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Subject: Analysis of the 2008 Tenure Question

Attached is the final report for the Analysis of the 2008 Tenure Question. This report summarizes the results from evaluating the new tenure question.

If you have any questions about this report, please contact Megha Joshipura (x31643).

Attachment: (Analysis of the 2008 Tenure Question)

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# **Analysis of the 2008 Tenure Question in the American Community Survey**

EVALUATION REPORT

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## 1.0 Background

In 2008, the American Community Survey (ACS) questionnaire included a new version of the tenure question to be consistent with the 2010 Census. The new version of the question removes the term “cash” from the two renter response options and adds an instruction to include home equity loans to the first owner option (owned with a mortgage or loan). It also adds the instruction to mark only one answer to the question.

### Old Question

**17** Is this house, apartment, or mobile home -

- Owned by you or someone in this household with a mortgage or loan?
- Owned by you or someone in this household free and clear (without a mortgage or loan)?
- Rented for cash rent?
- Occupied without payment of cash rent? → SKIP to **C**

### New Question

**17** Is this house, apartment, or mobile home -  
*Mark (X) ONE box.*

- Owned by you or someone in this household with a mortgage or loan? *Include home equity loans.*
- Owned by you or someone in this household free and clear (without a mortgage or loan)?
- Rented?
- Occupied without payment of rent? → SKIP to **C**

The changes in the new tenure question that are being implemented in 2008 were originally tested in the 2005 National Census Test (Rothhaas et al., 2006). Before this test was conducted, research had shown that respondents were confused by the term “cash rent.” The confusion stemmed from the fact that most people pay rent by check rather than cash. The Census Test found that dropping “cash” from the renter response options had a positive effect on response by decreasing item nonresponse.

Housing data analysts have suggested potential misinterpretation in the two owner options because certain respondents may not understand that a home is considered “mortgaged” if a home equity loan is present. The Census 2000 Content Reinterview Survey showed relatively low reliability for the two owner response options (Singer and Ennis, 2003). When the instruction to include home equity loans was tested during the Census Test, fewer households marked the response option, “owned free and clear.” This implies that the added instruction does indeed clarify the options. However, there was no significant increase in the number of households that marked the option “owned with a mortgage or loan.”

The 2007 ACS Content Test tested two versions of a new question on field of Bachelor’s degree and measured the effects of the new version of the tenure question. This evaluation assesses the effect of the new tenure question in the ACS based on the following factors:

- (1) the relative distribution of responses,
- (2) the occurrences of multiple answers,
- (3) the item nonresponse rates, and
- (4) the consistency of answers.

## 2.0 Research Questions

This evaluation used the data received from the 2007 ACS Content Test and the methodology described in Section 3.0 to address the following questions:

- Is the distribution of responses to the new question relatively comparable to the old question?
- Does the new question reduce the occurrence of multiple answers to the question?
- Does the new question reduce the item nonresponse rate?
- Is there a difference in responses when the same household is asked different versions of the question?
- Does the new question solicit more responses that are consistent with the other tenure-related questions (i.e., home equity loan, second mortgage, etc) on the questionnaire?
- Does the new question solicit consistent responses?

## 3.0 Methodology

The primary purpose of the 2007 ACS Content Test was to test two versions of a new question on field of Bachelor's degree. We also decided to look at the effects of the new version of the tenure question during this test because the evaluation would not affect the results of the field of degree analysis since they are in different parts of the questionnaire. The tenure question was administered in all three ACS response modes: mail, Computer-Assisted Telephone Interview (CATI), and Computer-Assisted Personal Interview (CAPI).

The sample for this test was chosen in nearby neighbor pairs. One member of each pair was assigned the old tenure question, while the other was assigned the new question. The Content Follow-up (CFU), a telephone reinterview of all responding occupied households, asked the new version of the tenure question of all households. Because the ACS had already committed to using the new version of the tenure question to be consistent with the 2010 Census (based on the 2005 Census Test results), the CFU checked its consistency and showed how the responses to the former tenure question map to responses to the new question. It should be noted that the CFU included the same additional questions about tenure that are included in the questionnaire (i.e., home equity loan, second mortgage, etc). However, unlike the original interview, the respondents were asked these questions directly after the tenure question in the CFU as probes to determine accuracy of tenure reporting.

Table 1. Experimental Design

|                    | <b>Panel 1</b>      | <b>Panel 2</b>      |
|--------------------|---------------------|---------------------|
| <b>Sample Size</b> | 15,000              | 15,000              |
| <b>Mail</b>        | Old tenure question | New tenure question |
| <b>CATI/CAPI</b>   | Old tenure question | New tenure question |
| <b>CFU</b>         | New tenure question | New tenure question |

#### 4.0 Limitations

The Content Test maintained the basic design of the ACS. However, there were some limitations to our study. The respondent data were not edited and were not imputed for missing responses. Also, the CFU was done entirely by telephone. If the original data were collected by mail or CAPI, there was a difference in data collection mode that could account for some of the response variance.

Because the CFU was conducted by telephone, households were excluded if a phone number was not provided in the original interview and could not be obtained from a vendor look-up. For about 14 percent of the CFU cases, we did not have the same respondent in the CFU that we had in the original interview. This means that differences between the original interview and the CFU for these cases could be due in part to having different people answer the questions. For more information on the test design, please see “Testing a New Field of Degree Question for the American Community Survey” (Raglin et al., 2008).

#### 5.0 Results

The six research questions listed in section 2.0 were used to measure the effects of the new tenure question on the ACS. In this section, we will discuss the major findings from the analysis of those questions. All statistical testing in this section was done using an alpha = .10. When breaking the data down by mode of response, CATI and CAPI have been grouped together because of the small percentage of CATI respondents. Most of the analysis is done on the four categories of the tenure question:

- owned with a mortgage or home equity loan,
- owned free and clear,
- rented, or
- occupied without payment of rent.

However, in some instances, the analysis is also done on the two larger categories of owner and renter since this is how the data are published. It should be noted that the owner category is the sum of “owned with a mortgage or home equity loan” and “owned free and clear”, while the renter category is the sum of “rented” and “occupied without payment of rent.”

5.1 Is the distribution of responses to the new question relatively comparable to the old question?

There are some significant differences in the distribution of responses to the new question when compared to the old question, as shown in Table 2 below. Table 2 shows the percent distributions, by question version, of the overall responses, responses by mode, and responses grouped into owner and renter. It also shows the difference between the two question versions.

Table 2. Percent Distributions of Tenure Categories

| <b>Mode</b>                               | <b>Old Question (%)</b> | <b>New Question (%)</b> | <b>Difference (%)</b> | <b>Margin of Error (%)</b> |
|-------------------------------------------|-------------------------|-------------------------|-----------------------|----------------------------|
| <i>All</i>                                |                         |                         |                       |                            |
| Owner                                     | 68.9                    | 67.3                    | 1.6*                  | 1.3                        |
| Renter                                    | 31.1                    | 32.7                    | -1.6*                 | 1.3                        |
| Owned with a mortgage or home equity loan | 48.3                    | 47.2                    | 1.1                   | 1.4                        |
| Owned free and clear                      | 20.7                    | 20.1                    | 0.5                   | 1.1                        |
| Rented                                    | 29.3                    | 30.7                    | -1.5*                 | 1.2                        |
| Occupied without payment of rent          | 1.8                     | 1.9                     | -0.1                  | 0.4                        |
| <i>Mail</i>                               |                         |                         |                       |                            |
| Owner                                     | 79.6                    | 78.1                    | 1.5*                  | 1.1                        |
| Renter                                    | 20.4                    | 21.9                    | -1.5*                 | 1.1                        |
| Owned with a mortgage or home equity loan | 54.8                    | 53.6                    | 1.2                   | 1.4                        |
| Owned free and clear                      | 24.8                    | 24.5                    | 0.3                   | 1.3                        |
| Rented                                    | 18.8                    | 20.7                    | -1.9*                 | 1.1                        |
| Occupied without payment of rent          | 1.6                     | 1.2                     | 0.4*                  | 0.4                        |
| <i>CATI/CAPI</i>                          |                         |                         |                       |                            |
| Owner                                     | 56.3                    | 54.4                    | 1.9                   | 2.8                        |
| Renter                                    | 43.7                    | 45.7                    | -1.9                  | 2.8                        |
| Owned with a mortgage or home equity loan | 40.5                    | 39.5                    | 1.0                   | 2.7                        |
| Owned free and clear                      | 15.8                    | 14.8                    | 0.9                   | 2.0                        |
| Rented                                    | 41.7                    | 42.8                    | -1.1                  | 2.6                        |
| Occupied without payment of rent          | 2.0                     | 2.8                     | -0.8*                 | 0.8                        |

\*Significant at the alpha = .10 level.



In general, the new question resulted in less households in the owner categories and more households in the renter categories when compared to the old question. There were no significant differences in the two owner categories or the “occupied without payment of rent” category. However, the statistical difference in the “rented” category of 1.5 is significant. The 2005 National Census Test only saw a significant decrease in the “owned free and clear” category from the old question to the new. The other three categories did not have a significant change. This could be due to the removal of the term “cash” from the “rented” category. The confusion caused by this term is evident in section 5.3, when we discuss the item non-response rate.

When we look at these categories for mail households, there was a significant difference in the responses to the two questions for the overall owner and renter categories along with the individual rented categories. However, the distribution is not significantly different for the two owner categories separately. The two renter categories do have a significant difference between the two question versions, with more households marking “rented” when the term “cash” is removed, once again showing the confusion the term “cash” brings in.

In the CATI/CAPI mode, the distribution of households who marked “occupied without payment of rent” category for the old version of the question is significantly different from those who marked it on the new version of the question. However, that is the only significant difference in that mode.

Most of the significant differences tend to be in the renter categories, implying that dropping of the word “cash” affects people’s responses. The differences in the data are something that should be noted, as it could cause a break in the tenure series of questions in the ACS. This means that in 2008, the changes in distributions could be a reflection of the question as well as a reflection of a housing market change.

### *5.2 Does the new question reduce the occurrence of multiple answers to the question?*

We could only answer this question using responses received in the mail mode. However, with only one household marking more than one answer for the old question and none doing so for the new question, there is not enough data to test this question in a statistically significant way. That being said, it should be noted that the small instances of multiple answers suggest that this is basically a non-issue for this question, in either version.

### *5.3 Does the new question reduce the item nonresponse rate?*

Yes, the new question does reduce the item nonresponse rate. We came to this conclusion by comparing the percent of households that did not respond to the old question to the percent of households who did not respond to the new question (see Table 3). The item nonresponse rate for the new question is lower than that for the old question when looking at responses overall and the mail mode. There is no significant difference when looking at CATI/CAPI. The lower item nonresponse rate for the new tenure

question was seen before, in the 2005 National Census Test (Rothaas et al., 2005). The lower rate can likely be attributed to replacing “rented with cash rent” with simply “rented.” The term “cash rent” seemed to be confusing to respondents and would therefore cause some respondents to not answer the question because they are unsure of what the correct answer should be. This could account for the lower item nonresponse rate in the new question as well as the higher number of renters that we saw in section 5.1.

Table 3. Item Nonresponse Rate

| <b>Mode</b> | <b>Item NR rate<br/>(Old Question)</b> | <b>Item NR rate<br/>(New Question)</b> | <b>Difference</b> | <b>Margin of<br/>Error</b> |
|-------------|----------------------------------------|----------------------------------------|-------------------|----------------------------|
| All         | 2.6                                    | 2.1                                    | 0.5*              | 0.3                        |
| Mail        | 3.9                                    | 3.1                                    | 0.8*              | 0.5                        |
| CATI/CAPI   | 1.0                                    | 0.7                                    | 0.3               | 0.5                        |

\*Significant at the alpha = .10 level.

#### 5.4 Is there a difference in responses when the same household is asked different versions of the question?

Yes, there are some differences in responses when the same respondent is asked different versions of the question. We answered this question by computing the net difference rates (NDR) for each tenure category for households that were originally asked the old version of the question. The NDR shows the net change between the response in the original interview and the response in the CFU. We looked at the NDRs for the four categories and grouped into owner and renter for the overall responses and by mode, as displayed in Table 4.

Table 4. Net Difference Rates between the Old Question Version and the New Question Version from the CFU (Margin of Errors are displayed in parentheses)

| <b>Category</b>                  | <b>Overall</b> | <b>Mail</b>    | <b>CATI/CAPI</b> |
|----------------------------------|----------------|----------------|------------------|
| Owner                            | 0.0<br>(0.3)   | -0.3*<br>(0.3) | 0.3<br>(0.5)     |
| Renter                           | 0.0<br>(0.3)   | 0.3*<br>(0.3)  | -0.3<br>(0.5)    |
| Owned with a mortgage or loan    | -0.8*<br>(0.4) | -1.5*<br>(0.5) | 0.1<br>(0.8)     |
| Owned free and clear             | 0.7*<br>(0.4)  | 1.2*<br>(0.5)  | 0.2<br>(0.7)     |
| Rented                           | 0.1<br>(0.3)   | 0.5*<br>(0.2)  | -0.4<br>(0.6)    |
| Occupied without payment of rent | -0.1<br>(0.3)  | -0.2<br>(0.2)  | 0.1<br>(0.5)     |

\*Significant at the alpha = .10 level.

When the data are grouped into owner and renter, we are not getting a difference in responses. However, the two owner categories both had NDRs that showed a difference

between the two versions of the question, while the two renter categories had NDRs that did not. These results imply that most of the movement seen between the two question versions happens between the two owner categories.

However, breaking the data down by mode helps to further examine the discrepancy between the two versions. While there are no significant differences in response in the CATI/CAPI mode, there are significant differences in response in the mail mode for the two owner categories, and the “rented” category. There remains a difference after the four categories are grouped into owner and renter overall. Therefore, there is a difference in responses when the same household is asked different versions of the question. The larger difference is between the two owner categories. The difference found in the mail mode is not contained between the two larger categories of owner and renter, implying that there is some movement between owner and renter as well. Once again, this difference could be due to the removal of “cash” from the “rented” response option. However, it could also partially be due to the change in mode of response as well.

*5.5 Does the new question solicit more responses that are consistent with the other tenure-related questions (i.e., home equity loan, second mortgage, etc) on the questionnaire?*

Yes, the new question does solicit more responses that are consistent with the other tenure-related questions on the questionnaire. To determine whether or not we had an inconsistent response, we looked to see if a respondent had marked something other than the “owned with a mortgage or loan” option AND marked that they had either a home equity loan or a second mortgage in the original interview. The percent inconsistent for each question version, along with the difference, is shown below in Table 5.

Table 5. Percent Inconsistent within Questionnaire

| <b>Mode</b> | <b>Inconsistency Rate (Old Question)</b> | <b>Inconsistency Rate (New Question)</b> | <b>Difference</b> | <b>Margin of Error</b> |
|-------------|------------------------------------------|------------------------------------------|-------------------|------------------------|
| All         | 1.2                                      | 0.7                                      | 0.5*              | 0.3                    |
| Mail        | 1.6                                      | 0.6                                      | 1.0*              | 0.3                    |
| CATI/CAPI   | 0.7                                      | 0.6                                      | -0.1              | 0.4                    |

\*Significant at the alpha = .10 level.

Looking at all of the modes together, we see that the difference in the percent inconsistent between the two question versions is significant. Breaking this further down by mode, we can see that the difference in the mail mode is the driving factor behind the overall difference. This is most likely because the CATI and CAPI modes allow the respondent to ask the interviewer for clarification.

### 5.6 Does the new question solicit consistent responses?

Yes, the new question does solicit mostly consistent responses between the original interview and the CFU. To answer this question, we only analyzed cases that received the new question both times, that is, the new question in the original interview and the CFU. We computed the NDR and the gross difference rate (GDR) for those households that received the new question during both the original interview and the CFU. The NDR, as mentioned above, shows the net change and the direction of that change. This is shown in Table 6 below. The GDR is the percent of inconsistent responses between the original interview and the CFU, and is shown in Table 7 below. We also looked at the L-fold index of inconsistency and compared to that of the Continuous Reinterview Survey of 2000. The L-fold index of inconsistency is an average index of inconsistency across all categories for the question. It is a relative measure of the response variance.

Table 6. Net Difference Rate between the New Question Version and the CFU (Margin of Error in parentheses)

| <b>Category</b>                  | <b>Overall</b> | <b>Mail</b>    | <b>CATI/CAPI</b> |
|----------------------------------|----------------|----------------|------------------|
| Owner                            | 0.3<br>(0.5)   | 0.1<br>(0.3)   | 0.4<br>(0.9)     |
| Renter                           | -0.3<br>(0.5)  | -0.1<br>(0.3)  | -0.4<br>(0.9)    |
| Owned with a mortgage or loan    | -0.8*<br>(0.5) | -1.9*<br>(0.4) | 0.5<br>(1.0)     |
| Owned free and clear             | 1.1*<br>(0.5)  | 2.1*<br>(0.5)  | -0.2<br>(0.9)    |
| Rented                           | 0.1<br>(0.4)   | -0.0<br>(0.2)  | 0.2<br>(0.8)     |
| Occupied without payment of rent | -0.3<br>(0.4)  | -0.1<br>(0.3)  | -0.5<br>(0.7)    |

The new question proved consistent when looking at the NDR for the collapsed categories of owner and renter. However, when looking at the NDR for the two owner categories in all modes, the NDR shows an inconsistency. Looking at this by mode, we can pinpoint the inconsistency to the mail mode. This could be attributed to the difference in modes. We should note that the inconsistency between the mail mode and the CFU seems to fall between the two owner categories. This could be attributed to the interviewers helping the respondents decide between the two categories.

Table 7. Gross Difference Rate between the New Question Version and the CFU  
(Margin of Error in parentheses)

| Category                         | Overall       | Mail          | CATI/CAPI     |
|----------------------------------|---------------|---------------|---------------|
| Owner                            | 2.6*<br>(0.4) | 1.4*<br>(0.3) | 4.1*<br>(0.8) |
| Renter                           | 2.6*<br>(0.4) | 1.4*<br>(0.3) | 4.1*<br>(0.8) |
| Owned with a mortgage or loan    | 4.2*<br>(0.5) | 3.6*<br>(0.4) | 4.8*<br>(0.9) |
| Owned free and clear             | 4.3*<br>(0.5) | 4.4*<br>(0.5) | 4.3*<br>(0.8) |
| Rented                           | 1.8*<br>(0.3) | 0.9*<br>(0.3) | 3.0*<br>(0.7) |
| Occupied without payment of rent | 1.7*<br>(0.4) | 1.0*<br>(0.2) | 2.5*<br>(0.7) |

The gross difference rates show that there is some inconsistency in this new question. Once again, though, it seems that the owner categories have a nominally higher level inconsistency than the renter categories.

The L-fold level of inconsistency for all modes here is 9.3. An L-fold level that is less than 20 is considered to have low inconsistency. The L-fold level of inconsistency for the tenure question in the Continuous Reinterview Survey of 2000 was 19.4. While we cannot do any statistical testing to compare the L-fold level of inconsistency with that of the Continuous Reinterview Survey of 2000, we can say that this question has a nominally lower level of inconsistency, although both are in the “low” range.

## 6.0 Conclusion

In conclusion, the new version of the tenure question that is being used in the 2008 American Community Survey questionnaire does not appear to have a negative impact on response. In fact, it has been shown to improve item nonresponse rates and the percent inconsistent with the other tenure-related questions on the questionnaire. The distribution of the data is slightly different from the old version. However, that could be due to many reasons, one of which could be that the new question provides a clearer understanding of some of the categories, especially the renter categories. The level of inconsistency for the new question is relatively low, as seen in the L-fold calculation and the NDR. While there were some instances of small inconsistencies, the insignificant NDRs for the two larger categories of owner and renter should be noted because tenure data is most often collapsed into owner and renter.

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