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The Effect of Incentives on Response in 2005 ARMS Phase III Interviews

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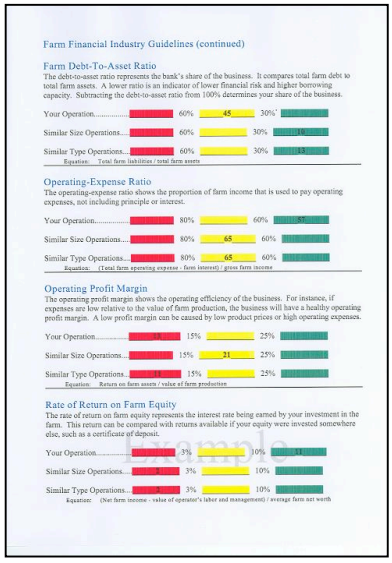
Farm Financial Industry Guidelines (continued)

Farm Debt-To-Asset Ratio
The debt-to-asset ratio represents the bank's share of the business. It compares total farm debt to total farm assets. A lower ratio is an indicator of lower financial risk and higher borrowing capacity. Subtracting the debt-to-asset ratio from 100% determines your share of the business.

Your Operation..... 60% 45 30%
Similar Size Operations... 60% 30% 18
Similar Type Operations... 60% 30% 13
Equation: Total farm liabilities / total farm assets

Operating-Expense Ratio
The operating-expense ratio shows the proportion of farm income that is used to pay operating expenses, not including principle or interest.

Your Operation..... 80% 60% 57
Similar Size Operations... 80% 65 60%
Similar Type Operations... 80% 65 60%
Equation: (Total farm operating expense - farm interest) / gross farm income

Operating Profit Margin
The operating profit margin shows the operating efficiency of the business. For instance, if expenses are low relative to the value of farm production, the business will have a healthy operating profit margin. A low profit margin can be caused by low product prices or high operating expenses.

Your Operation..... 15% 25%
Similar Size Operations... 15% 21 25%
Similar Type Operations... 15% 25%
Equation: Return on farm assets / value of farm production

Rate of Return on Farm Equity
The rate of return on farm equity represents the interest rate being earned by your investment in the farm. This return can be compared with returns available if your equity were invested somewhere else, such as a certificate of deposit.

Your Operation..... 3% 10% 14
Similar Size Operations... 3% 3% 10%
Similar Type Operations... 3% 3% 10%
Equation: (Net farm income - value of operator's labor and management) / average farm net worth

Example

The views expressed herein are not necessarily those of NASS or USDA. This report was prepared for limited distribution to the research community outside the U.S. Department of Agriculture.

EXECUTIVE SUMMARY

Phase 3 of the Agricultural Resource Management Survey (ARMS) is the one of the longest and most detailed sample survey data collections conducted by the US Department of Agriculture's National Agricultural Statistics Service (NASS). For this survey, NASS collects highly detailed economic data covering a calendar year from agricultural producers nationwide. Previous research with a self-administered mail-out/mail-back version of the ARMS questionnaire (Beckler, Ott and Horvath, 2005) showed benefits of indirect monetary incentives ($20 ATM cards). Face-to-face interviews are used to collect data from the Costs and Returns Report (CRR) sample of the ARMS Phase 3. For 2005, use of ATM cards was continued as standard practice with the mail-out/mail-back Core form sample and an incentive experiment was conducted comparing several types of incentives provided to ARMS Phase 3 CRR sampled operations.

Five treatment groups (including a control group) in the CRR sample were used for this incentive experiment. All experimental groups received a pre-survey letter and were then contacted for a face-to-face interview. Treatment groups received either 1) a standard pre-survey letter with no incentive, 2) pre-survey letter with a prepaid indirect cash incentive (in the form of $20 automated teller machine (ATM) cards), 3) pre-survey letter with a promised individual financial profile comparing the operation with aggregated information about other operations, 4) pre-survey letter with a NASS logo wall clock or 5) pre-survey letter with a pre-paid $20 ATM card and a promised individual financial profile. The entire ARMS Core version was provided with a $20 incentive but was not included in this experiment. Information for the Core form sample is provided along with the experimental groups.

Response rates for the CRR incentive groups were slightly higher than the control group. However, the differences were not significantly different, with response rates for all groups in the low 70 percents. Each incentive tested required an additional cost for the incentives themselves and also for processing and delivery of the incentive.

Used as tested, these incentives do not appear to be effective in increasing response rates on the face-to-face ARMS CRR sample. This is contrary to our prior evaluation of their use with the mail-back Core Version of the form where response rates were increased. For the Core form sample, incentives raised response rates and were also cost effective since they increased mail response and reduced costs from face-to-face interviews. In addition, the number of cards cashed was low, and the Core Version non-respondents cashed their ATM cards at a much lower rate than respondents (both in the previous research and in the current year). In the current research, Phase 3 CRR interview respondents and non-respondents cashed the ATM cards at comparable rates. This suggests that incentives, while increasing costs, are of limited effectiveness when combined with a face-to-face interview mode. Careful consideration should be made regarding how incentives are used in the future as they do not appear to be universally effective.

RECOMMENDATIONS

1. Incentives (both monetary and non-monetary), as tested in this experiment, should **not** be used for ARMS Phase 3 samples which use only face-to-face interviews. This is because they raise costs but do not significantly increase response rates.

2. A small subsample control group should be used to monitor the continued effectiveness of incentives with the mail-back Core version of ARMS 3.

The Effect of Incentives on Response in 2005 ARMS Phase 3 Interviews

Jaki S. McCarthy, Daniel G. Beckler, and Kathleen Ott[1/]

Abstract

The United States Department of Agriculture's National Agricultural Statistics Service conducts the annual Agricultural Resource Management Survey (ARMS) in several phases. Phase 3 of this survey collects detailed economic information with a lengthy Costs and Returns Report (CRR) questionnaire administered in face-to-face interviews. An additional sample uses a sixteen-page Core questionnaire with mail-out/mail-back data collection and face-to-face nonresponse follow-up. Based on positive results of incentive use with the 2004 ARMS Core form, both prepaid and promised incentives were tested on the CRR face-to-face interview sample of the 2005 ARMS in order to increase response rates. Incentives included $20 ATM cards, NASS logo wall clocks, and Individual Farm Analyses.

The results showed that incentives, as implemented, did not significantly increase the overall response rates. Due to the increased cost and processing required to provide incentives, their use is not recommended for future ARMS face-to-face interview samples.

Key Words: Incentives; nonresponse; response rate; refusal conversion.

1. INTRODUCTION

The Agricultural Resource Management Survey (ARMS) is an annual survey conducted by the United States Department of Agriculture's (USDA) National Agricultural Statistics Service (NASS) and co-sponsored by USDA's Economic Research Service (ERS). The ARMS consists of three phases: Phase 1 screens for potential samples for Phases 2 and 3; Phase 2 collects data on cropping practices and agricultural chemical usage; and Phase 3 collects detailed economic information about the agricultural operation as well as the operator's household.

ARMS Phase 3 has been problematic because, compared with other NASS surveys, its response rates are low, and its data collection costs are high. All ARMS Phase 3 data are collected by face-to-face enumeration because of the length and complexity of the questionnaire.

The ARMS Phase 3 contains several distinct subsamples. The Cost and Returns Report (CRR) sample provides information for the financial analysis of farm businesses, farm households and costs associated with producing agricultural commodities. In addition, cost of production and expenditure data are obtained with specific individual commodity subsamples. The CRR and commodity subsamples are all conducted with face-to-face interviews. The CRR

1/ Daniel G. Beckler and Kathleen Ott conducted this research while mathematical statisticians with the USDA's National Agricultural Statistics Service - Research and Development Division (RDD), Jaki McCarthy is also a statistician in the RDD, located at Room 305, 3251 Old Lee Highway, Fairfax, VA 22030.

questionnaire is over 30 pages long and interviews average about 1½ hours in length. A much shorter self-administered Phase 3 "Core" questionnaire developed for the 2003 survey was used for part of the sample for mail-out/mail-back data collection.

Since the utility of a self-administered ARMS Phase 3 Core form was demonstrated in 2003, NASS sought ways to implement its use and increase the overall response rate as well as contain data collection costs. Offering potential respondents incentives is a proven technique to increase response rates on a variety of surveys conducted by several agencies and companies (Church, 1993; James and Bolstein, 1992; James and Bolstein, 1990; Singer, 2002). An incentive experiment conducted with the 2004 ARMS Phase 3 Core indicated that monetary incentives increased response rates for the mail-out/mail-back sample of this survey while being cost effective (Beckler, Ott and Horvath, 2005).

Based on the promising results of the use of incentives with the mail-out/mail-back Core form, it was hypothesized that incentives could also boost response rates in the ARMS face-to-face interviews. Therefore, an experiment comparing incentive use with the CRR face-to-face interview sample of the 2005 ARMS Phase 3 was conducted.

2. METHODS

The 2005 ARMS Phase 3 Costs and Returns Report (CRR) sample size was 11,625 including list and area frame samples. Ten thousand list frame sample operations were randomly assigned to 5 treatment groups. The total sample was stratified by state, the ARMS farm value of sales (as maintained on the sampling frame), and the type of operation (also as maintained on the sampling frame). Then, five sub-samples, each of size 2,000, were systematically selected. The sub-samples were drawn such that each was equally represented by the strata. Once the sub-samples were drawn, NASS Field Offices had the opportunity to remove operations from the samples with whom they had previous data collection agreements. This resulted in each sub-sample being slightly less than 2,000.

In addition, the Core sample size was 16,498 farm/ranch operations across 15 states. The 15 states were those with the highest agricultural value of sales and included Arkansas, California, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Minnesota, Missouri, Nebraska, North Carolina, Texas, Washington, and Wisconsin.

For the 2005 ARMS Phase 3 sample, data collection could begin January 30 and ended in mid April. All data for the 5 treatment groups were collected via face-to-face interviews.

The National Processing Center (NPC) in Jeffersonville, IN printed all of the pre-survey letters and assembled and mailed all of the pre-survey materials to the treatment groups. They also assembled and mailed the Core sample questionnaires and ATM cards.

Each of the 5 treatment groups were mailed a pre-survey letter, as is standard data collection methodology. In addition, treatment groups received incentives with their pre-survey letters in the form of $20 automated teller machine (ATM) cards, a non-monetary incentive in the form of a NASS logo wall clock, and the promise of a Farm Profile for their operation. The Farm Profile or "Individual Farm Analysis" was a report that displayed the percentile within which the operation's data fell compared to an overall group estimate for each of 16

expense categories. An example appears in Appendix A, Figure A3. Generic profiles without individual operation data were generated for non-respondents. The Farm Profiles were generated individually by staff in NASS's Statistics Division, printed in Headquarters, and sent to the appropriate NASS field offices in September 2006 for distribution to sampled operations.

Combinations of these stimuli were administered to four of the five sub-samples mentioned above; a fifth sub-sample received no stimuli (except the standard pre-survey letter) and served as the control group for this project. Collectively, these five sub-samples formed the five treatment groups used for this project. Table 1 contains descriptions of the treatment groups.

Table 1: ARMS Phase 3 Version 1 Treatment Groups

Treatment Group	First Contact	Interview Contact
1 (Control)	Pre-Survey Letter No Incentive	Face-to-Face Interview No Incentive
2	Pre-Survey Letter $20 ATM Card Incentive	Face-to-Face Interview No Incentive
3	Pre-Survey Letter Mention Individual Financial Profile Incentive	Face-to-Face Interview Promise Individual Financial Profile Incentive
4	Pre-Survey Letter Non-Monetary Clock Incentive	Face-to-Face Interview No Incentive
5	Pre-Survey Letter $20 ATM Card Incentive Mention Individual Financial Profile Incentive	Face-to-Face Interview Promise Individual Financial Profile Incentive

All treatment groups received pre-survey letters that included some uses of the ARMS data. The letters also included a reference to the type of incentive the operation received ($20 ATM card, NASS logo clock, financial profile) as an advanced thank you for participation. The decision to use $20 ATM cards as incentives was based on their previous successful use with the ARMS Core form. Wall clocks were chosen as a prominent way to display the NASS logo to respondents. The letters and examples of the incentives are shown in Appendix A1-A6.

The sub-samples in the incentive treatment groups all received pre-survey letters that: (1) explained the incentive was a "thank you", and; (2) described the uniqueness of the ARMS. Because all interviews were to be completed via personal interview, there was no statement justifying the ATM card being used as a cost saving measure. (This statement was included in the cover letter for the Core forms which were to be completed and returned via mail but were not part of this experiment.)

The actual ATM card incentive was mailed with the pre-survey letter to recipients via United States Postal Service and was affixed to a standard 8½ inch x 11 inch sheet of paper that reiterated a "thank you" and included instructions on how to use the card. This is shown in Appendix A, Figure A6. The wall clocks, with a pre-survey letter, were delivered via Federal Express.

The $20 ATM cards were supplied by

JPMorgan Chase bank and were usable in nationwide ATM machines that displayed the NYCE®, Pulse®, Maestro®, or Cirrus® logos. The cards were also usable at point-of-sale (POS) (i.e., retail) establishments that allow the use of debit cards as payment; however, recipients were not explicitly told this. In addition to the $20 incentive, the ATM cards were loaded with an extra $4 to cover any transaction charges. The cards were pre-activated and were immediately usable when the recipients received them. The personal identification number (PIN) needed to use the card was embossed on the front of each card after the words "THANK YOU".[1] The front of each card also included the embossed message, "FOR HELP 1-888-424-7828"; this toll-free telephone number was answered by NASS staff. Finally, all ATM cards expired on May 31, 2006 (there was no provision for extending this date). If a card recipient lost or could not use the card, a replacement could be requested by calling the toll-free phone number listed on the instruction sheet. For the few cases where this occurred, only the replacement card was used in our analysis.

Interviewers were instructed to schedule interviews using the same procedures as in previous years when no incentives were provided to the CRR sample. Interviewers were informed of which CRR respondents received incentives. However, other Federal Agencies who have used monetary incentives have found that when interviewers ask respondents about receipt of the incentives, potential respondents often report they did not receive the incentive and ask for a replacement to be provided (see McGrath, 2006). This significantly increases costs and NASS did not have sufficient additional ATM cards to meet substantial numbers of replacement requests. For this reason, interviewers were specifically instructed NOT to mention the incentives in their contacts with respondents.

[1] There was a problem with how some card recipients were told to use their cards. This may have impacted how many recipients were able to cash their cards. The necessary PIN was embossed on the front of each card and all recipients received instructions to that effect. However, the PIN was created from the cards "sequence number". The actual PIN, while only four digits long, appeared in error on the card if the sequence number was over four digits long. For example, suppose the sequence number was "12345"; the actual PIN was "2345". The initial instructions did not acknowledge this or how to correctly enter the PIN. A postcard was sent a week or two after the problem was discovered alerting recipients (with five digit sequence numbers) to only enter the last four digits as the PIN.

3. RESULTS AND DISCUSSION

3.1 Response Rates

Unlike previous incentive research conducted with the ARMS Core mail form, the results of this project showed that the incentives for the CRR sample did not significantly increase response rates. Table 2 shows the response rates by treatment group (treatment group descriptions are given in Table 1). While not part of the experimental comparisons, the response rate for the Core form (who all received $20 ATM cards) is also shown.

Table 2: Response Rates [1/] by Treatment Group

Treatment Group	N [2/]	Completes	Response Rate	Δ from Control
1 (Control)	1,985	1,395	70.28	--
2	1,958	1,414	72.22	1.94
3	1,967	1,387	70.51	0.23
4	1,965	1,422	72.37	2.09
5	1,955	1,420	72.63	2.35
Core	*16,230*	*11,928*	*73.49*	--

1/ The Response Rate denominator included completes, refusals, inaccessibles, estimated refusals, and estimated inaccessibles.

2/ Initially, all treatment groups contained 2,000 records, but field offices removed operations with whom they had previous data collection agreements (held in office), or otherwise did not want them to participate in the study. The Ns given here include only the count of operations that were provided with the incentives (except the Control, which only excludes the held in office). Counts are according to information obtained from NPC.

As shown in Table 2, although all treatment groups that received an incentive had slightly higher response rates than the control group (Treatment Group 1), none were significantly different. See Appendix B for details on the significance testing. Pairwise comparisons of the groups' response rates are shown in Appendix C.

3.2 ATM Card Usage by CRR Sample

In previous research using $20 ATM cards with the Core Version of the ARMS, NASS realized a significant cost savings in large non-respondents, cashed their ATM cards at a very low rate, both this year and in previous research.

This seemingly curious result may have occurred because the ATM cards were not described as resulting in cost savings for the CRR sample. For the Core form, respondents who received the ATM cards but did not respond may have felt they were not entitled to the money or perhaps that their cards would not be activated without the return of their form.

In addition, for the Core form sample, the part due to the low number of people who actually cashed their cards (Beckler, Ott and Horvath, 2005.) As shown in Table 3, less than 30 percent of ATM cards were cashed by the treatment groups receiving them in this face-to-face interview sample. This is similar to findings of other government agencies (Kay, Boggess, Selvavel and McMahon, 2001). However, unlike the Core form respondents, the proportion of CRR sampled operations who cashed the cards is similar for respondents and non-respondents. Core form sampled operations who receive ATM cards but were ultimately ATM card was delivered in the same package as the questionnaire they were to complete. For the CRR respondents, the incentives were delivered completely separate from the interviewer's request to provide the data (and as mentioned previously, the interviewers were instructed not to mention the incentive.) This may have impacted the response rates and card cashing rates for the current experiment.

Table 3: ATM Card Usage by Treatment Group [1/]

Treatment Group	Card Use by Respondents			Card Use by Nonrespondents			Card Use by All Card Recipients		
	Count	Cards Used For $ Withdrawal	Percent of Cards Cashed	Count	Cards Used For $ Withdrawal	Percent of Cards Cashed	Count	Cards Used For $ Withdrawal	Percent of Cards Cashed
2	1,414	369	26.10	544	165	30.33	1,958	534	27.27
5	1,420	371	26.13	535	131	24.49	1,955	502	25.68
Core	*11,928*	*3,561*	*29.85*	*4,303*	*215*	*5.00*	*16,231*	*3,776*	*23.26*
Total	14,762	4,301	29.14	5,382	511	9.49	20,144	4,812	23.89

1/ Counts include distinct operators who withdrew money using ATM cards (also includes those who made Point of Sale (POS) purchases). A small number of operators received multiple cards (because they requested a replacement claiming the first one did not work), and a small percent of those actually did cash both of their cards. Counts in this table count those who cashed more than one card only once; card expenses given in Table 4 include the expenses for all cards cashed.

3.3 Costs of Incentive Use

The use of ATM cards and also non-monetary incentives such as clocks or other tokens of appreciation add additional costs both in dollars and other resources. The cost of ATM cards include the $20 dollars provided to the respondent who uses the card plus an additional $4 to cover any fees that may be charged by the particular machine used. These fees include withdrawal and purchase fees, balance inquiry fees and failure fees. In addition, since the ATM cards could be used at point-of-sale (POS) debit card machines, users could withdraw money at a variety of locations (although recipients were not explicitly told this.) The fees actually incurred by ATM recipients are shown in Table 4. Also shown in Table 4 is the substantial cost of using ATM cards operationally in the large Core form sample.

Table 4: ATM Card Charges by Treatment Group [1/]

Treatment Group	ATM Withdrawal [2/]		ATM Withdrawal Fee [3/]		POS* Purchase [2/]		POS Purchase Fee [3/]		Balance Inquiry Fee		Transaction Failure Fee		Total Cost
	Count	Cost ($)	Count	Cost ($)	Count	Cost ($)	Count	Cost ($)	Count	Cost ($)	Count	Cost ($)	
2	532	11,504.31	537	539.00	8	105.48	8	2.80	17	7.65	51	15.20	$12,174.44
5	501	10,844.05	514	514.00	5	63.69	5	1.75	19	8.55	39	11.40	$11,443.44
Core	*3,772*	*80,994.27*	*3,760*	*3,760.00*	*34*	*514.24*	*34*	*11.90*	*105*	*47.25*	*238*	*70.45*	*$85,398.11*

* = Point of Sale (POS), i.e., the ATM card was used as a debit card.

1/ Counts reflect the numbers of each type of transaction that were made. The sum of "ATM Withdrawal" and "POS Purchase" is slightly higher than the counts given in Table 3 because Table 3 reflects counts of distinct operators (i.e., state/POIDs), whereas the counts in this table reflects those who used their cards for multiple withdrawal/purchase transactions and the very few operators who received and cashed multiple cards.

2/ Includes amount of withdrawal/purchase as well as any transaction fees imposed by the ATM owner/retailer.

3/ JPMorgan Chase transaction fee. JPMorgan Chase was the issuer of the ATM cards.

For incentives that are not monetary, the costs of incentives include the incentive itself, and the additional costs of packaging and mailing the incentives. Unlike ATM cards whose full value is only paid if the recipient takes action to cash the card, the entire cost of non-monetary incentives is spent whether the potential respondent uses the incentive or not.

The Farm Profiles were designed and generated by Statistics Division staff in the Economics Section. Operations who responded had profiles with their operation compared to similar operations; for those operations who did not respond, a generic profile was generated without individual operation data[2]. All profiles were created some time after the survey contacts (and were delivered to the Field Offices in September 2006). Once created and printed, the profiles were distributed to the respective field offices for final distribution to sampled operations. (Costs associated with this final step of field offices distributing the profiles to the operations were not tracked and are not included in this analysis.)

A token incentive, like a wall clock, is more likely to be noticed due to its large size. However, it costs much more to package and mail these types of incentives. The costs of each of the incentives used in this study are shown in Table 5.

[2] For sampled operations who reported incomplete data or refused to participate, the generic profiles included only information about farms of similar size and type (based on list frame control data for that operation). The cover letter for these profiles acknowledged their incomplete data or refusal.

Because the incentives cost more but did not significantly impact response rates, the control group who received nothing more than the pre-survey letter was the least expensive in both cost per sample and average cost per completed interview. This is in stark contrast to the results of using incentives with a mail-back form where substantial cost savings can be realized by reducing the number of personal interviews, even if overall response rates are not affected. It should also be noted that the total additional cost of incentives would be multiplied if it extended to the entire sample instead of a small treatment group.

Table 5: Overall Costs by Treatment Group

Treatment Group	N	Costs (In Dollars)								
		Postage 1/	NPC Printing 2/	NPC Extra Admin 3/	Incentive Cost 4/	ATM Card Admin 5/	Enumeration Costs 6/	Total	Average Per Sample	Average Per Complete
1 (Control)	1,985	598	88	–	0	0	254,080	254,766	128	183
2	1,958	597	176	861	12,174	0	250,624	264,432	135	187
3	1,967	600	89	–	10,984	0	251,776	263,449	134	190
4	1,965	10,198	88	5,895	18,505	0	251,520	286,206	146	201
5	1,955	596	176	860	22,359	0	250,240	274,231	140	193

1/ $0.305 each for first class; $5.19 each for FedEx (used for the clocks)

2/ Pre-survey letter at $0.045 each plus (if appropriate) debit card instruction sheet at 0.045 each.

3/ $0.44 each for hand stuffing the ATM cards; $3.00 each for packaging the clocks.

4/ Includes ATM card costs or the cost of the non-monetary incentives, [Clocks at $18,505 ($16,400 for the clocks, $80 set up fee, $2,025 shipping fee). Individual Financial Profiles at $21,900 (20,000 in estimated staff costs, $1,500 in mailing costs, and $400 in printing/paper costs)]. See Appendix D for more detailed description.

5/ JP Morgan did not charge NASS the standard $0.85 ATM Administrative Fee per card since the delivery of the ATM cards was delayed.

6/ 2005 Agricultural Resource Management Survey (ARMS) Phase 3 Survey Administration Analysis: US average per sample ($128) multiplied by the number in the treatment group.

3.4 Data Quality and Non-response Bias

As there were no significant differences in response rates across the treatment groups, no analysis of potential non-response bias or potential impact on data quality was done. Even though non-response rates are comparable across groups, it is possible that characteristics of non-respondents differ across groups. However, we did not examine this.

4. Conclusion

In the research on incentives with the 2004 Core form, there were significant increases in response for groups receiving the $20 ATM cards. In contrast, the current research did not find incentives to be effective in raising response rates. There are several possible reasons for this.

First, prior results were based on incentive use for a mail-out/mail-back form (with face-to-face follow up). The stated justification to respondents for providing incentives in a mail survey is to save the costs of personal enumeration. There may be a set of operations that may only be prompted to respond by mail, if provided with an incentive described this way. The justification to save costs cannot be provided to potential respondents in a face-to-face interview survey.

In addition, with a mail survey, the incentive can be delivered with the questionnaire itself, so the incentive and the survey request

are strongly linked. With a face-to-face interview survey, the incentive is delivered separately and not directly linked to the survey request (and indeed, our interviewers were explicitly told NOT to attempt to link the incentive to their survey contact). We have no way of knowing if making this connection more explicit (for example, by the interviewer asking about it when attempting to schedule an interview) might have increased response.

Incentives can be beneficial in both increasing response rates and decreasing costs, but this may be highly related to the way in which the incentives are used. Even those incentives that have been effective in the past should be evaluated periodically to make sure that they continue to be effective. While we assume that the use of ATM cards with the Core form sample was beneficial in 2005, as it had been in 2004, we have no way of knowing this. Including a small sample control group for comparison would provide this information. As other organizations employ incentives, their novelty may wear off and decrease their effectiveness. In addition, if inflation changes the value of $20, this may no longer be an effective amount to stimulate response. Finally, if more respondents cash their cards, the cost of providing incentives would increase.

5. Recommendations

Based on the results of the present study, the following recommendations are offered:

1. Incentives (both monetary and non-monetary), as tested in this experiment, should **not** be used for ARMS Phase 3 samples which use only face-to-face interviews. This is because they raise costs but do not significantly increase response rates.

2. A small subsample control group should be used to monitor the continued effectiveness of incentives with the mail-back Core version of ARMS 3.

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APPENDIX A: Treatment Group Survey Materials

Figure A1: Pre-Survey Letter for Treatment Group 1 (Control)

USDA

United States Department of Agriculture

National Agricultural Statistics Service

January 26, 2006

Dear <***name of operator***>:

Whenever fuel prices spike, dry weather or hurricanes damage crops, or producers encounter other agricultural adversities, facts and figures are needed to assist in turning these challenges into opportunities. The **Agricultural Resource Management Survey (ARMS)** is the only source for the data that answers questions about the financial stability of U.S. farmers and ranchers. Agriculture's supporters often reference the *Farm Production Expenditures* report – one of several valued reports referencing ARMS data.

Your input matters! Your operation is among a small, but representative sample, selected to participate in the upcoming ARMS survey. An interviewer representing USDA National Agricultural Statistics Service (NASS) will contact you in the near future to explain more about the survey, answer any questions, and set up a convenient time to complete your report.

This survey is important! Make participation in ARMS a priority, because it serves producers and the communities where they live in many ways:

- The 2007 Farm Bill will be drafted during the next year.
- Farm organizations and elected officials use the statistics to support farm policies including tax reform when shaping policies and programs that affect your bottom line.
- Land grant universities use the data in research aimed at increasing farm productivity and efficiency, preserving the rural environment, enhancing food safety, and supporting retirement and succession planning.
- Federal grants to your state and community are allocated based on farm-level statistics.

Your individual information is confidential and protected by law (U.S. Code, Title 7). Results will be published only in statistical totals so that no individual data can be discovered or calculated. Our reports are available online at **www.nass.usda.gov**.

Thank you in advance for making sure that decisions affecting U.S. agriculture are based on facts, not opinions.

Sincerely,

R. Ronald Bosecker

R. Ronald Bosecker
Administrator
USDA National Agricultural Statistics Service

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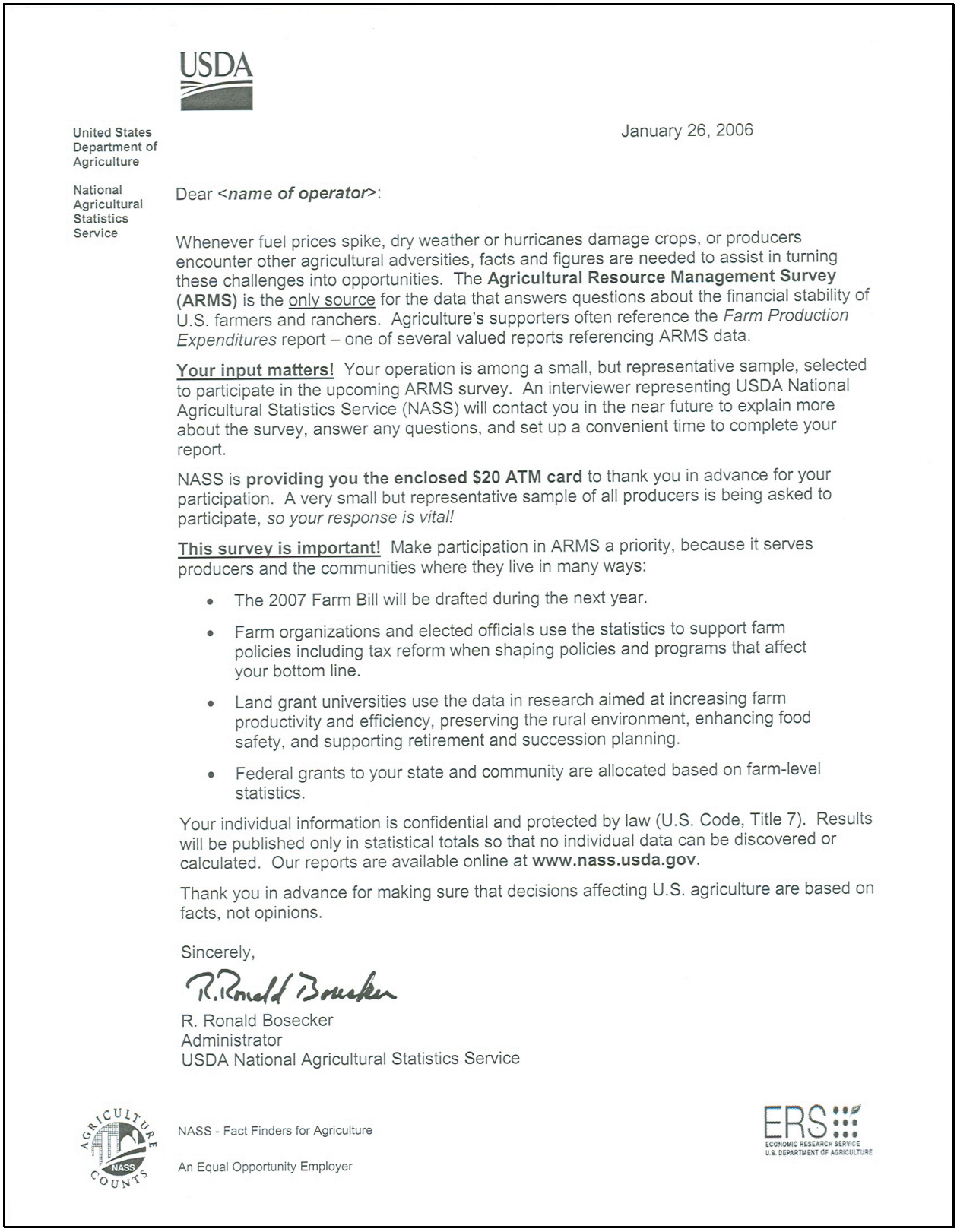
Figure A2: Pre-Survey Letter for Treatment Group 2 ($20 ATM card)



USDA

United States Department of Agriculture

National Agricultural Statistics Service

January 26, 2006

Dear <***name of operator***>:

Whenever fuel prices spike, dry weather or hurricanes damage crops, or producers encounter other agricultural adversities, facts and figures are needed to assist in turning these challenges into opportunities. The **Agricultural Resource Management Survey (ARMS)** is the only source for the data that answers questions about the financial stability of U.S. farmers and ranchers. Agriculture's supporters often reference the *Farm Production Expenditures* report – one of several valued reports referencing ARMS data.

Your input matters! Your operation is among a small, but representative sample, selected to participate in the upcoming ARMS survey. An interviewer representing USDA National Agricultural Statistics Service (NASS) will contact you in the near future to explain more about the survey, answer any questions, and set up a convenient time to complete your report.

NASS is **providing you the enclosed $20 ATM card** to thank you in advance for your participation. A very small but representative sample of all producers is being asked to participate, *so your response is vital!*

This survey is important! Make participation in ARMS a priority, because it serves producers and the communities where they live in many ways:

- The 2007 Farm Bill will be drafted during the next year.
- Farm organizations and elected officials use the statistics to support farm policies including tax reform when shaping policies and programs that affect your bottom line.
- Land grant universities use the data in research aimed at increasing farm productivity and efficiency, preserving the rural environment, enhancing food safety, and supporting retirement and succession planning.
- Federal grants to your state and community are allocated based on farm-level statistics.

Your individual information is confidential and protected by law (U.S. Code, Title 7). Results will be published only in statistical totals so that no individual data can be discovered or calculated. Our reports are available online at **www.nass.usda.gov**.

Thank you in advance for making sure that decisions affecting U.S. agriculture are based on facts, not opinions.

Sincerely,

R. Ronald Bosecker
Administrator
USDA National Agricultural Statistics Service

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Figure A3: Pre-Survey Letter for Treatment Group 3 (Financial Profile)

USDA

United States Department of Agriculture

National Agricultural Statistics Service

January 26, 2006

Dear <***name of operator***>:

Whenever fuel prices spike, dry weather or hurricanes damage crops, or producers encounter other agricultural adversities, facts and figures are needed to assist in turning these challenges into opportunities. The **Agricultural Resource Management Survey (ARMS)** is the only source for the data that answers questions about the financial stability of U.S. farmers and ranchers. Agriculture's supporters often reference the *Farm Production Expenditures* report – one of several valued reports referencing ARMS data.

Your input matters! Your operation is among a small, but representative sample, selected to participate in the upcoming ARMS survey. An interviewer representing USDA National Agricultural Statistics Service (NASS) will contact you in the near future to explain more about the survey, answer any questions, and set up a convenient time to complete your report.

NASS is asking a small but representative sample of all producers to participate, so *your response is vital!* Upon summarization of the survey, you will receive your own **Individual Farm Analysis** – a comparison of your financial data to nationwide averages. Your profile is our way of saying thank you and it can serve as a benchmark as you assess your future business plans.

This survey is important! Make participation in ARMS a priority, because it serves producers and the communities where they live in many ways:

- The 2007 Farm Bill will be drafted during the next year.
- Farm organizations and elected officials use the statistics to support farm policies including tax reform when shaping policies and programs that affect your bottom line.
- Land grant universities use the data in research aimed at increasing farm productivity and efficiency, preserving the rural environment, enhancing food safety, and supporting retirement and succession planning.
- Federal grants to your state and community are allocated based on farm-level statistics.

Your individual information is confidential and protected by law (U.S. Code, Title 7). Results will be published only in statistical totals so that no individual data can be discovered or calculated. Our reports are available online at **www.nass.usda.gov**.

Thank you in advance for making sure that decisions affecting U.S. agriculture are based on facts, not opinions.

Sincerely,

R. Ronald Bosecker

R. Ronald Bosecker
Administrator
USDA National Agricultural Statistics Service

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Figure A3: 4 page Farm Profile Example provided to Treatment Groups 3 and 5

NASS
FACT FINDERS FOR AGRICULTURE
UNITED STATES DEPARTMENT OF AGRICULTURE
Washington, D.C.

John Doe Farms
Financial Analysis

Dear John Doe,

1001 County Road A
Farmersville, IL 61999
ID: 17999999990

Thank you for participating in the 2005 Agricultural Resource Management Survey (ARMS). To express our appreciation for your help, USDA's National Agricultural Statistics Service (NASS) created this personalized financial analysis for John Doe Farms to:

1) show how your financial data compares with the average of similar operation, and
2) compare your operation and the average with farm industry guidelines of financial stability.

This analysis is provided to only those respondents who participate in the ARMS survey. Your data are strictly confidential. We are showing your individual data to you and only you. No other person, organization, or entity will ever be provided any data you report to NASS.

NASS has summarized the financial data you provided, along with all other responses, to produce State, Regional, and National expenditure estimates. USDA's Economic Research Service (ERS) has published detailed cost of production, chemical per acre costs, and other financial information in its ARMS Briefing Room. All NASS and ERS data can be found at the Internet Websites shown on the last page.

We hope you find this information beneficial to your operation. If you have questions about any data in this report, please call 1 (800) 999-9999.

Thank you again for your cooperation,

Susan E. Smith,
State Director

Example

Operation Size & Type

All responses in ARMS are categorized by economic size, type of production, and geographic region. Based on the data you provided, your operation falls into the following categories.

Economic Size: **$500,000 - $999,999 gross sales**
Production Type: **Cash Grain**
State or Geographic Region: **Midwest**

Comparisons and averages in this document refer to *"similar operations"* that match either your size or your type and are located in your area. All possible sizes, types, and geographic regions are shown on the last page.

Basic Characteristics

Item	Your Operation	Similar Size Operations	Similar Type Operations
Number of Operations	1	2,995	9,512
Acres Operated (average per farm)	2,075	1,775	742
Farm Net Worth (average per farm)	$1,646,000	$1,896,000	$905,000
Net Farm Income (average per farm)	$270,000	$195,000	$66,000

Expense Analysis

Your LOWEST expenses vs. Similar Type Operations	Your HIGHEST expenses vs. Similar Type Operations
Livestock & Poultry Related	Fertilizer, Lime & Soil Conditioners
Seeds & Plants	Interest
Feed	Farm Improvements & Construction

Farm Financial Industry Guidelines

The Farm Financial Standards Council established industry guidelines and standard calculations for 16 measures of farm financial stability. Farm Net Worth and Net Farm Income, shown above, are two of these measures. NASS calculated four additional ratio measures for your operation.

Agricultural universities have researched and determined the percentages that indicate more vulnerable vs. stronger financial stability for each ratio. The percentages are displayed between the red, yellow, and green boxes. In the following example, 65% separates a vulnerable vs. neutral situation and 35% separates a neutral vs. strong situation.

Industry Guidelines..... vulnerable 65% neutral 35% strong

The opposite page shows the four ratios and:

1) a description of each ratio's meaning,
2) the industry percentages indicating vulnerable, neutral, or strong financial stability,
3) your operation's ratio in the appropriate color-coded box,
4) the average ratio for similar operations in its color-coded box, and
5) the standard equation and variables used to calculate the ratios.

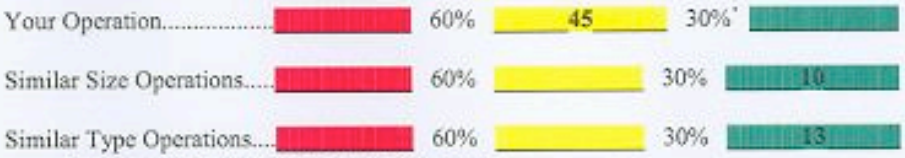
More information about the standard measures, guidelines, and ratios can be found on the Internet Websites shown on the back page.

Sample

Farm Financial Industry Guidelines (continued)

Farm Debt-To-Asset Ratio

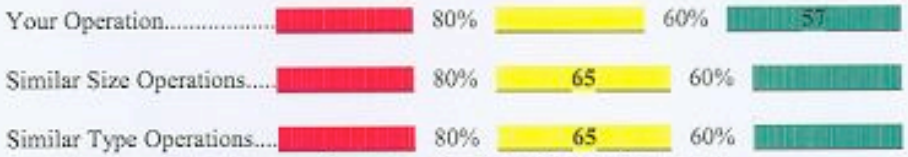
The debt-to-asset ratio represents the bank's share of the business. It compares total farm debt to total farm assets. A lower ratio is an indicator of lower financial risk and higher borrowing capacity. Subtracting the debt-to-asset ratio from 100% determines your share of the business.



Equation: Total farm liabilities / total farm assets

Operating-Expense Ratio

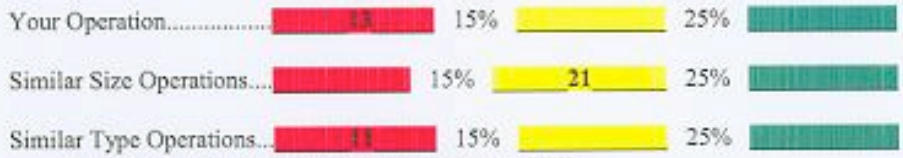
The operating-expense ratio shows the proportion of farm income that is used to pay operating expenses, not including principle or interest.



Equation: (Total farm operating expense - farm interest) / gross farm income

Operating Profit Margin

The operating profit margin shows the operating efficiency of the business. For instance, if expenses are low relative to the value of farm production, the business will have a healthy operating profit margin. A low profit margin can be caused by low product prices or high operating expenses.

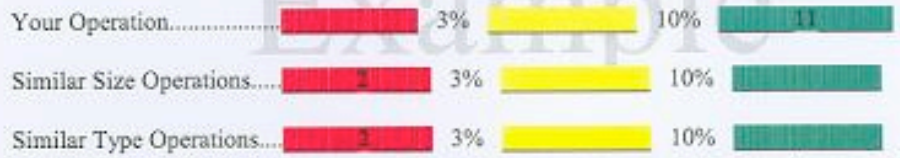


Equation: Return on farm assets / value of farm production

Rate of Return on Farm Equity

The rate of return on farm equity represents the interest rate being earned by your investment in the farm. This return can be compared with returns available if your equity were invested somewhere else, such as a certificate of deposit.

Example



Equation: (Net farm income - value of operator's labor and management) / average farm net worth

Economic Sizes

- 0-$99,999
- $100,000-$249,999
- $250,000-$499,999
- $500,000-$999,999
- $1 million or more

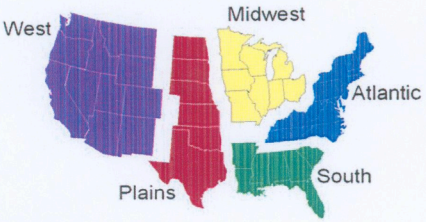
Size is based on the gross value of sales for all commodities.

Farm Production Types

- Cash Grains
- Wheat
- Corn
- Soybean
- Tobacco, Cotton, Peanuts
- Other Field Crops
- Fruit, Vegetable, Nursery
- General Livestock
- Cattle
- Hogs
- Poultry
- Dairy

Type is based on which commodity accounts for the majority of gross sales.

Geographic Regions



Farm Financial Industry Websites

- Farm Financial Standards Council
  - http://www.ffsc.org/
    - From the homepage, click on 'Guidelines'
- Center for Farm Financial Management
  - http://www.cffm.umn.edu/Pubs/vermont.pdf

NASS Website

- National Agricultural Statistics Service
  - http://www.usda.gov/nass
- From the homepage, click on:
  - Publications
  - Reports by Title
  - Farm Production Expenditures

ERS Website

- Economic Research Service
  - http://www.ers.usda.gov/
- From the homepage, click on:
  - Briefing Rooms
  - ARMS
  - Web-based Delivery Tool
  - Farm Structure & Finance
  - Tailored Reports

Thank You Again!

Example

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Figure A4: Pre-Survey Letter and Clock for Treatment Group 4 (NASS Logo Clock)

USDA

United States
Department of
Agriculture

National
Agricultural
Statistics
Service

January 26, 2006

Dear <***name of operator***>:

Whenever fuel prices spike, dry weather or hurricanes damage crops, or producers encounter other agricultural adversities, facts and figures are needed to assist in turning these challenges into opportunities. The **Agricultural Resource Management Survey (ARMS)** is the only source for the data that answers questions about the financial stability of U.S. farmers and ranchers. Agriculture's supporters often reference the *Farm Production Expenditures* report – one of several valued reports referencing ARMS data.

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Your individual information is confidential and protected by law (U.S. Code, Title 7). Results will be published only in statistical totals so that no individual data can be discovered or calculated. Our reports are available online at **www.nass.usda.gov**.

Enclosed is a token of appreciation to thank you for your participation. Your participation ensures that decisions affecting U.S. agriculture are based on facts, not opinions.

Sincerely,

R. Ronald Bosecker

R. Ronald Bosecker
Administrator
USDA National Agricultural Statistics Service

AGRICULTURE COUNTS NASS

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ERS
ECONOMIC RESEARCH SERVICE
U.S. DEPARTMENT OF AGRICULTURE

NASS Logo Clock

Figure A5: Pre-Survey Letter for Treatment Group 5 ($20 ATM card and Financial Profile)

USDA

United States Department of Agriculture

National Agricultural Statistics Service

January 26, 2006

Dear <***name of operator***>:

Whenever fuel prices spike, dry weather or hurricanes damage crops, or producers encounter other agricultural adversities, facts and figures are needed to assist in turning these challenges into opportunities. The **Agricultural Resource Management Survey (ARMS)** is the only source for the data that answers questions about the financial stability of U.S. farmers and ranchers. Agriculture's supporters often reference the *Farm Production Expenditures* report – one of several valued reports referencing ARMS data.

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NASS is **providing you the enclosed $20 ATM card** to thank you in advance for your participation. In addition, you will receive your own **Individual Farm Analysis** – a comparison of your financial data to nationwide averages. Your profile is another way of saying thank you and it can serve as a benchmark as you assess your future business plans.

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- Federal grants to your state and community are allocated based on farm-level statistics.

Your individual information is confidential and protected by law (U.S. Code, Title 7). Results will be published only in statistical totals so that no individual data can be discovered or calculated. Our reports are available online at **www.nass.usda.gov**.

Thank you in advance for making sure that decisions affecting U.S. agriculture are based on facts, not opinions.

Sincerely,

R. Ronald Bosecker

R. Ronald Bosecker
Administrator
USDA National Agricultural Statistics Service

AGRICULTURE COUNTS NASS

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Figure A6: Presentation and Instruction Sheet for ATM Cards

Thank you in advance for completing your Agricultural Resource Management Survey Questionnaire!

As a special thank you, here is your **$20** in the form of an ATM (automated teller machine) card.

- Insert this card into any ATM displaying the NYCE, PULSE, MAESTRO, or CIRRUS logo.
- When prompted for the personal identification number (PIN), enter the four digit number after the words "THANK YOU" on the card.
- Choose the "Withdrawal" option, when prompted for a transaction.
- Accept any transaction fees the ATM may charge since we have arranged to cover them.
- Choose the "Checking" option and enter $20. Money will be drawn out of the survey's account, not your personal account.
- The card must be used by May 31, 2006. Call toll free (888) 424-7828 for help.

AGRICULTURE COUNTS NASS NATIONAL AGRICULTURAL STATISTICS SERVICE

ERS ECONOMIC RESEARCH SERVICE

ARMS-AP (10/14/05)

APPENDIX B: Response Rate Significance Calculations

Multiple comparisons of the binomial parameters of interest (i.e., the proportion, π_i, of survey response in each treatment group) were tested using the *t*-test statistic, given below, for the overall mail and overall response rates. One-sided tests were used for those comparisons that involved Treatment Group 1 (i.e., the control group) since only positive treatment effects were of interest (and expected). Two-sided tests were used for all comparisons not involving Treatment Group 1. A Bonferroni adjustment was made to control the error rate for the family of ten significance tests conducted. Refer to Snedecor and Cochran (1989) for more details on this test.

<u>For one-sided tests comparing treatment groups with control:</u>

Consider → $H_0: \pi_t - \pi_1 > 0$ for treatment group $t = 2,3,4,5$

t-test statistic → $$z_W = \frac{\hat{\pi}_t - \hat{\pi}_1}{\sqrt{\left(\frac{\hat{\pi}_t\left(1-\hat{\pi}_t\right)}{n_t} + \frac{\hat{\pi}_1\left(1-\hat{\pi}_1\right)}{n_1}\right)}}$$

Significant at α=0.05 if → $z_W > z_{\frac{\alpha}{10}} = 2.58$

<u>For two-sided tests comparing treatment groups with each other (excluding control group):</u>

Consider → $H_0: \pi_t - \pi_i = 0$ for treatment group $t = 2,3,4,5$ and $i = 2,3,4,5$ where $t \neq i$

t-test statistic → $$z_W = \frac{\hat{\pi}_t - \hat{\pi}_i}{\sqrt{\left(\frac{\hat{\pi}_t\left(1-\hat{\pi}_t\right)}{n_t} + \frac{\hat{\pi}_i\left(1-\hat{\pi}_i\right)}{n_i}\right)}}$$

Significant at α=0.05 if → $|z_W| > z_{\frac{\alpha}{10}} = 2.81$

APPENDIX C. Pairwise comparisons of Treatment group response rates

Comparisons of Response Rates

Comparison	Response Rate Difference 1/	*t*-test Statistic 2/	*p*-value*
Treatment Group 2 versus Treatment Group 1	1.94	1.3457	0.0892
Treatment Group 3 versus Treatment Group 1	0.24	0.1628	0.4354
Treatment Group 4 versus Treatment Group 1	2.09	1.4522	0.0733
Treatment Group 5 versus Treatment Group 1	2.36	1.6388	0.0507
Treatment Group 3 versus Treatment Group 2	-1.70	-1.1804	0.2380
Treatment Group 4 versus Treatment Group 2	0.15	0.1049	0.9165
Treatment Group 5 versus Treatment Group 2	0.42	0.2924	0.7700
Treatment Group 4 versus Treatment Group 3	1.85	1.2864	0.1984
Treatment Group 5 versus Treatment Group 3	2.12	1.4727	0.1409
Treatment Group 5 versus Treatment Group 4	0.27	0.1878	0.8510

1/ In percentage points.
2/ Comparisons involving Treatment Group 1 (the control) are based on a one-sided *t*-test; comparisons not involving Treatment Group 1 (the control) are based on a two-sided *t*-test. One-sided tests were used with comparisons involving the control group because it was assumed that any effect the incentive had would be positive.
Note: originally applied a Bonnferroni adjustment to account for the 10 comparisons that were performed. However, this resulted in several *p*-values exceeding one, which is not possible, so the Bonnferroni adjustment was removed and the "raw" *p*-values are reported.
*None of the comparisons is statistically significant at the $\alpha = 0.05$ level.

APPENDIX D: Cost Calculations

NPC Extra Admin

This amount is the National Processing Center's (NPC) best estimate for the labor cost associated with administering the incentive program for all treatment groups. This included $.44 each for handstuffing the ATM cards and $3 each for packaging the clocks.

Incentive Costs

Incentive costs include all charges associated with ATM card usage among the recipients and the costs of non-monetary incentives. ATM charges include: ATM withdrawals, ATM withdrawal fees, POS purchases, POS purchase fees, ATM balance inquiry, ATM failure fees, POS purchase failure fees. Refer to Table 5 for details on each of these individual charges. Costs for the clocks included $16,400 for the clocks (2050 were ordered to include any necessary replacements), $80 in set up fees, and $2,025 in shipping fees. Costs of the Farm Profiles included $20,000 in staff time (10 weeks @ $2,000 per week), $1500 in mailing costs and $400 in printing costs. The total cost of $21,900 was divided by the total number of Farm Profiles produced (3922) to get a rate of $5.58 per Farm Profile. This was then multiplied by the number of records in the treatment group.

ATM Card Admin

ATM Card Admin would normally include the amount JPMorgan Chase charged for the physical cards. In the 2004 study, this was computed as follows:

$$\text{ATM Card Admin} = \$0.85\ n_i \quad \text{for } i=2,4,5$$

where:

n_i = the sample size of incentive i

NASS was charged a "per card" cost of $0.85 (appearing in the above equation).

However, due to a mistake by JP Morgan Chase the fee was waived for this year.

Enumeration Costs

Enumeration Costs include enumeration costs for face-to-face interviews. Since all states participated in this study, the US average costs as shown in the *Survey Administration Analysis* were used to compute enumeration costs. The US average was $128 per sample. This number was multiplied by the number of records in the treatment group.

Total

Total = Postage + NPC Printing + NPC Extra Admin + Incentive Costs + ATM Card Admin + Enumeration Costs

Averages

Average per Sample = Total / n_i

Average per Complete = Total / r_i

where:

r_i = total survey responses in treatment group *i* (Item Code 910 in (1,3,5) where 1=mail complete, 3=non-mail complete, 5=out of scope)

n_i = total survey samples