

RESEARCH REPORT SERIES
(*Survey Methodology #1986-01*)

Preliminary Report:
Effects of Mail Reminder Cards on Return Rates
in the 1986 Census of Central Los Angeles County

Deborah Sherman Sedlacek

Center for Survey Measurement
Research and Methodology Directorate
U.S. Census Bureau
Washington, D.C. 20233

Report issued: 1986

Disclaimer: This report is released to inform interested parties of research and to encourage discussion of work in progress. Any views expressed on the methodological issues are those of the authors and not necessarily those of the U.S. Census Bureau.

Abstract

As part of the 1986 Census of Central Los Angeles County, several experiments were conducted to evaluate the effect of procedures designed to encourage public cooperation. High mail response rates are critical to an efficient and cost-effective national census. While mail response rates have traditionally been high for the decennial census, we cannot afford to assume that the past is a perfect predictor of the future. Therefore, it is critical for the Census Bureau to develop and test new procedures designed to improve and/or maintain high mail response rates. Previous social science research suggests that the use of follow-up reminders can increase response rates in mail surveys (Heberlein and Baumgartner, 1978; Nederhof, 1983). Follow-up reminders were also successful in increasing mail response rates in the 1982 Census of Agriculture (Ruggles, Dea, Kwok and Carmen, 1984). A study to assess the feasibility of using a follow-up reminder in a population census indicated that a reminder postcard increased response rates 8 percentage points in a test census in which baseline response rates (for the different form types used) ranged from 42 to 54 percent (Marquis and Sedlacek, 1985).

The purpose of conducting mail reminder card research in the 1986 test censuses was to determine: (a) whether these results would generalize to another test census setting, and (b) whether more than one reminder postcard would increase response rates significantly over the increase attributable to a single reminder card. This report presents the results of an evaluation study conducted in conjunction with the 1986 Census of Central Los Angeles County. Data from the Los Angeles experiment are used to address the following questions: (1) Are mail return rates affected by the use of a single mail reminder card?; (2) Do two mail reminder cards affect mail return rates significantly more than a single reminder card?; (3) Does a mail reminder card or cards affect mail return rates differentially by housing unit density (i.e., single unit/multiunit structures)?; and (4) Does a mail reminder card or cards affect mail return rates differentially when a motivational insert is included in the census mailing package?

Keywords: census mail non-response reminder postcards

Suggested Citation: Deborah Sherman Sedlacek. (1986). **Preliminary Report: Effects of Mail Reminder Cards on Return Rates in the 1986 Census of Central Los Angeles County.** *Research and Methodology Directorate, Center for Survey Measurement Study Series (Survey Methodology #1986-01)*. U.S. Census Bureau. Available online at <http://www.census.gov/content/dam/Census/library/working-papers/1986/a/drm/sm1986-01.pdf>



Survey

UNITED STATES DEPARTMENT OF COMMERCE
Bureau of the Census
Washington, D.C. 20233

September 9, 1986

MEMORANDUM FOR Susan M. Miskura
Chief, Decennial Planning Division

From: Elizabeth A. Martin *EAM*
Chief, Center for Survey Methods Research

Subject: Effects of Mail Reminder Cards on Return Rates
in the 1986 Census of Central Los Angeles County

Please include the attached report in your 1986 Preliminary Research
and Evaluation Memoranda Series.

Attachment

cc:
D. Sedlacek (CSMR)



UNITED STATES DEPARTMENT OF COMMERCE
Bureau of the Census
Washington, D.C. 20233

1986 TEST CENSUS
PRELIMINARY RESEARCH AND EVALUATION MEMORANDUM NO.

Prepared by: Deborah Sherman Sedlacek *DSS*
Center for Survey Methods Research

Subject: Effects of Mail Reminder Cards on Return Rates
in the 1986 Census of Central Los Angeles County

The attached report presents preliminary findings of the Effects of Mail Reminder Cards on Return Rates in the 1986 Census of Central Los Angeles County.

Attachment

NOTE: The data in this report are preliminary and tentative in nature. Users of the research memoranda should understand that these documents are prepared for internal office use, with the aim of circulating information among Census Bureau staff members as quickly as possible. These memoranda, therefore, do not undergo the careful review and clearance normally associated with published census documents. Conclusions and recommendations contained herein essentially reflect the thoughts of certain staff members at the time of publication and should not be interpreted as statements of Census Bureau position.

PRELIMINARY REPORT

EFFECTS OF MAIL REMINDER CARDS ON RETURN RATES IN THE
1986 CENSUS OF CENTRAL LOS ANGELES COUNTY

by

Deborah Sherman Sedlacek
Center for Survey Methods Research
September 9, 1986

NOTE: The data in this report are preliminary and tentative in nature. Users of the research memoranda should understand that these documents are prepared for internal office use, with the aim of circulating information among Census Bureau staff members as quickly as possible. These memoranda, therefore, do not undergo the careful review and clearance normally associated with published census documents. Conclusions and recommendations contained herein essentially reflect the thoughts of certain staff members at the time of publication and should not be interpreted as statements of Census Bureau position.

1.0 PURPOSE AND BACKGROUND

As part of the 1986 Census of Central Los Angeles County, several experiments were conducted to evaluate the effect of procedures designed to encourage public cooperation. High mail response rates are critical to an efficient and cost-effective national census. While mail response rates have traditionally been high for the decennial census, we cannot afford to assume that the past is a perfect predictor of the future. Therefore, it is critical for the Census Bureau to develop and test new procedures designed to improve and/or maintain high mail response rates.

Previous social science research suggests that the use of follow-up reminders can increase response rates in mail surveys (Heberlein and Baumgartner, 1978; Nederhof, 1983). Follow-up reminders were also successful in increasing mail response rates in the 1982 Census of Agriculture (Ruggles, Dea, Kwok and Carmen, 1984). A study to assess the feasibility of using a follow-up reminder in a population census^{1/} indicated that a reminder postcard increased response rates 8 percentage points in a test census in which baseline response rates (for the different form types used) ranged from 42 to 54 percent (Marquis and Sedlacek, 1985). The purpose of conducting mail reminder card research in the 1986 test censuses was to determine: (a) whether these results would generalize to another test census setting, and (b) whether more than one reminder postcard would increase response rates significantly over the increase attributable to a single reminder card.

This report presents the results of an evaluation study conducted in conjunction with the 1986 Census of Central Los Angeles County.^{2/} Data from the Los Angeles experiment are used to address the following questions: (1) Are mail return rates affected by the use of a single mail reminder card?; (2) Do two mail reminder cards affect mail return rates significantly more than a single reminder card?; (3) Does a mail reminder card or cards affect mail return rates differentially by housing unit density (i.e., single unit/multiunit structures)?; and (4) Does a mail reminder card or cards affect mail return rates differentially when a motivational insert is included in the census mailing package?

^{1/}The Tampa mail reminder card study evaluated the effect on mail return rates of a single reminder postcard, sent to nonresponding households only.

^{2/}A reminder card experiment was also conducted in the Meridian, Mississippi site, but this report does not contain any formal evaluation of the effectiveness of the reminder card(s) used in that site. Appendix A contains tables of the daily mail return rates in Mississippi for the short and long census forms. The one and two reminder card panels in Mississippi represent totally different treatments than the Los Angeles panels and the two experiments should not be considered comparable. In addition, serious complications occurred in Mississippi with the mailout of the reminder cards (see Etzler Memorandum dated May 22, 1986). The reader should keep these facts in mind when reviewing the Mississippi data.

2.0 MAJOR FINDINGS

The overall mail return rates in the 1986 Census of Los Angeles were disappointingly low (i.e., North Office - short forms: 46.8 percent, long forms: 40.3 percent; South Office - short forms: 36.1 percent, long forms: 28.4 percent). In spite of this problem, the mail reminder card significantly increased mail returns in both collection offices. The mail return rate for nonrespondents as of March 26, 1986 (10 days after Census Day) was 8.3 percentage points higher in the reminder card panels than in the control panel in the North Office, and 6.4 percentage points higher than the control panel in the South Office.

Two reminder cards appear to be significantly better than one reminder card for increasing mail return rates. Two cards increased mail returns 3.4 percentage points over one card in the North Office and 3.7 percentage points over one card in the South Office.

The increase in mail returns in the reminder card panels was higher in Los Angeles than the increase found in the reminder card study conducted during the 1985 Census of Tampa, Florida.

The mail reminder card does not appear to either enhance or detract from the positive effects produced by the motivational insert used in Los Angeles, nor does the reminder card appear to differentially affect mail returns for short and long census forms or from households in single and multiunit structures.

The combined results from the 1985 and the 1986 reminder card evaluations suggest that a two wave mailout of reminder postcards could substantially decrease follow-up costs in 1990 and contribute to our goal of producing an efficient and cost-effective national census.

3.0 METHODOLOGY

3.1 Research Design

A split panel experimental design was used to evaluate the effects of the reminder card treatment in both the North and South collection offices in Los Angeles. Since a motivational insert intended to improve public cooperation was also being tested in Los Angeles, the three panels for the reminder card experiment were completely crossed with the two panels for the motivational insert experiment. This type of experimental design allows us to distinguish the effects of each treatment, and identify any interactions. The motivational insert panels and the reminder card panels were also crossed with form type so that we could distinguish any treatment effects unique to the long or short form.

The reminder card experiment consisted of allocating all housing units on the Address Control File (ACF) into two treatment and one control panels. At close of check-in on March 19th, all nonresponding households were

identified and address lists for housing units in the treatment panels were generated. On March 25, the first wave of reminder cards was mailed to nonrespondents. Eleven thousand reminder cards were mailed a day late (i.e., March 26) because the contractor responsible for printing and labeling was not prepared for the higher-than-anticipated nonresponse rate. We were not able to identify the units which were mailed the first reminder card late at the time this report was prepared. Consequently, in the analysis, these units were treated exactly as if they had been sent a reminder card on schedule. A second list of nonresponding households was generated at the close of check-in on March 26. Nonresponding units as of March 26, which were designated as eligible for two reminder cards, were identified and address labels were printed for these units. Reminder cards were mailed to the second group of nonrespondents on March 31.

3.2 Sampling

An estimated 240,000 housing units were included in the two Los Angeles collection offices. A sample of 4,000 housing units was selected from all units on the ACF for a special study to evaluate a new format for coverage question H1. These housing units did not receive a motivational insert and they were not included in any of the analyses in this evaluation. All the remaining units on the ACF were systematically allocated (i.e., every other housing unit), within form type, to treatment (mailing package included a motivational insert) and control (no insert) panels for the motivational insert experiment. Units were then systematically allocated into three panels for the reminder card study.

After consultation with the Statistical Methods Division (SMD), 90 percent of the units were allocated to the treatment (mail reminder card) panels and 10 percent to the control (no reminder card) panel. This split was selected to represent the best possible balance between the need to retain sufficient statistical power to detect differences in return rates comparable to the differences detected in the 1985 mail reminder card study, and the need to reduce follow-up costs by sending reminder cards to as many housing units as possible.

To generate the reminder card panels, the Decennial Operations Division (DOD) selected groups of twenty housing units and allocated the first and tenth unit to the control panel, the even cases to the panel eligible to receive one reminder card and the odd cases to the panel eligible to receive two reminder cards. While we recognize that systematic allocation does not generate a true random sample, we have assumed simple random sampling when selecting statistical models for use in this evaluation.

3.3 Independent and Dependent Variables

Three independent variables, one concomitant variable and two dependent variables were considered. The dependent variables were mail return status and date of mail return (on or before 3/25 [date of the first reminder card mailout], 3/26 - 4/2 [after the first card mailout and before anticipated receipt of the second card], 4/3 - 5/12 [after anticipated receipt of the second mailout], or never). The independent variables were: (1) form type

(short form and long form in each office), (2) motivational insert (insert or no insert), and (3) reminder card treatment (one card, two cards or no card). The concomitant variable considered was housing unit density (single unit or multiunit). Density was included in the study because we considered it possible that reminder cards might not reach households in multiunit structures as unerringly as they reached households in single unit structures. An interaction between reminder card and density could provide a clue that a problem such as this was occurring.

Since all units on the ACF were classified by each of the variables considered, no allocations or imputations were necessary for the analyses in this report. Mail returns with no check-in date were grouped with the late mail returns (i.e., 4/3 - 5/12) in the analyses. No separate data were available on census forms filled out in assistance centers; so the effect of the mail reminder card on assistance center usage could not be evaluated.

3.4 Analyses

An important point to note regarding the Los Angeles data is that the census process itself was terminated in the South Office. Mail returns were checked in from this office, but no follow-up was conducted. Consequently, the data from the South Office include a substantial number of housing units, treated as valid addresses, which would have been identified as vacants or duplicates during follow-up and then removed from the data set used for the evaluation. Because of the known differences in data quality between the two collection offices, the data were analyzed separately for each collection office.

Mail returns were included in the data for this evaluation up through check-in on May 12. The data analyzed represent all the housing units in the original mailout universe (i.e., Mail 1). No subsequent adds were included in this analysis because no other units were allocated to a treatment condition. Vacant units, post master returns (PMR) and deletes were removed from the total mailout figures used in the analyses. Mail return rates presented in this report consist of: number of forms returned by mail/total forms mailed out less vacants, PMRs and deletes.

4.0 RESULTS

As was noted earlier, the overall mail return rates^{3/} were disappointingly low for the entire Los Angeles census (see Table 1).

^{3/}Appendix B contains daily mail return rate tables for the short and Tong forms in both offices and plots of the cumulative percentage of mail returns by day for the three reminder card panels.

TABLE 1: PERCENTAGE OF MAIL RETURNS BY COLLECTION OFFICE AND TYPE OF CENSUS FORM

	<u>North Office</u>		<u>South Office</u>	
	<u>Percent Mail Return</u>	<u>Total Forms Mailed Out*</u>	<u>Percent Mail Return</u>	<u>Total Forms Mailed Out*</u>
Short Forms	46.8	80,947	36.1	103,734
Long Forms	40.3	16,708	28.4	20,765
Overall	45.7	97,655	34.8	124,449

* Vacants, deletes and PMRs have been removed from these totals.

In the first stage of the analysis, chi-square tests were used to determine whether the use of one or two reminder cards was independent of mail response across time in each of the Los Angeles Offices. The likelihood-ratio chi-square (Rao, 1973) was used for this analysis because this statistic allows partitioning of the overall contingency table into additive components. Table 2 shows that, in the North Los Angeles Office, the reminder card or cards affected whether and when census forms were returned by mail.

One approach to investigating the nature of the association between two or more variables is to partition the contingency table into subtables. The complete contingency table of n rows is partitioned into one table consisting of m rows ($m < n$) and a second table consisting of the remaining $n-m$ rows plus a row formed by collapsing the original m rows. (The same operation may be performed for columns instead of rows, or for both columns and rows.) When this is done the degrees of freedom and the likelihood-ratio chi-square statistic for the complete table are partitioned between the two derivative tables (see Goodman, 1968).

In order to identify the sources of variation in the overall contingency table, Table 2 was partitioned into two subtables. The partitioned tables answer two questions: (1) Did the three reminder card panels differentially affect mail response before the first card was mailed out (Table 2a)?; and (2) Did the three panels differentially affect mail response after the first reminder card mailout? (Table 2b).

As would be expected in an experiment using random assignment, Table 2a shows no difference in mail return rates across the three reminder card panels prior to the mailout of the first reminder card. The significant source of variation in Table 2 is represented in the second partitioning of the table. The significant chi-square value for Table 2b indicates that there were differences in when and whether forms were returned by mail across the three reminder card panels after the first card mailout. More forms were returned by mail in the treatment panels than in the control panel and the return rate was higher over time in the two card panel than in the one card panel. It should also be noted that the likelihood-ratio chi-square value and degrees

TABLE 2: CROSS-TABULATION OF MAIL RETURNS BY CHECK-IN DATE AND REMINDER CARD PANEL (NORTH OFFICE)

	Checked In Before 3/26/86 (Before Mailing of First Card)	Checked In 3/26-4/2/86 (After Mailing of First Card)	Checked In After 4/2/86 (After Mailing of Second Card)	Never Checked In	Total
No Reminder Card	32.3 (3,152)	4.6 (449)	4.2 (409)	58.9 (5,738)	100% 9,748
One Reminder Card	32.0 (14,037)	7.7 (3,390)	5.6 (2,459)	54.7 (23,975)	100% 43,861
Two Reminder Cards	31.4 (13,835)	7.9 (3,474)	7.9 (3,462)	52.8 (23,275)	100% 44,046
Total	31,024	7,313	6,330	52,988	97,655

$L^2 = 461.36, 6 \text{ d.f.}, p < .01$

PARTITION OF TABLE 2*
(NORTH OFFICE)

TABLE 2a: Percentage of Mail Returns Before First Card Mailout
and All Other Census Response

	Checked In Before 3/26/86 (Before Mailing of First Card)	Checked In After 3/26/86 or Never Checked In	Total
No Reminder Card	32.3 (3,152)	67.7 (6,596)	100% 9,748
One Reminder Card	32.0 (14,037)	68.0 (29,824)	100% 43,861
Two Reminder Card	31.4 (13,835)	68.6 (30,211)	100% 44,046
Total	31,024	66,631	97,655

$L^2 = 5.06$, 2 d.f., n.s.

TABLE 2b: Percentage of Mail Returns by Time After First Card Mailout

	Checked In 3/26-4/2/86 (After Mailing of First Card)	Checked In After 4/2/86 (After Mailing of Second Card)	Never Checked In	Total
No Reminder Card	6.8 (449)	6.2 (409)	87.0 (5,738)	100% 6,596
One Reminder Card	11.4 (3,390)	8.2 (2,459)	80.4 (23,975)	100% 29,824
Two Reminder Cards	11.5 (3,474)	11.5 (3,462)	77.0 (23,275)	100% 30,211
Total	7,313	6,330	52,988	66,631

$L^2 = 456.30$, 4 d.f., $p < .01$

*Note: L^2 from 2a and L^2 from 2b sum to 461.36 (L^2 for the full North Office--
Table 2).

of freedom for Tables 2a and 2b sum to the chi-square value (and degrees of freedom) for the full table.

Comparable results were found for the South Los Angeles Office. Table 3 shows that there are differences in mail returns across time and reminder card panel. Table 3a shows that the differences were not significant prior to the first reminder card mailout and Table 3b shows that there were significant differences in when and whether census forms were returned by mail across the three reminder card panels after the first mailout.

In addition to testing for differences among the reminder card panels over time, it was important to investigate the overall difference between mail returns in the three panels. Table 4 summarizes these differences between the treatment and control panels and between the two treatment panels. Table 4a indicates that mail return rates were significantly higher in households in the two treatment panels. The first column of the table shows the overall effect of the reminder card and the second column shows the effect of the card after the first mailout. Column two of Table 4a shows that 21 percent of the North Office housing units which were sent a reminder card or cards returned their census forms by mail while only 13 percent of the untreated units (no reminder card) did so. These results indicate that, among households which had not returned a form by the date of the first mailout, the reminder card or cards increased response rates 8 percentage points compared to no reminder card. Table 4a also shows that, for all households in the test census, the reminder card or cards increased response rates 5 percentage points compared to no reminder card.

Table 4b shows that two reminder cards were significantly more effective than one reminder card in increasing mail return rates. Among households which had not returned a form by the date of the first mailout, two cards increased the response rate in the North Office 3 percentage points more than one card. Table 4b also shows that, for all households in the North Office, two cards increased the response rate 2 percentage points more than one card.

Similar results were found in the South Office (see Table 5). Table 5a shows that, among households which had not returned a form by March 25th, 16 percent of the treatment panels and only 10 percent of the control panel eventually returned the form, a difference of 6 percentage points. Table 5a also shows that, for all households in the South Office, the reminder card or cards increased response rates 5 percentage points compared to no reminder card.

Table 5b shows that two reminder cards were significantly more effective than one reminder card in the South Office. Of the households which had not returned their census form by March 25th, 14 percent in the one-card panel and 18 percent in the two-card panel eventually returned their forms, a difference of 4 percentage points. Table 5b also shows that for all households in the South Office, two reminder cards increased mail return rates 3 percentage points more than a single reminder card.

TABLE 3: CROSSTABULATION OF MAIL RETURNS BY CHECK-IN DATE AND REMINDER CARD PANEL (SOUTH OFFICE)

	Checked In Before 3/26/86 (Before Mailing of First Card)	Checked In 3/26-4/2/86 (After Mailing of First Card)	Checked In After 4/2/86 (After Mailing of Second Card)	Never Checked In	Total
No Reminder Card	23.1 (2,876)	4.1 (512)	3.3 (409)	69.5 (8,673)	100% 12,470
One Reminder Card	23.2 (12,982)	6.6 (3,703)	4.2 (2,345)	66.0 (36,947)	100% 55,977
Two Reminder Cards	22.9 (12,831)	7.1 (3,998)	6.6 (3,690)	63.4 (35,533)	100% 56,052
Total	28,689	8,213	6,444	81,153	124,499

$L^2 = 639.56$, 6 d.f., $p < .01$

PARTITION OF TABLE 3
(SOUTH OFFICE)

TABLE 3a: Percentage of Mail Returns Before First Card Mailout and All Other Census Response

	Checked In Before 3/26/86 (Before Mailing of First Card)	Checked In After 3/26/86 or Never Checked In	Total
No Reminder Card	23.1 (2,876)	76.9 (9,594)	100% 12,470
One Reminder Card	23.2 (12,982)	76.8 (42,995)	100% 55,977
Two Reminder Card	22.9 (12,831)	77.1 (43,221)	100% 56,052
Total	28,689	95,810	124,499

$L^2 = 1.43, 2 \text{ d.f.}, n.s.$

TABLE 3b: Percentage of Mail Returns by Time After First Card Mailout

	Checked In 3/26-4/2/86 (After Mailing of First Card)	Checked In After 4/2/86 (After Mailing of Second Card)	Never Checked In	Total
No Reminder Card	5.3 (512)	4.3 (409)	90.4 (8,673)	100% 9,594
One Reminder Card	8.6 (3,703)	5.5 (2,345)	85.9 (36,947)	100% 42,995
Two Reminder Cards	9.3 (3,998)	8.5 (3,690)	82.2 (35,533)	100% 43,221
Total	8,213	6,444	81,153	95,810

$L^2 = 638.13, 4 \text{ d.f.}, p < .01$

*Note: L^2 from 3a and L^2 from 3b sum to 639.56 (L^2 for the full South Office--
Table 3).

TABLE 4: EFFECTS OF REMINDER CARD ON PERCENTAGE OF HOUSEHOLDS RETURNING FORMS BY MAIL (NORTH OFFICE)

TABLE 4a: Effects of Card versus No Card

<u>Treatment</u>	<u>Percent Mail Return All Households</u>	<u>Percent Mail Return After 3/25 (Excludes returns before first card mailout)</u>
Card (1 and 2)	46.2	21.3
No card	41.1	13.0
Difference	5.1	8.3
Number of Households	97,655	66,631*

TABLE 4b: Effects of One versus Two Cards

<u>Treatment</u>	<u>Percent Mail Return All Households</u>	<u>Percent Mail Return After 3/25 (Excludes returns before first card mailout)</u>
Card (1 and 2)	47.2	23.0
No card	45.3	19.6
Difference	1.9	3.4
Number of Households	87,907	60,035*

*Totals represent all households for which a census form had not been checked in as of close of business 3/25/86.

TABLE 5: EFFECTS OF REMINDER CARD ON PERCENTAGE OF HOUSEHOLDS RETURNING FORMS BY MAIL (SOUTH OFFICE)

TABLE 5a: Effects of Card versus No Card

Treatment	Percent Mail Return All Households	Percent Mail Return After 3/25 (Excludes returns before first card mailout)
Card (1 and 2)	35.3	15.9
No card	30.4	9.6
Difference	4.9	6.3
Number of Households	124,499	95,810*

TABLE 5b: Effects of One versus Two Cards

Treatment	Percent Mail Return All Households	Percent Mail Return After 3/25 (Excludes returns before first card mailout)
Card (1 and 2)	36.6	17.8
No card	34.0	14.1
Difference	2.6	3.7
Number of Households	112,029	86,216*

*Totals represent all households for which a census form had not been checked in as of close of business 3/25/86.

Once it was clear that reminder cards had an effect on response rates, logit models (see Feinberg, 1980) were used to determine whether the effect of the reminder card differed at different levels of the other independent and concomitant variables. Stepwise logistic regression analysis was used to develop a model which predicted the odds of a mail return, after the first card was mailed out, from form type, motivational insert, housing unit density, and reminder card treatment. Tables 6 and 7 present the main and interaction effects contained in the final logit models for the North and South Offices respectively. Appendix C contains the mathematical model from which the coefficients associated with each effect were derived. In these tables, contrasts between levels of a main or interaction effect are indicated as subcomponents of that effect.^{4/} The first term presented for each contrast is the level of that contrast for which the odds of a mail return were higher (i.e., contrast (1) for the mail reminder card effect in both tables indicates that the odds of a mail return were greater from households which were sent two rather than one reminder card).

Table 6 indicates that, in the North Office, where vacants, deletes and PMRs were fully identified and removed from the data, the reminder card effect was the same for both short and long forms, for both panels of the motivational insert study and for households in single and multiunit structures.

In the South Office, the reminder card did not significantly interact with the motivational insert, but it did appear to have a differential effect on households in the short and long form panels and on households in single and multiunit structures (see Table 7). The significant interactions between reminder card and density and reminder card and form type in the South Office data, suggest two things: (a) being sent a reminder card (either one or two) increased the odds of responding by mail more for households in single unit structures than it did for households in multiunit structures; and (b) being sent a reminder card (either one or two) increased the odds of responding by mail more among households that received a long census form than it did among households that received a short census form.

The interaction between reminder card and housing unit density is probably artifactual because more deleted addresses tend to be found in multiunit structures^{5/} where apartment numbers can easily be confused or even changed over time (e.g., one apartment is made into two or vice versa). As was noted earlier, no deletes or vacants were removed from the South Office data.

The reminder card by form type interaction is not as easy to explain, but it may also be associated with the fact that vacants and deletes were not removed from the data set. The difference between short and long form

4/For example, the three levels of mail reminder card treatment were analyzed as two contrasts: (1) compared households in the two reminder card panel to households in the one reminder card panel and (2) compared households in both treatment panels to households in the control panel.

5/Personal communication from Donald Dalzell, July 9, 1986.

TABLE 6: FINAL LOGIT MODEL - NORTH LOS ANGELES COLLECTION OFFICE

Parameter	Coefficient*	Std. Error	T-Value**
Constant	-.42256	.01052	-40.18
Form (short/long)	-.19625	.01235	-15.88
Card (two/one) [1]	-.03698	.00685	- 5.40
(all/none) [2]	.14481	.01462	9.90
Insert (yes/no)	-.09093	.00920	- 9.88
Density (single/multi)	-.44836	.00988	-45.38

Fit Statistic for the Overall Model: $L^2 = 21.54$
 $p = .253$

*Appendix C contains the mathematical model from which these coefficients were derived and an explanation of the design matrix used by the estimation program.

**T-values greater than 2.0 indicate that a particular main or interaction effect makes a statistically significant contribution to the overall model.

TABLE 7: FINAL LOGIT MODEL - SOUTH LOS ANGELES COLLECTION OFFICE

Parameter	Coefficient*	Std. Error	T-Value**
Constant	-.83954	.01118	-75.07
Form (short/long)	-.27442	.01570	-17.47
Card (two/one) [1]	-.06795	.00887	- 7.66
(all/none) [2]	.17306	.01988	8.70
Form*Card [1]	-.02094	.01245	- 1.68
[2]	.06143	.02792	2.20
Insert (yes/no)	-.10005	.00849	-11.78
Density (single/multi)	-.29911	.01112	-26.90
Card*Density [1]	.00657	.00903	0.73
[2]	-.05680	.01964	- 2.89

Fit Statistic for the Overall Model $L^2 = 10.92$
 $p = .692$

*Appendix C contains the mathematical model from which these coefficients were derived and an explanation of the design matrix used by the estimation program.

**T-values greater than 2.0 indicate that a particular main or interaction effect makes a statistically significant contribution to the overall model.

mail return rates is typically larger in test censuses than in the decennial census (i.e., the long forms are returned at a lower rate in a test census) and this inter-form variation may also have contributed to the interaction in question. However, no interaction was found between reminder card and form type in the Tampa test census, where differences between short and long form mail return rates were large, but vacants and deletes had been removed from the data. Given the contradictory findings from the North Los Angeles Office and from the 1985 reminder card study, we believe the significant interactions for the South Office presented in Table 7 are artifactual and do not indicate that the mail reminder card effect differs either by density or form type.

5.0 CONCLUSIONS

The results of this evaluation show that in the Los Angeles test census, where mail return rates ranged from 28 to 47 percent, a reminder card significantly increased mail return rates and two reminder cards were significantly better than one. In addition, reminder cards did not significantly enhance or detract from the effects of a motivational insert on mail return rates.

The reminder cards did not affect mail response differentially across form types or levels of housing unit density in the North Los Angeles Office where the full census process was completed and where vacants and deletes could be removed from the data. This is consistent with the results obtained in the mail reminder card experiment conducted during the 1985 Census of Tampa. Based on these two findings, we believe that the mail reminder card does not differently affect mail response in spite of the small, but statistically significant interaction terms found in the unedited data from the South Los Angeles Office.

Unfortunately, the clear results of the 1986 reminder card study are limited in their relevance because of the very low mail return rates received in both Los Angeles Offices. As was the case with the 1985 results from Tampa, the low mail return rates make any generalization of the mail reminder card findings to the decennial census uncertain. Research literature suggests that follow-up reminders can improve mail response when the baseline mail return rates are between 30 and 65 percent (Heberlein and Baumgartner, 1978 and Nederhof, 1983). The mail return rates in Los Angeles (i.e., North Office: 45.7 percent; South Office: 34.8 percent) and Tampa (i.e., 64.4 percent) were within this range and the results from both evaluation studies confirm that reminder cards are effective when baseline rates are low.

The mail return rates in the two Los Angeles Offices were 19 and 30 percentage points lower than the response rate in Tampa and the effect of the reminder card on the level of mail returns was much larger in Los Angeles than it was

in Tampa.^{6/} This result is consistent with the hypothesis that reminder cards will be less effective as the baseline response rate rises. When we confine our attention to the single reminder card panel in Los Angeles, the difference in magnitude between the reminder card effect in Tampa and Los Angeles is less pronounced,^{7/} but the results of the Los Angeles experiment clearly support the hypothesis that reminder cards are more effective when baseline response rates are low and that their effect diminishes as response rates increase. What these studies do not tell us is whether the use of a reminder card would significantly increase return rates during a national event like the decennial census when major media and outreach campaigns are in progress which are designed to focus the public's attention on the importance of filling out and returning their census forms. Short of an experiment conducted during the decennial census itself, we cannot be sure how a mail reminder card will affect nonrespondents when baseline mail response rates exceed 65 percent and the level of public awareness is high.

While we cannot be certain from the Tampa and Los Angeles experiments that mail reminder cards would substantially increase mail return rates across the entire United States in the decennial census, it does appear that the reminder card could be both useful and cost-effective in 1990. If a blanket reminder card were used in 1990 (i.e., if a card were sent to everyone on the ACF rather than just to nonrespondents) the procedure might ultimately be less expensive than a targeted mailout^{8/} and, based on test census evidence, could be expected to increase mail response from households that had not yet returned their forms. Even if the card were not as effective in the presence of the high publicity and high baseline response rates we expect in 1990, our evidence suggests that it would stimulate some additional households to respond by mail, thereby decreasing the cost of nonresponse follow-up.

If the cost of blanket mail reminder cards for the whole United States appears to be prohibitive, blanket reminder card mailouts could be used only in problem areas where mail response has traditionally been low. Since we know reminder cards increase mail returns when response rates are low,

^{6/}Mail returns in the no reminder card panel in Tampa were 21.4 percent after the first mailout. The return rate in the card panel was 8.1 percentage points higher. The mail return rates in the no card panels in Los Angeles were 13 percent in the North Office and 9.5 percent in the South Office after the first mailout. To achieve an increase in mail returns comparable to that achieved in Tampa, the North Los Angeles Office needed a 4.9 percentage point increase (e.g., $X = [(.081 \times .130) / .214]$). The actual increase was 8.3 percentage points (due to treatment - one or two cards). The South Office needed a 3.6 percent increase to be comparable to Tampa and a 6.4 percentage point increase was observed in the treatment panels.

^{7/}The increase in mail returns in the one reminder card panel alone was 6.6 percentage points in the North Los Angeles Office and 4.6 percentage points in the South Los Angeles Office.

^{8/}Based on speculative discussions with Donald Dalzell and Donald Dwyer.

blanket mailings might be very useful in inner-city neighborhoods or rural areas where the baseline mail response rates are typically lower than the national average. A strategy such as this could be less expensive than a national program and it should have a higher probability of substantially decreasing follow-up costs than a broader campaign, given the evidence that reminder cards are most effective when baseline response rates are low.

In summary, the combined results from the 1985 and the 1986 reminder card evaluations suggest that a two wave mailout of reminder postcards could substantially decrease follow-up costs in 1990 and contribute to our goal of producing an efficient and cost-effective national census.

REFERENCES

- Etzler, A.L. "1986 Test Census - Shipping Problems", U.S. Bureau of the Census Memorandum, Washington, D.C., 1986.
- Feinberg, S.E. The Analysis of Cross Classified Categorical Data, Second Edition, Cambridge, Mass: The MIT Press, 1980.
- Goodman, L.A. "The Analysis of Cross-Classified Data: Independence, Quasi-independence and Interactions in Contingency Tables With or Without Missing Entries," Journal of the American Statistical Association, Vol. 63, No. 324, pp. 1091-1131.
- Heberlein, T.A. and Baumgartner, R.M. "Factors Affecting Response Rates to Mailed Questionnaires: A Quantitative Analysis of the Published Literature," American Sociological Review, 1978, Vol. 43, No. 4, pp. 447-462.
- Marquis, K.H. and Sedlacek, D.S. "Effects of Mail Reminder Card and OMR Form on Mailback Rates in the Tampa Test Census," Draft Version, 1985.
- Nederhof, A.J. "Effects of Repetition and Consistency of Personalization Treatments on Response Rate in Mail Surveys," Social Science Research, 1983, Vol. 12, pp. 1-9.
- Rao, C.R. Linear Statistical Inference and Its Applications, Second Edition, New York: John Wiley, 1973.
- Ruggles, D.R., Dea, J.Y., Kwok, F.K. and Carmen, C.A. "Evaluation of the Effectiveness of Data Collection Procedures for the 1982 Census of Agriculture," Proceedings of the American Statistical Association, Section on Survey Research Methods, 1984, pp. 588-593.

APPENDIX A

DAILY MAIL RETURN RATE TABLES
1986 CENSUS OF MERIDIAN, MISSISSIPPI

TABLE A-1

Meridian Site
Daily Frequency and Cumulative Percentage of Mail Returns by Date
(Short Form--Keyed)

	INSERT				NO INSERT				TOTAL			
	1 Card	%	2 Card	%	1 Card	%	2 Card	%	1 Card	%	2 Card	%
On or before 3/17	2054	13.71	174	1.06	1987	13.34	187	1.15	4041	13.52	361	1.11
3/18	2695	31.69	1343	9.28	2454	29.81	1316	9.21	5149	30.75	2659	9.25
3/19	602	35.71	745	13.84	558	33.55	740	13.75	1160	34.63	1485	13.79
3/20	1293	44.33	2123	26.83	1309	42.34	2051	26.32	2602	43.34	4174	26.57
3/21	786	49.58	1534	36.22	787	47.62	1507	35.55	1573	48.60	3041	35.89
3/22	0	49.58	0	36.22	0	47.62	0	35.55	0	48.60	0	35.89
3/23	0	49.58	0	36.22	0	47.62	0	35.55	0	48.60	0	35.89
3/24	0	49.58	0	36.22	0	47.62	0	35.55	0	48.60	0	35.89
3/25	939	55.85	1816	47.33	936	53.90	1706	46.01	1875	54.88	3522	46.67
3/26	502	59.20	1095	54.03	536	57.50	1177	53.22	1038	58.35	2272	53.63
3/27	113	59.95	442	56.73	115	58.27	421	55.80	228	59.11	863	56.27
3/28	73	60.44	276	58.42	77	58.79	352	57.96	150	59.62	628	58.19
3/29	0	60.44	0	58.42	0	58.79	0	57.96	0	59.62	0	58.19
3/30	0	60.44	0	58.42	0	58.79	0	57.96	0	59.62	0	58.19
3/31	0	60.44	0	58.42	0	58.79	0	57.96	0	59.62	0	58.19
4/1	0	60.44	0	58.42	0	58.79	0	57.96	0	59.62	0	58.19
4/2	211	61.84	457	61.22	233	60.35	484	60.93	444	61.10	941	61.07
4/3	54	62.20	121	61.96	71	60.83	97	61.52	125	61.52	218	61.74
4/4	0	62.20	0	61.96	0	60.83	0	61.52	0	61.52	0	61.74
4/5	0	62.20	0	61.96	0	60.83	0	61.52	0	61.52	0	61.74
4/6	131	63.08	176	63.04	117	61.61	208	62.80	248	62.35	384	62.92
4/7	0	63.08	0	63.04	0	61.61	0	62.80	0	62.35	0	62.92
4/8	42	63.36	28	63.21	37	61.86	30	62.98	79	62.61	58	63.09
4/9	54	63.72	17	63.31	61	62.27	16	63.08	115	63.00	33	63.20
4/10	2	63.73	0	63.31	2	62.29	0	63.08	4	63.01	0	63.20
4/11	0	63.73	0	63.31	0	62.29	0	63.08	0	63.01	0	63.20
4/12	0	63.73	0	63.31	0	62.29	0	63.08	0	63.01	0	63.20
4/13	0	63.73	0	63.31	0	62.29	0	63.08	0	63.01	0	63.20
4/14	6	63.77	21	63.44	5	62.32	4	63.10	11	63.05	25	63.27
4/15	16	63.88	12	63.51	16	62.43	14	63.19	32	63.16	26	63.35
4/16	7	63.93	8	63.56	13	62.51	12	63.26	20	63.22	20	63.41
4/17	0	63.93	0	63.56	0	62.51	0	63.26	0	63.22	0	63.41
4/18	0	63.93	0	63.56	0	62.51	0	63.26	0	63.22	0	63.41
On or after 4/19	17	64.04	25	63.72	18	62.64	23	63.40	35	63.34	48	63.56
TOTAL MAIL RETURNS	9597		10413		9332		10345		18929		20758	
TOTAL MAILED OUT	14986		16343		14899		16316		29885		32659	

TABLE A-2

Meridian Site
Daily Frequency and Cumulative Percentage of Mail Returns by Date
(Long Form--Keyed)

	INSERT				NO INSERT				TOTAL			
	1 Card	%	2 Card	%	1 Card	%	2 Card	%	1 Card	%	2 Card	%
On or before 3/17	300	10.02	30	.92	318	10.68	22	.68	618	10.35	52	.80
3/18	474	25.86	189	6.69	456	25.99	192	6.58	930	25.93	381	6.63
3/19	124	30.00	140	10.97	129	30.32	116	10.14	253	30.16	256	10.56
3/20	250	38.36	412	23.56	252	38.78	386	22.01	502	38.57	798	22.79
3/21	145	43.20	307	32.94	137	43.38	239	29.36	282	43.29	546	31.15
3/22	0	43.20	0	32.94	0	43.38	0	29.36	0	43.29	0	31.15
3/23	0	43.20	0	32.94	0	43.38	0	29.36	0	43.29	0	31.15
3/24	0	43.20	0	32.94	0	43.38	0	29.36	0	43.29	0	31.15
3/25	184	49.35	320	42.71	166	48.96	329	39.47	350	49.15	649	41.10
3/26	143	54.13	272	51.02	131	53.36	244	46.97	274	53.74	516	49.00
3/27	39	55.43	93	53.86	24	54.16	113	50.45	63	54.80	206	52.16
3/28	5	55.60	31	54.81	10	54.50	30	51.37	15	55.05	61	53.10
3/29	0	55.60	0	54.81	0	54.50	0	51.37	0	55.05	0	53.10
3/30	0	55.60	0	54.81	0	54.50	0	51.37	0	55.05	0	53.10
3/31	0	55.60	0	54.81	0	54.50	0	51.37	0	55.05	0	53.10
4/1	0	55.60	0	54.81	0	54.50	0	51.37	0	55.05	0	53.10
4/2	53	57.37	97	57.78	49	56.15	110	54.75	102	56.76	207	56.27
4/3	7	57.60	13	58.17	9	56.45	14	55.18	16	57.03	27	56.68
4/4	0	57.60	0	58.17	0	56.45	0	55.18	0	57.03	0	56.68
4/5	0	57.60	0	58.17	0	56.45	0	55.18	0	57.03	0	56.68
4/6	42	59.00	41	59.43	34	57.59	60	57.02	76	58.30	101	58.23
4/7	0	59.00	0	59.43	0	57.59	0	57.02	0	58.30	0	58.23
4/8	10	59.34	2	59.49	10	57.92	1	57.06	20	58.63	3	58.27
4/9	26	60.21	14	59.91	37	59.17	18	57.61	63	59.69	32	58.76
4/10	1	60.24	0	59.91	2	59.23	2	57.67	3	59.74	2	58.80
4/11	5	60.41	2	59.98	1	59.27	1	57.70	6	59.84	3	58.84
4/12	0	60.41	0	59.98	0	59.27	0	57.70	0	59.84	0	58.84
4/13	0	60.41	0	59.98	0	59.27	0	57.70	0	59.84	0	58.84
4/14	0	60.41	0	59.98	0	59.27	0	57.70	0	59.84	0	58.84
4/15	5	60.57	10	60.28	8	59.54	10	58.01	13	60.06	20	59.15
4/16	0	60.57	0	60.28	0	59.54	1	58.04	0	60.06	1	59.16
4/17	0	60.57	0	60.28	0	59.54	0	58.04	0	60.06	0	59.16
4/18	0	60.57	0	60.28	0	59.54	0	58.04	0	60.06	0	59.16
On or after 4/19	9	60.88	6	60.46	8	59.81	10	58.35	17	60.34	16	59.41
TOTAL MAIL RETURNS	1822		1979		1781		1898		3603		3877	
TOTAL MAILED OUT	2993		3273		2978		3253		5971		6526	

APPENDIX B

DAILY MAIL RETURN RATE TABLES AND GRAPHS
1986 CENSUS OF CENTRAL LOS ANGELES COUNTY

TABLE B-1

Los Angeles Site--North Office
Daily Frequency and Cumulative Percentage of Mail Returns by Date*
(Short Form--FOSDIC)

	INSERT						NO INSERT						TOTAL					
	ONE CARD		TWO CARDS		NO CARD		ONE CARD		TWO CARDS		NO CARD		ONE CARD		TWO CARDS		NO CARD	
	FQY	%	FQY	%	FQY	%	FQY	%	FQY	%	FQY	%	FQY	%	FQY	%	FQY	%
ON OR BEFORE 3/17	20	.1	22	.1	4	.1	24	.1	26	.1	4	.1	44	.1	48	.1	8	.1
3/18	1596	8.9	1544	8.5	372	9.3	1393	7.8	1442	8.1	350	8.8	2989	8.3	2986	8.3	722	9.0
3/19	2861	24.5	2760	23.6	620	24.6	2680	22.6	2690	22.9	571	23.1	5541	23.6	5450	23.2	1191	23.8
3/20	781	28.8	736	27.6	188	29.2	638	26.2	588	26.1	143	26.6	1419	27.5	1324	26.8	331	27.9
3/21	371	30.8	371	29.6	90	31.4	346	28.1	351	28.1	85	28.7	717	29.5	722	28.8	175	30.1
3/22 -- 3/24	417	33.1	416	31.9	71	33.2	357	30.1	362	30.1	86	30.9	774	31.6	778	31.0	157	32.0
3/25	336	35.0	345	33.7	63	34.7	304	31.7	257	31.5	67	32.5	640	33.4	602	32.6	130	33.6
3/26	226	36.2	212	34.9	42	35.7	191	32.8	197	32.6	37	33.5	417	34.5	409	33.7	79	34.6
3/27	197	37.3	232	36.1	28	36.4	171	33.7	201	33.7	25	34.1	368	35.5	433	34.9	53	35.3
3/28	178	38.2	177	37.1	26	37.1	216	34.9	150	34.5	24	34.7	394	36.6	327	35.8	50	35.9
3/29 -- 3/31	461	40.8	416	39.4	54	38.4	428	37.3	444	36.9	44	35.8	889	39.0	860	38.2	98	37.1
4/1	214	41.9	283	40.9	29	39.1	236	38.6	257	38.3	30	36.5	450	40.3	540	39.6	59	37.8
4/2	149	42.8	186	41.9	26	39.8	157	39.5	173	39.3	15	36.9	306	41.1	359	40.6	41	38.3
4/3	239	44.1	361	43.9	25	40.4	232	40.8	375	41.4	25	37.5	471	42.4	736	42.6	50	39.0
4/4	106	44.6	119	44.5	16	40.8	69	41.1	138	42.1	8	37.7	175	42.9	257	43.3	24	39.3
4/5 -- 4/7	183	45.7	257	45.9	29	41.5	154	42.0	276	43.6	21	38.3	337	43.8	533	44.8	50	39.9
4/8	82	46.1	129	46.6	19	42.0	80	42.4	129	44.3	13	38.6	162	44.3	258	45.5	32	40.3
4/9	78	46.5	117	47.3	22	42.5	68	42.8	118	45.0	16	39.0	146	44.7	235	46.1	38	40.7
4/10	45	46.8	71	47.7	9	42.7	69	43.2	86	45.5	14	39.3	114	45.0	157	46.6	23	41.0
4/11	38	47.0	44	47.9	3	42.8	34	43.4	38	45.7	4	39.4	72	45.2	82	46.8	7	41.1
4/12 -- 4/14	66	47.3	85	48.4	17	43.2	70	43.8	73	46.1	7	39.6	136	45.6	158	47.2	24	41.4
4/15	33	47.5	29	48.5	4	43.3	29	43.9	40	46.3	5	39.7	62	45.7	69	47.4	9	41.5
4/16	18	47.6	29	48.7	5	43.4	22	44.0	22	46.4	7	39.9	40	45.8	51	47.6	12	41.7
4/17	23	47.7	16	48.8	3	43.5	19	44.2	14	46.5	9	40.1	42	46.0	30	47.6	12	41.8
4/18	16	47.8	19	48.9	3	43.6	12	44.2	15	46.6	4	40.2	28	46.0	34	47.7	7	41.9
ON OR AFTER 4/19 AND DATE NOT KNOWN	68	48.2	91	49.4	20	44.1	87	44.7	95	47.1	13	40.5	155	46.5	186	48.2	33	42.3
TOTAL MAIL RETURNS	8802	48.2	9067	49.4	1788	44.1	8086	44.7	8557	47.1	1627	40.5	16888	46.5	17624	48.2	3415	42.3
TOTAL MAILED OUT	18258	****	18364	****	4057	****	18090	****	18165	****	4013	****	36348	****	36529	****	8070	****

* Deleted returns have been removed from these data.

TABLE B-2
 Los Angeles Site--North Office
 Daily Frequency and Cumulative Percentage of Mail Returns by Date*
 (Long Form--Keyed)

	INSERT						NO INSERT						TOTAL					
	ONE CARD		TWO CARDS		NO CARD		ONE CARD		TWO CARDS		NO CARD		ONE CARD		TWO CARDS		NO CARD	
	FQY	%	FQY	%	FQY	%	FQY	%	FQY	%	FQY	%	FQY	%	FQY	%	FQY	%
ON OR BEFORE 3/17	0	.0	0	.0	0	.0	6	.2	3	.1	2	.2	6	.1	3	.0	2	.1
3/18	210	5.6	197	5.2	65	7.7	193	5.3	189	5.1	48	6.0	403	5.4	386	5.2	113	6.9
3/19	470	18.1	449	17.1	111	21.0	414	16.4	428	16.5	87	16.3	884	17.2	877	16.8	198	18.7
3/20	141	21.8	119	20.3	23	23.7	97	18.9	154	20.6	23	19.1	238	20.4	273	20.5	46	21.4
3/21	73	23.8	77	22.4	16	25.6	62	20.6	66	22.4	19	21.3	135	22.2	143	22.4	35	23.5
3/22 -- 3/24	68	25.6	78	24.4	6	26.3	65	22.3	60	24.0	9	22.4	133	23.9	138	24.2	15	24.4
3/25	65	27.3	60	26.0	15	28.1	49	23.6	45	25.2	14	24.1	114	25.5	105	25.6	29	26.1
3/26	43	28.4	30	26.8	15	29.9	31	24.5	38	26.2	7	24.9	74	26.4	68	26.5	22	27.4
3/27	37	29.4	30	27.6	8	30.9	27	25.2	26	26.9	6	25.6	64	27.3	56	27.3	14	28.2
3/28	34	30.3	33	28.5	2	31.1	30	26.0	29	27.7	3	26.0	64	28.2	62	28.1	5	28.5
3/29 -- 3/31	89	32.7	88	30.8	8	32.1	67	27.8	80	29.8	5	26.6	156	30.2	168	30.3	13	29.3
4/1	61	34.3	49	32.1	6	32.8	56	29.3	59	31.4	2	26.8	117	31.8	108	31.8	8	29.8
4/2	48	35.6	52	33.5	4	33.3	43	30.4	32	32.2	3	27.2	91	33.0	84	32.9	7	30.2
4/3	49	36.9	66	35.3	5	33.8	45	31.6	68	34.1	4	27.7	94	34.2	134	34.7	9	30.8
4/4	30	37.7	41	36.3	6	34.6	31	32.4	45	35.3	4	28.1	61	35.1	86	35.8	10	31.3
4/5 -- 4/7	37	38.7	74	38.3	3	34.9	48	33.7	59	36.8	11	29.4	85	36.2	133	37.6	14	32.2
4/8	19	39.2	32	39.2	2	35.2	20	34.2	26	37.5	4	29.9	39	36.7	58	38.3	6	32.5
4/9	19	39.7	26	39.8	6	35.9	18	34.7	30	38.3	4	30.4	37	37.2	56	39.1	10	33.1
4/10	14	40.0	17	40.3	0	35.9	17	35.2	12	38.6	3	30.8	31	37.6	29	39.5	3	33.3
4/11	12	40.4	14	40.7	2	36.1	9	35.4	7	38.8	2	31.0	21	37.9	21	39.7	4	33.6
4/12 -- 4/14	20	40.9	22	41.3	4	36.6	16	35.8	18	39.3	8	31.9	36	38.4	40	40.3	12	34.3
4/15	11	41.2	10	41.5	3	36.9	10	36.1	5	39.4	0	31.9	21	38.7	15	40.5	3	34.4
4/16	5	41.3	13	41.9	1	37.1	4	36.2	9	39.7	1	32.1	9	38.8	22	40.8	2	34.6
4/17	6	41.5	3	41.9	0	37.1	7	36.4	5	39.8	1	32.2	13	38.9	8	40.9	1	34.6
4/18	2	41.5	4	42.0	1	37.2	5	36.5	6	40.0	0	32.2	7	39.0	10	41.0	1	34.7
ON OR AFTER 4/19 AND DATE NOT KNOWN	40	42.6	38	43.1	7	38.0	25	37.2	26	40.7	6	32.9	65	39.9	64	41.9	13	35.5
TOTAL MAIL RETURNS	1603	42.6	1622	43.1	319	38.0	1395	37.2	1525	40.7	276	32.9	2998	39.9	3147	41.9	595	35.5
TOTAL MAILED OUT	3764	****	3767	****	839	****	3749	****	3750	****	839	****	7513	****	7517	****	1678	****

*Vacant, PMRs and deletes have been removed from these data.

TABLE B-3

Los Angeles Site--South Office
Daily Frequency and Cumulative Percentage of Mail Returns by Date*
(Short Form--FOSDIC)

	INSERT						NO INSERT						TOTAL					
	ONE CARD		TWO CARDS		NO CARD		ONE CARD		TWO CARDS		NO CARD		ONE CARD		TWO CARDS		NO CARD	
	FQY	%	FQY	%	FQY	%	FQY	%	FQY	%	FQY	%	FQY	%	FQY	%	FQY	%
ON OR BEFORE 3/17	2	.0	2	.0	0	.0	16	.1	20	.1	2	.0	18	.0	22	.0	2	.0
3/18	1628	7.0	1624	7.0	366	7.1	1483	6.4	1502	6.5	313	6.1	3111	6.7	3126	6.7	679	6.6
3/19	2487	17.6	2417	17.3	568	18.0	2171	15.7	2227	16.1	485	15.4	4658	16.7	4644	16.7	1053	16.7
3/20	753	20.9	747	20.5	173	21.3	663	18.6	690	19.0	137	18.0	1416	19.7	1437	19.8	310	19.7
3/21	385	22.5	322	21.9	88	23.0	346	20.1	315	20.4	83	19.6	731	21.3	637	21.1	171	21.3
3/22 -- 3/24	379	24.1	376	23.5	83	24.6	347	21.6	350	21.9	97	21.5	726	22.9	726	22.7	180	23.1
3/25	333	25.6	309	24.8	71	26.0	322	22.9	283	23.1	75	22.9	655	24.3	592	23.9	146	24.5
3/26	215	26.5	198	25.7	43	26.8	176	23.7	185	23.9	35	23.6	391	25.1	383	24.8	78	25.2
3/27	264	27.6	294	26.9	35	27.5	294	25.0	293	25.1	36	24.3	558	26.3	587	26.0	71	25.9
3/28	267	28.8	320	28.3	30	28.1	284	26.2	289	26.4	22	24.7	551	27.5	609	27.3	52	26.4
3/29 -- 3/31	462	30.8	504	30.5	53	29.1	448	28.1	439	28.2	61	25.9	910	29.4	943	29.3	114	27.5
4/1	178	31.5	140	31.1	24	29.6	124	28.6	153	28.9	25	26.4	302	30.1	293	30.0	49	28.0
4/2	215	32.4	295	32.3	41	30.3	242	29.7	274	30.1	34	27.0	457	31.1	569	31.2	75	28.7
4/3	182	33.2	290	33.6	30	30.9	141	30.3	312	31.4	27	27.5	323	31.7	602	32.5	57	29.2
4/4	116	33.7	174	34.3	19	31.3	98	30.7	151	32.1	16	27.9	214	32.2	325	33.2	35	29.6
4/5 -- 4/7	153	34.4	313	35.6	37	32.0	161	31.4	274	33.2	32	28.5	314	32.9	587	34.4	69	30.2
4/8	78	34.7	151	36.3	13	32.3	73	31.7	148	33.9	10	28.7	151	33.2	299	35.1	23	30.5
4/9	78	35.0	118	36.8	14	32.5	83	32.1	97	34.3	17	29.0	161	33.5	215	35.5	31	30.8
4/10	56	35.3	98	37.2	7	32.7	53	32.3	75	34.6	6	29.1	109	33.8	173	35.9	13	30.9
4/11	26	35.4	59	37.5	13	32.9	25	32.4	37	34.8	5	29.2	51	33.9	96	36.1	18	31.1
4/12 -- 4/14	60	35.6	111	37.9	12	33.1	79	32.7	93	35.2	12	29.4	139	34.2	204	36.5	24	31.3
4/15	32	35.8	48	38.2	7	33.3	34	32.9	35	35.3	6	29.5	66	34.3	83	36.7	13	31.4
4/16	35	35.9	34	38.3	3	33.3	31	33.0	43	35.5	5	29.6	66	34.5	77	36.9	8	31.5
4/17	27	36.1	22	38.4	4	33.4	20	33.1	17	35.6	3	29.7	47	34.6	39	37.0	7	31.6
4/18	20	36.1	19	38.5	3	33.5	23	33.2	16	35.6	1	29.7	43	34.7	35	37.0	4	31.6
ON OR AFTER 4/19 AND DATE NOT KNOWN	174	36.9	177	39.2	22	33.9	136	33.8	158	36.3	20	30.1	310	35.3	335	37.8	42	32.0
TOTAL MAIL RETURNS	8605	36.9	9162	39.2	1759	33.9	7873	33.8	8476	36.3	1565	30.1	16478	35.3	17638	37.8	3324	32.0
TOTAL MAILED OUT	23331	****	23355	****	5190	****	23313	****	23347	****	5198	****	46644	****	46702	****	10388	****

*Vacant, PMRs and deletes have been removed from these data.

TABLE B-4

Los Angeles Site--South Office
Daily Frequency and Cumulative Percentage of Mail Returns by Date*
(Long Form--FOSDIC)

	INSERT						NO INSERT						TOTAL					
	ONE CARD		TWO CARDS		NO CARD		ONE CARD		TWO CARDS		NO CARD		ONE CARD		TWO CARDS		NO CARD	
	FQY	%	FQY	%	FQY	%	FQY	%	FQY	%	FQY	%	FQY	%	FQY	%	FQY	%
ON OR BEFORE 3/17	0	.0	0	.0	0	.0	0	.0	0	.0	0	.0	0	.0	0	.0	0	.0
3/18	220	4.7	222	4.7	53	5.1	176	3.8	202	4.3	38	3.7	396	4.2	424	4.5	91	4.4
3/19	331	11.8	361	12.5	76	12.4	325	10.8	282	10.4	62	9.6	656	11.3	643	11.4	138	11.0
3/20	131	14.6	133	15.3	23	14.6	128	13.5	110	12.7	22	11.7	259	14.0	243	14.0	45	13.2
3/21	76	16.2	66	16.7	10	15.6	53	14.7	62	14.0	5	12.2	129	15.4	128	15.4	15	13.9
3/22 -- 3/24	68	17.6	63	18.1	14	16.9	54	15.8	54	15.2	7	12.9	122	16.7	117	16.6	21	14.9
3/25	50	18.7	46	19.1	11	18.0	55	17.0	46	16.2	14	14.2	105	17.9	92	17.6	25	16.1
3/26	35	19.5	44	20.0	10	18.9	45	18.0	37	17.0	8	15.0	80	18.7	81	18.5	18	17.0
3/27	32	20.1	52	21.1	6	19.5	39	18.8	57	18.2	7	15.7	71	19.5	109	19.6	13	17.6
3/28	55	21.3	57	22.3	3	19.8	43	19.7	55	19.4	4	16.0	98	20.5	112	20.8	7	17.9
3/29 -- 3/31	77	23.0	75	23.9	9	20.7	56	20.9	69	20.8	5	16.5	133	22.0	144	22.4	14	18.6
4/1	40	23.8	39	24.8	7	21.3	58	22.2	45	21.8	7	17.2	98	23.0	84	23.3	14	19.3
4/2	28	24.4	44	25.7	4	21.7	26	22.7	40	22.7	3	17.5	54	23.6	84	24.2	7	19.6
4/3	34	25.1	54	26.9	6	22.3	27	23.3	62	24.0	5	18.0	61	24.2	116	25.4	11	20.1
4/4	13	25.4	41	27.7	6	22.9	14	23.6	21	24.4	5	18.4	27	24.5	62	26.1	11	20.7
4/5 -- 4/7	29	26.0	65	29.1	7	23.5	27	24.2	57	25.7	5	18.9	56	25.1	122	27.4	12	21.2
4/8	18	26.4	34	29.8	5	24.0	15	24.5	30	26.3	1	19.0	33	25.5	64	28.1	6	21.5
4/9	16	26.8	25	30.4	1	24.1	11	24.8	19	26.7	0	19.0	27	25.8	44	28.5	1	21.6
4/10	8	26.9	23	30.9	0	24.1	8	24.9	20	27.1	2	19.2	16	25.9	43	29.0	2	21.7
4/11	7	27.1	9	31.1	1	24.2	4	25.0	5	27.2	0	19.2	11	26.1	14	29.2	1	21.7
4/12 -- 4/14	16	27.4	11	31.3	4	24.6	8	25.2	16	27.6	3	19.5	24	26.3	27	29.4	7	22.0
4/15	7	27.6	11	31.5	1	24.7	4	25.3	13	27.9	2	19.7	11	26.4	24	29.7	3	22.2
4/16	3	27.6	6	31.7	0	24.7	8	25.5	7	28.0	1	19.8	11	26.6	13	29.8	1	22.2
4/17	3	27.7	7	31.8	1	24.8	1	25.5	6	28.1	1	19.9	4	26.6	13	30.0	2	22.3
4/18	3	27.8	4	31.9	0	24.8	3	25.5	3	28.2	0	19.9	6	26.7	7	30.1	0	22.3
ON OR AFTER 4/19 AND DATE NOT KNOWN	36	28.5	43	32.8	6	25.4	28	26.1	28	28.8	2	20.1	64	27.3	71	30.8	8	22.7
TOTAL MAIL RETURNS	1336	28.5	1535	32.8	264	25.4	1216	26.1	1346	28.8	209	20.1	2552	27.3	2881	30.8	473	22.7
TOTAL MAILED OUT	4681	****	4677	****	1041	****	4652	****	4673	****	1041	****	9333	****	9350	****	2082	****

*Vacant, PMRs and deletes have been removed from these data.

Figure B-1
 Percentage of Short Forms Returned by Mail
 (North Office)

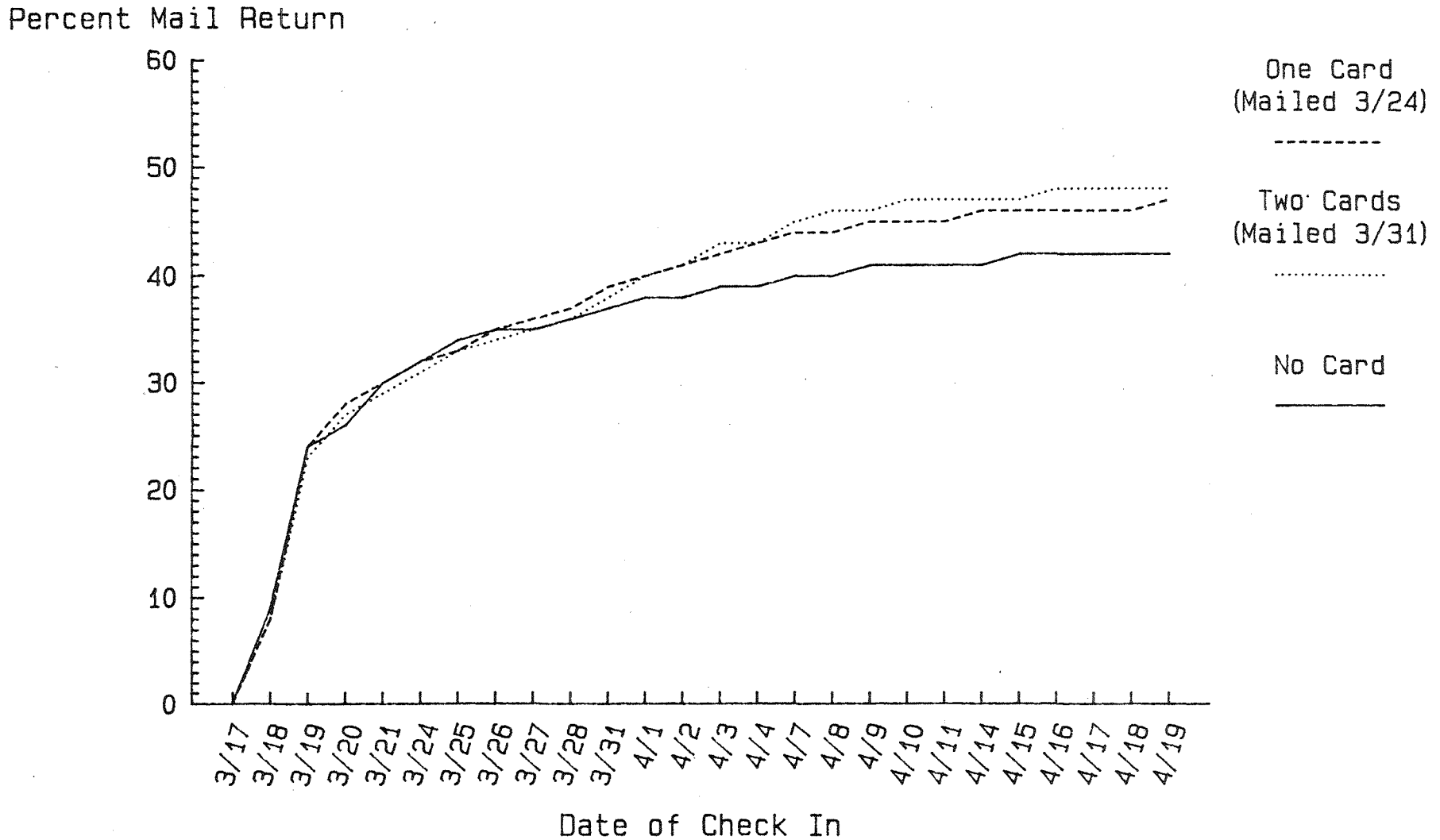


Figure B-2
 Percentage of Long Forms Returned by Mail
 (North Office)

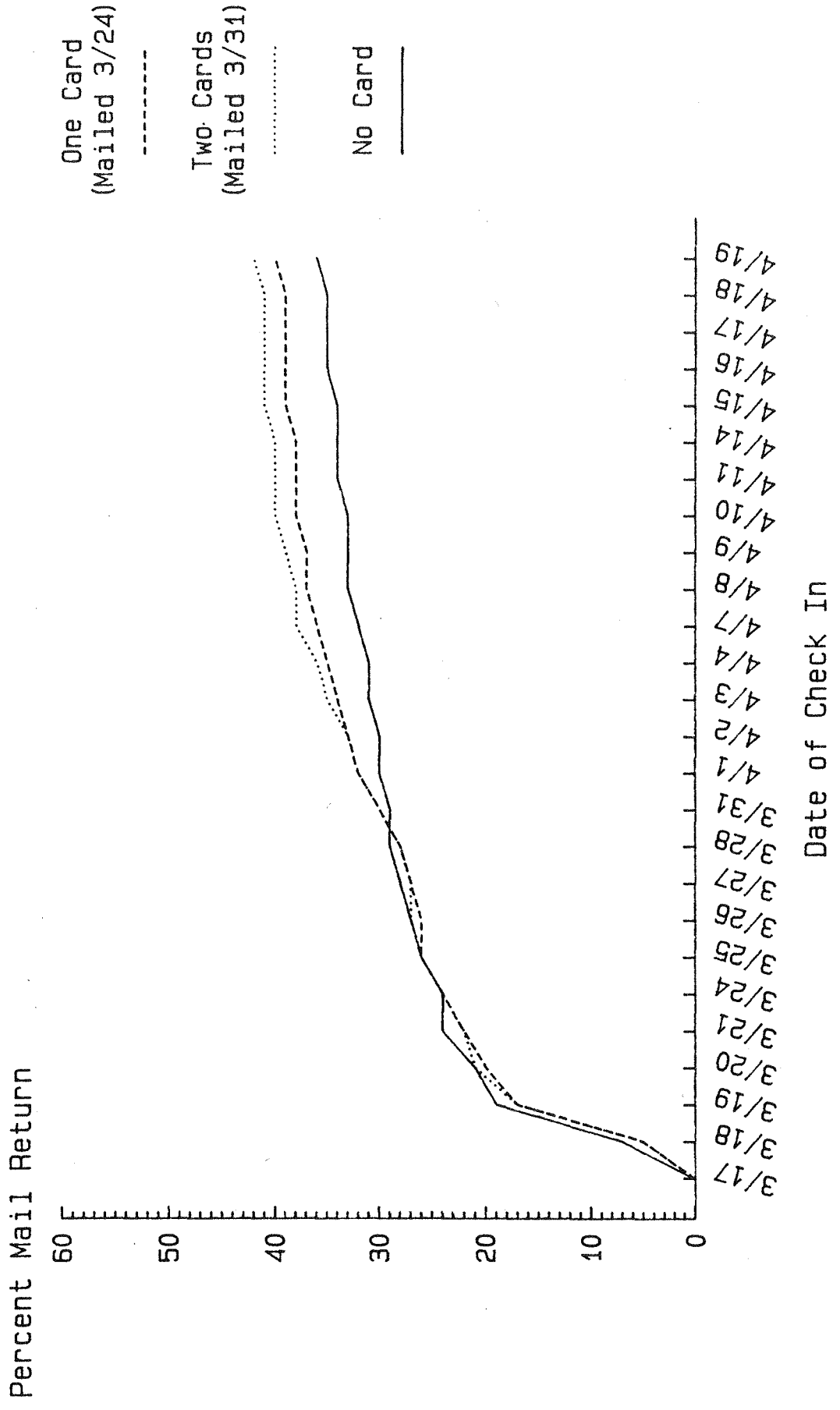


Figure B-3
 Percentage of Short Forms Returned by Mail
 (South Office)

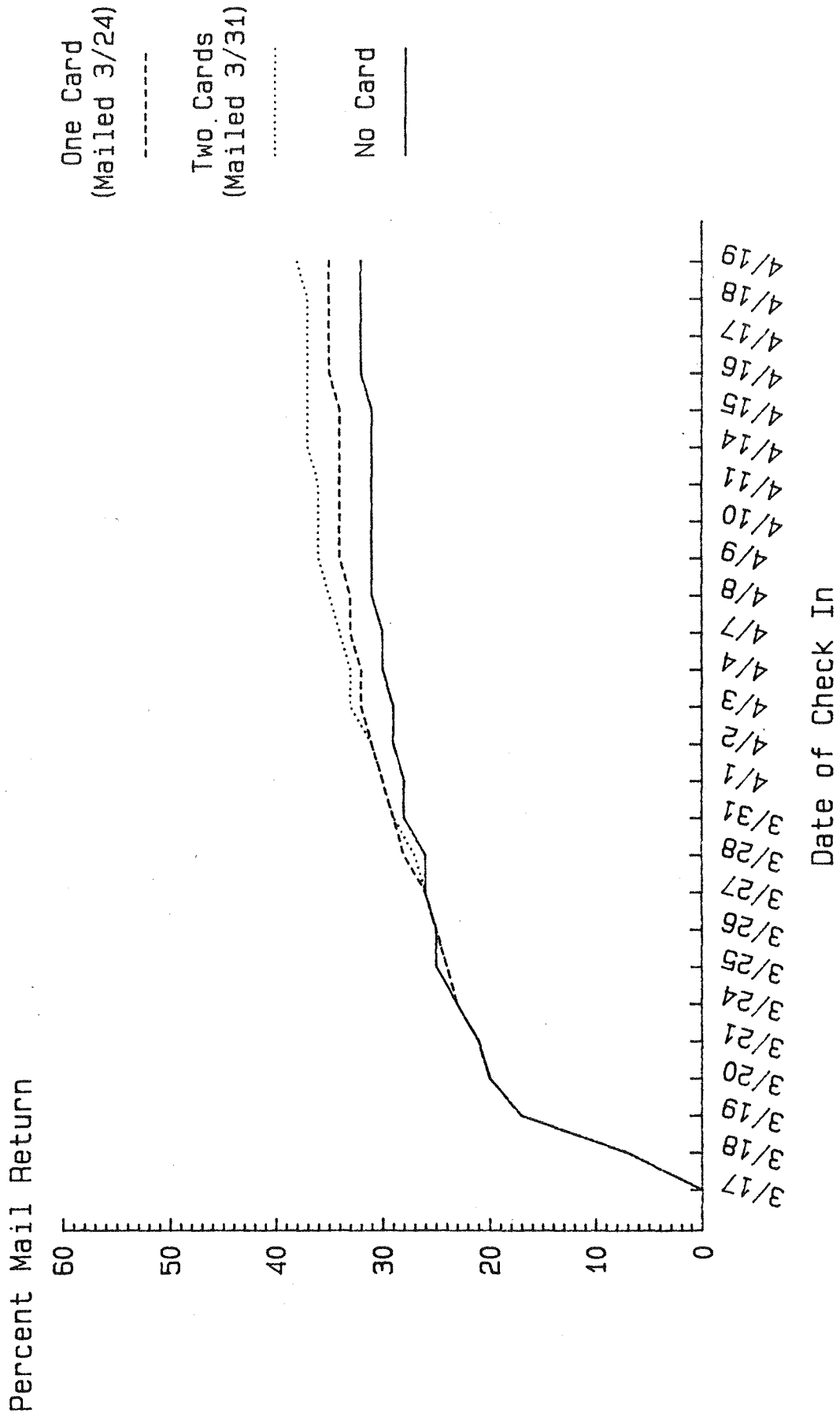
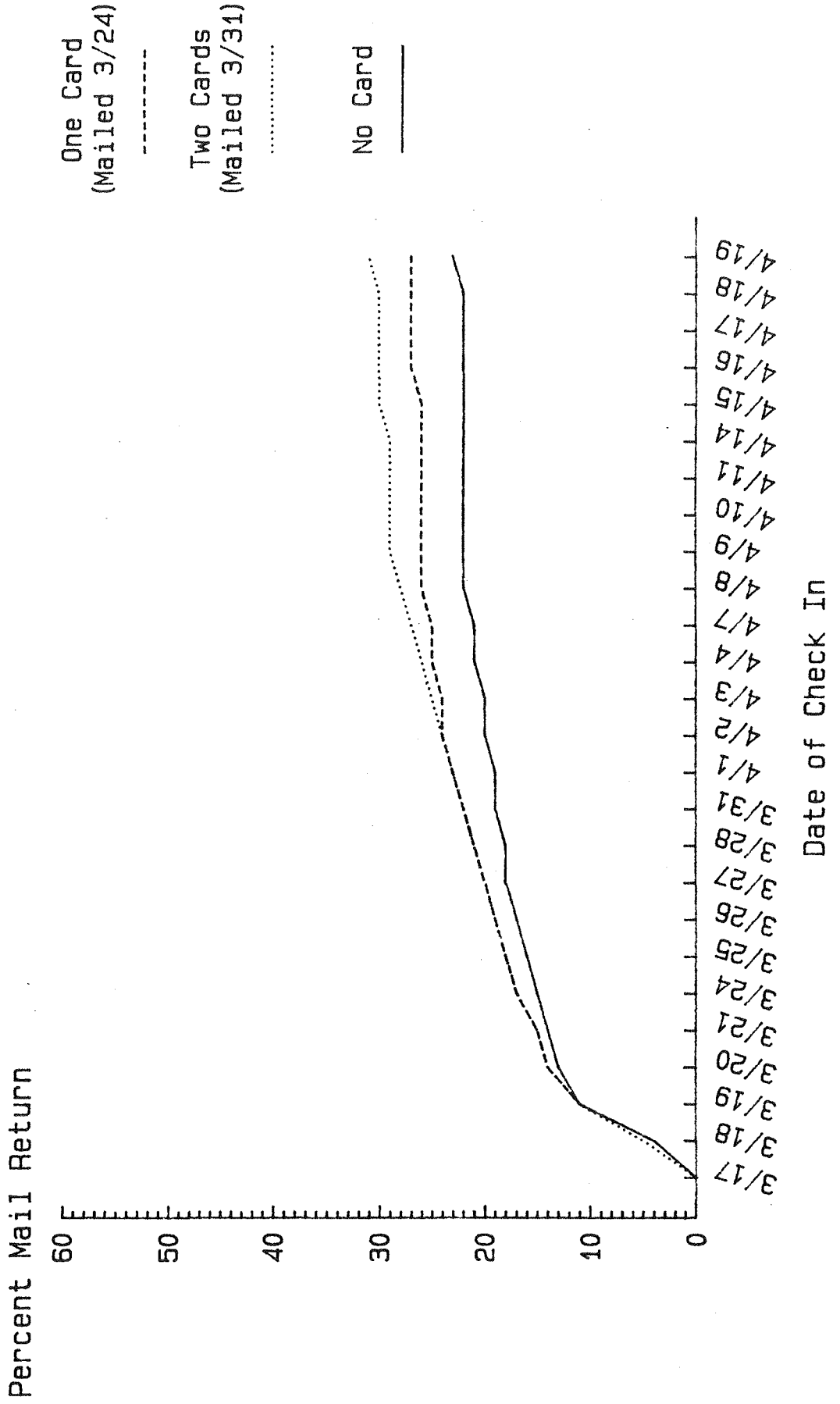


Figure B-4
 Percentage of Long Forms Returned by Mail
 (South Office)



APPENDIX C

TECHNICAL DEFINITION OF LOGIT MODEL COEFFICIENTS

The coefficients shown in Table 6 are derived from the following logistic model for P, the probability of a mail response in the North Office,

$$\ln \left(\frac{P}{P-1} \right) = \text{constant} + C_F X_F + C_{C1} X_{C1} + C_{C2} X_{C2} + C_I X_I + C_D X_D$$

where:

$$\begin{aligned} X_{C2} &= .5 \text{ for one or two reminder cards,} \\ X_{C2} &= -1 \text{ for no reminder cards.} \end{aligned}$$

All remaining X's take the value -1 for the first category and 1 for the second; for example, X_F takes the values -1 or 1 for short or long forms, respectively.

The model for the South Office includes the interaction of card with form and density. These represent four additional terms $C_{FC1} X_{FC1}$, $C_{FC2} X_{FC2}$, $C_{FD1} X_{FD1}$, and $C_{FD2} X_{FD2}$. X_{FC1} takes the value 1 for one card with the long form or two cards with the short, and 2 for one card with the short form or two cards with the long. X_{FC2} takes the value 1 for no reminder cards, short form; -1 for no cards, long form; -.5 for one or two cards, short form; and .5 for one or two cards, long form. X_{FD1} and X_{FD2} are defined similarly.