the difference is statistically significant. Similarly, African-American, Asian-American, and other non-white households are more likely to read Marketing Mail and have a positive reaction than are Caucasian/white households. African-American households are also more likely to respond to Marketing Mail advertising than other households. That Hispanic and non-white households are more receptive to Marketing Mail is meaningful because these households actually receive less Marketing Mail.⁵² According to the HDS, non-Hispanic white households received an average of 13.8 pieces of Marketing Mail per week compared with 10.5 pieces per week for Hispanic households, 9.4 pieces per week for African-American households, and 11.7 pieces per week for Asian-American households. Our analysis indicates that these households may be an untapped market for direct mail marketers.

⁵² Although non-white and Hispanic households may have a different mail mix than white non-Hispanic households, the impact of any difference in mail mixes is already accounted for within the regression equation.

Table 18: Race/Ethnicity Odds-Ratios

<i>Race/ethnicity of head of household (base head of household "Caucasian")</i>	Reading	Reaction	Response
Hispanic head of household	1.385*** (0.033)	1.285*** (0.033)	1.104*** (0.038)
African American head of household	1.737*** (0.035)	1.884*** (0.042)	1.602*** (0.043)
Asian head of household	1.621*** (0.045)	1.189*** (0.035)	0.981 (0.046)
Other (nonwhite) head of household	1.236*** (0.040)	1.189*** (0.041)	1.124** (0.054)

Standard error in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 19: Predicted Reading, Reaction, and Response Rates by Ethnicity and Race

Ethnicity/Race	Predicted Value Reading	Predicted Value Reaction	Predicted Value Response
Not Hispanic	44.6%	56.9%	12.3%
Hispanic	51.6%	61.5%	13.3%
Caucasian/White	44.1%	56.5%	12.1%
African-American	55.8%	67.8%	17.2%
Asian-American	54.4%	59.7%	11.9%
Other Nonwhite	48.6%	59.7%	13.2%

Technology Use – Online Bill Presentment

Households that receive online bills and statements are less likely to read their Marketing Mail, are less likely to have a positive reaction to it, and are less likely to respond to the advertising. All of these results are consistent with the idea that these households are less connected to their mail than households that rely exclusively on the mail for the receipt of their bills and statements.

Table 20: Technology Use Odds-Ratios

<i>Household Technology Use</i>	<u>Reading</u>	<u>Reaction</u>	<u>Response</u>
Receives bills or statements online	0.804*** (0.007)	0.812*** (0.008)	0.841*** (0.011)

Standard error in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 21: Predicted Reading, Reaction, and Response Rates and Technology Use

Receives Bills or Statements Online	Predicted Value <u>Reading</u>	Predicted Value <u>Reaction</u>	Predicted Value <u>Response</u>
No	48.0%	59.8%	13.5%
Yes	43.4%	55.9%	11.8%

C. Mailer Characteristics

Past Business Relationship

HDS households are asked whether the Marketing Mail received was sent by a business with which the household has a past business relationship (i.e. whether at least one household member is an existing customer). Existence of a past business relationship has a strong impact on household reading of Marketing Mail, an even stronger impact on household reaction, and a still stronger impact on the likelihood of response.

Table 22: Odds-Ratios for Mailer Characteristics

<i>Mailer Characteristics</i>	<u>Reading</u>	<u>Reaction</u>	<u>Response</u>
Past business relationship	2.025*** (0.009)	2.400*** (0.011)	2.867*** (0.030)
Nonprofit	1.201*** (0.015)	1.572*** (0.021)	1.268*** (0.024)
Financial sender	0.679*** (0.008)	0.556*** (0.007)	0.501*** (0.012)

Standard error in parentheses *** p<0.01, ** p<0.05, * p<0.1

Nonprofit Postage

Households are also significantly more likely to read, react positively, and respond to mail sent using nonprofit postage. These pieces are used by nonprofit and other social agencies that qualify for the reduced postage rate. The strongest effect is on reaction suggesting that even when households do not respond to nonprofit mailings (most of which are requests for donations) they still view these mailings positively.

Financial Industry Sender

In contrast to mail from nonprofit senders, households are significantly less likely to read, react positively, and respond to mail sent by the financial sector. Many of these mailings are solicitations from credit card companies which tend to be particularly unpopular.

Table 23 presents the predicted reading, reaction, and response rates for the different mailer characteristics. Marketing Mail sent by a business that has a past business relationship with the recipient is more than twice as likely to be read and generate a positive reaction, and six times as likely to get a response than mail sent by businesses with no past relationship. Yet it is important to recognize that companies must send mail to households with which they do not have a past business relationship in order to generate new customers. While this “prospecting” mail is far less likely to be read it can be an important first step to creating a new customer and a future business relationship.

Table 23: Predicted Reading, Reaction, and Response Rates by Mailer Characteristics

<i>Past business relationship?</i>	Predicted Value <u>Reading</u>	Predicted Value <u>Reaction</u>	Predicted Value <u>Response</u>
No	26.0%	35.0%	2.9%
Yes	57.3%	71.9%	18.4%

Was the sender a nonprofit?

No	44.1%	55.4%	11.8%
Yes	48.0%	63.7%	14.2%

Was the sender in the financial industry?

No	46.5%	59.6%	13.2%
Yes	38.3%	48.1%	7.5%

Table 23 also shows the reading, reaction, and response rates for mail sent by a nonprofit company and mail sent by a company in the financial industry. One interesting result is that households are almost as likely to indicate that they are considering responding to a non-financial for-profit business (13.2%) as they are to a nonprofit company (14.2%). Another point to keep in mind is that the positive impact of having a past business relationship can override the negative impact of being from the financial industry.

D. Mail Piece Characteristics

1. Mail Piece Shape

The logistic regression analysis provides information on the relationship between the shape of the Marketing Mail piece and household reading, reaction, and response to the mailing. Seven different mail piece shapes are considered: letter, flat, catalog, detached label card, postcard, flyer, and newsletter. Within the regression the omitted shape category is “letter” so the coefficients reflect differences in the reading, reaction, and response rates of non-letter pieces relative to letters.

Flats are significantly more likely to be read, create a positive reaction, and generate a likely response than letters. Catalogs have an interesting relationship with households. They are no more likely to be read or responded to, but they create a strong positive reaction. One feature of catalogs is that they are not likely to be read immediately, instead often being set aside for later reading. “Set aside for later” is one of the responses households can give to the reading question and catalogs have a high “set aside” rate. Thus, the analysis suggests that people enjoy receiving catalogs even if they do not immediately read them.

Postcards are more likely to be read, generate a positive reaction, and a likely response than letters. The same holds true for flyers though the impact is not as strong as for postcards. Newsletters are more likely to be read, and like catalogs are far more likely to generate a positive reaction.

Table 24: Odds-Ratios for Mail Piece Shape

<i>Shape (letters are the base)</i>	<u>Reading</u>	<u>Reaction</u>	<u>Response</u>
Flat	1.237*** (0.028)	1.612*** (0.039)	1.500*** (0.048)
Catalog	0.867*** (0.013)	3.424*** (0.057)	0.902*** (0.020)
Detached label card	0.615*** (0.031)	0.602*** (0.029)	0.630*** (0.062)
Postcard	1.883*** (0.054)	1.697*** (0.051)	1.668*** (0.062)
Flyer	1.102*** (0.013)	1.517*** (0.018)	1.140*** (0.020)
Newspaper/newsletter/magazine	1.269*** (0.027)	3.560*** (0.091)	0.792*** (0.028)

Standard error in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 25 presents the predicted reading, reaction, and response rate by mail piece shape.

Table 25: Predicted Reading, Reaction, and Response Rates by Shape

<i>Mail Piece Shape</i>	Predicted Value <u>Reading</u>	Predicted Value <u>Reaction</u>	Predicted Value <u>Response</u>
Letter	44.0%	49.9%	11.8%
Flat	48.5%	59.3%	16.1%
Catalog	40.9%	72.8%	10.9%
Detached label card	34.0%	39.8%	8.1%
Postcard	57.4%	60.3%	17.4%
Flyer	46.0%	58.1%	13.1%
Newsletter	49.1%	73.4%	9.8%

The model predicts that about 44 percent of Marketing letters are read by someone in the household, with higher reader rates found for flats, postcards, flyers, and newsletters. Nearly three quarters of catalogs generate a positive reaction. Households indicate that they are more likely to respond to postcards than any other type of Marketing Mail.

Other Mail Piece Characteristics

The impact of four other mail piece characteristics are examined: 1) whether the mail piece was specifically addressed to a household member; 2) whether it contained a coupon; 3) whether it came with a return envelope without paid postage; and 4) whether it came with a return envelope with paid postage. Of these, the presence of a coupon is found to be the most important, significantly raising the reading, positive reaction, and response rates, with the strongest impact on the response rate. Interestingly, pieces with return envelopes are less likely to be read but more likely to generate a response.

Table 26: Odds-Ratios for Other Mail Piece Characteristics

<i>Other Mail Piece Characteristics</i>	Reading	Reaction	Response
Specifically addressed to HH members	1.394*** (0.017)	1.298*** (0.016)	1.084*** (0.020)
Contains coupon	1.597*** (0.018)	1.958*** (0.024)	2.966*** (0.046)
Return envelope without postage	0.895*** (0.013)	1.104*** (0.018)	1.562*** (0.033)
Postage paid return envelope	0.709*** (0.009)	0.874*** (0.012)	1.076*** (0.024)

Standard error in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 27: Predicted Reading, Reaction, and Response Rates by Other Mail Piece Characteristics

<i>Mail Piece Characteristics</i>	Predicted Value Reading	Predicted Value Reaction	Predicted Value Response
Not addressed to household	39.2%	53.2%	11.7%
Addressed to household	46.2%	58.1%	12.5%
Does not contain coupon	42.4%	54.0%	9.2%
Contains coupon	52.5%	66.5%	21.3%
No return envelope	46.3%	57.3%	11.6%
Return envelope without postage	43.9%	59.1%	16.3%
Postage paid return envelope	39.0%	54.8%	12.3%

E. Other Measures of Mail Mix

The analysis has shown that the greater the non-advertising portion of a household's mail, the greater is the probability that the household will read and react positively to any particular piece of Marketing Mail. The next section includes further investigations of the impact of mail mix by looking at specific components of non-advertising mail. In all cases, different definitions of the mail mix do not meaningfully affect the coefficients on the other variables (household demographics, mailer characteristics, and features of the mail piece) and therefore only the mail mix coefficients are presented and discussed.

Separate Impacts of First-Class Mail and Periodicals

Table 28 compares the odds-ratio coefficients from the single mail mix model (non-advertising share) and a mail mix with separate shares for First-Class Mail and Periodicals Mail. The results indicate that the presence of First-Class and Periodicals Mail have approximately equal importance in raising household reading of Marketing Mail. An increase in the First-Class Mail share has a statistically positive impact on household reaction and likely response to advertising mail. The Periodicals share also has a positive impact on reaction and response (the odds-ratios are greater than 1.0) but in neither case is the impact as large as for First-Class Mail or statistically significant. Keep in mind that most of the non-advertising mail received by households is First-Class Mail which is why the First-Class Mail share odds-ratios are close to the odds-ratios of the non-advertising mail share.

Table 28: Odds Ratios for Separate First Class and Periodicals Mail Mix

<i>Mail mix variable</i>	<u>Reading</u>	<u>Reaction</u>	<u>Response</u>
Non-Advertising Share	1.645*** (0.048)	1.239*** (0.039)	1.288*** (0.056)
First-Class Share	1.634*** (0.051)	1.264*** (0.042)	1.308*** (0.060)
Periodicals Share	1.717*** (0.116)	1.096 (0.079)	1.172 (0.118)

Standard error in parentheses *** p<0.01, ** p<0.05, * p<0.1

Separate Impacts of First-Class Correspondence and Transactions Mail

Given the importance of First-Class Mail in the household mail mix, the total First-Class Mail share is decomposed into separate shares for First-Class correspondence mail and First-Class transactions mail. Table 29 presents the results from this mail mix model and shows that it is primarily the First-Class transactions share that affects household reading, reaction, and response to Marketing Mail. Transactions mail strongly affects the probability of reading having a positive reaction to, or considering responding to Marketing Mail. First-Class correspondence mail (which includes correspondence from both individuals and businesses) has a positive effect on household reading of Marketing Mail but its impact on reaction and response is not significant.

Table 29: Odds-Ratios for Separate Correspondence and Transaction Mail Mix

<i>Mail mix variable</i>	Reading	Reaction	Response
Non-Advertising Share	1.645*** (0.048)	1.239*** (0.039)	1.288*** (0.056)
First-Class Correspondence Share	1.118** (0.050)	0.975 (0.046)	0.911 (0.061)
First-Class Transactions Share	2.259*** (0.093)	1.579*** (0.069)	1.776*** (0.108)
Periodicals Share	1.718*** (0.116)	1.097 (0.079)	1.171 (0.117)

Standard error in parentheses *** p<0.01, ** p<0.05, * p<0.1

A final issue investigated in this study is the impact of packages received by households. Packages were not included in the calculations of mail mix presented so far because in most cases, packages are not received at the same time and place (e.g., the mailbox) as other mail. Therefore, the interaction between package volumes and household treatment of Marketing Mail is less direct than it is with other forms of non-advertising mail. Nevertheless, given the growing importance of package deliveries to the Postal Service and households, it is worth looking at whether the package share of mail affects household treatment of advertising mail. To do this, the mail shares were recalculated including packages in the total number of mail pieces received. These shares are shown in [Table 30](#). Packages represent only 3.7 percent of mail received by HDS households from 2013 to 2017, though this share increased during this time. Household package volumes are highly skewed with most households receiving zero or one package during their diary week while a few receive a high volume of packages.

Table 30: HDS Volumes of Mail Received by Households including Packages

Type of mail	Pieces received per household per week, among household used in the reading model	Share of all mail & packages
Non advertising	8.88	38.1%
Periodicals	1.27	5.4%
Correspondence	2.82	12.1%
Transactions and other	3.94	16.9%
Packages	0.85	3.7%
Advertising	14.41	61.9%
First Class ads	0.72	3.1%
Marketing Commercial	11.03	47.4%
Marketing Nonprofit	2.66	11.4%
All mail & packages	23.29	100.0%

Table 31 presents the odds ratios for different types of non-advertising mail. The key takeaway is that the package share of mail has a significantly negative impact on household reading, reaction, and response to advertising mail. However, for reasons discussed above, this analysis warrants further investigation.

Table 31: Odds-Ratios for Mail Mix Variables including Packages

<i>Mail mix variable</i>	<u>Reading</u>	<u>Reaction</u>	<u>Response</u>
Correspondence Share of mail and packages	1.156*** (0.053)	1.000 (0.049)	0.925 (0.064)
Transactions Share of mail and packages	2.270*** (0.097)	1.578*** (0.071)	1.778*** (0.111)
Periodicals Share of mail and packages	1.799*** (0.125)	1.140* (0.085)	1.188* (0.123)
Packages Share of mail and packages	0.416*** (0.033)	0.482*** (0.039)	0.528*** (0.064)

Standard error in parentheses *** p<0.01, ** p<0.05, * p<0.1

Appendix: Management's Comments

STEVEN MONTEITH
VICE PRESIDENT, MARKETING



April 10, 2019

To: Amanda Martinez
Manager, RARC Central
Risk Analysis Research Center
U.S. Postal Service Office of the Inspector General

SUBJECT: Mail Mix and Recipients' Reaction to Direct Mail (Project Number 2018RARC013)

Thank you for the opportunity to review and provide comments on the subject draft white paper on "Mail Mix and Recipients' Reaction to Direct Mail."

In general, we agree with the Office of the Inspector General's conclusion that the Postal Service needs to continue to actively try to stem the decline in all segments of mail. According to this study, First-Class Mail and Periodicals are important to the mail mix and may actually increase the effectiveness of USPS Marketing Mail as an advertising medium. Households will be more likely to read, have a positive reaction to, and respond to the advertising mail they receive.

This study also found that the shape of a mailpiece impacted the recipients' reactions. Flats like large envelopes, newsletters, and magazines were more likely than letters to be read, create a positive reaction, and generate a response.

The findings from this report are in line with results from research we conducted. We agree with the Office of the Inspector General that the mix of mail in the mailbox does matter to recipients. Different mixes of mail either increase or decrease the "value" of mail consumers receive in the mailbox.

A handwritten signature in cursive script that reads "Steven W. Monteith".

Steven W. Monteith

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We conducted work for this white paper in accordance with the Council of the Inspectors General on Integrity and Efficiency's Quality Standards for Inspection and Evaluation (January 2012).