Analysis of the Representativeness of the TV Viewer Monitoring System's Data in a Major United States Designated Marketing Area (DMA)

By

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Introduction

Harold S Haller & Company was hired to study the frequency distributions of households ("HH") in zip codes and African American ("AA") communities from which data were obtained using a viewer monitoring system ("VMS") and 2010 census data in the DMA. Data were to be provided by a major TV network for analysis based pm a VMS from an audit firm.

Data Available for Analysis

Approximately weekly reports from the TV network for 10/11/11 to 7/9/12 submitted from VMSs that indicate

- Total # VMS HH
- # AA VMS HH
- # Forced Turnovers (FTO)
- # Scheduled Installations

Dated reports from the TV network that list the number total number of VMSs and the number of VMSs in each zip code in the DMA for 1/24 to 1/30/2010, 2/3/11 to 3/2/11, 3/3/12 to 3/6/12 plus the 2010 census data for each zip code in the DMA.

Summary

Because the correlation is best between the number of VMSs in each zip code and the number of HH in each zip code for the DMA and because the number of AA HH in each zip code is available for analysis from the 2010 census, analysis of the representativeness of the VMS placement is based on the number of HH in each zip code. The VMS AA "TV families" are not representative of the expected rate of VMS placements, namely 4 VMSs per 10,000 HH in each zip code in the DMA.

The VMS reports indicate that the auditor firm is varying the strategy for the total number of VMSs and number of AA VMSs placed based on information not available for our analysis. Shifts such as these could have an effect on the accuracy of the ratings provided to advertisers using TV Network in the DMA.

There are significant correlations between the total number of HH with VMSs and the total number of HH ($R^2 = 0.75$), total number of HH with male and no wife ($R^2 = 0.59$), and total number of HH with female and no husband ($R^2 = 0.26$) in each zip code in the DMA. There is no correlation between the total number of HH with VMSs and the median HH income in each zip code in the DMA

Findings

Conclusion 1

The total number of HH with VMSs and the number of AA HH with VMSs is not a stable process based on a shift-away analysis as shown in Figures 1 and 2. This suggests that auditor is varying the strategy for choosing the number of VMS's or is finding it difficult to sign up HH that will follow the VMS protocol. These shifts could have an effect on the accuracy of the ratings provided to advertisers using the TV network.
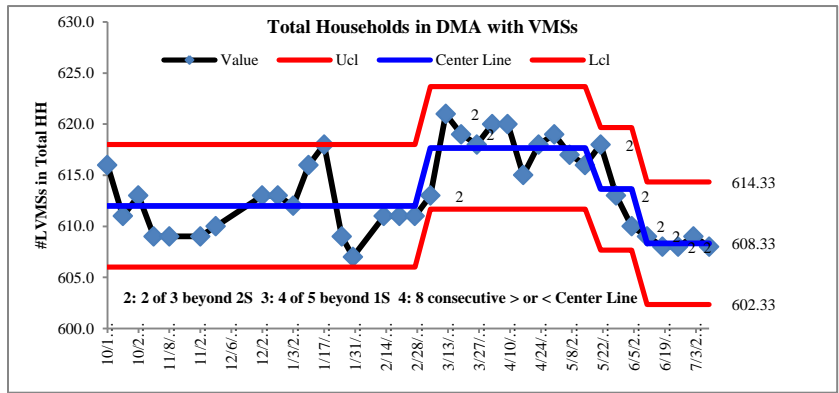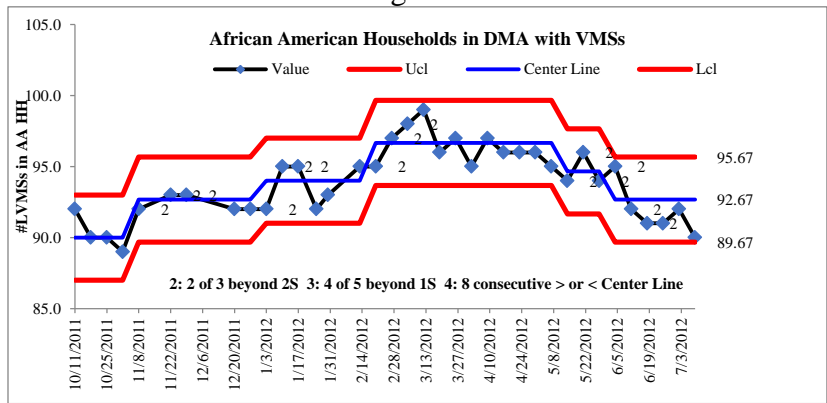
Figure 1

Figure 2

Conclusion 2

The number of Forced Turnovers ("FTO") for VMSs in total HH and non-AA HH are stable but the number of FTO for VMSs in AA HH are unstable, which reflects problems with AA participants adhering to the VMS protocol that necessitates removal of the VMSs from AA HH where they are installed. Figures 3, 4, and 5 reveal this using a shift-away analysis.
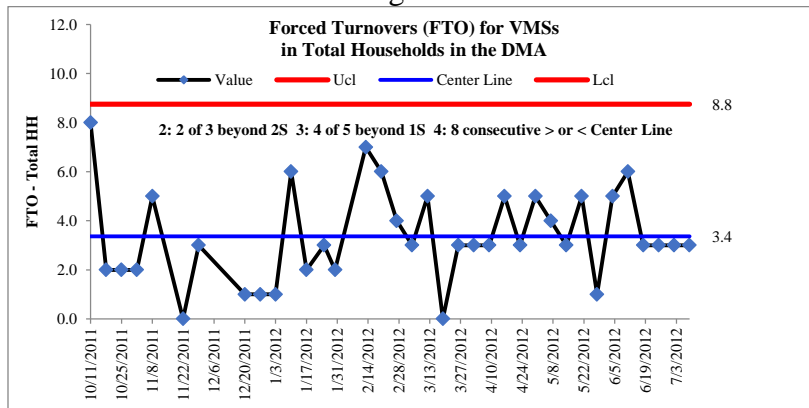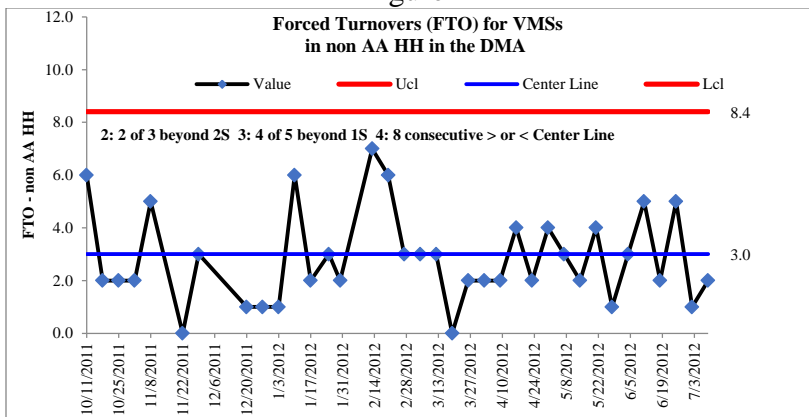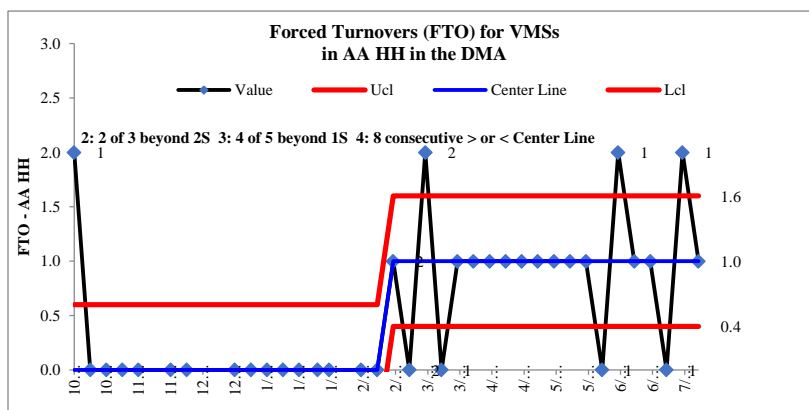
Figure 3

Forced Turnovers (FTO) for VMSs in Total Households in the DMA

Legend: Value — Ucl — Center Line — Lcl

2: 2 of 3 beyond 2S   3: 4 of 5 beyond 1S   4: 8 consecutive > or < Center Line

Y-axis: FTO - Total HH (0.0 to 12.0)

Reference lines: 8.8 (Ucl), 3.4 (Center Line)

X-axis dates: 10/11/2011, 10/25/2011, 11/8/2011, 11/22/2011, 12/6/2011, 12/20/2011, 1/3/2012, 1/17/2012, 1/31/2012, 2/14/2012, 2/28/2012, 3/13/2012, 3/27/2012, 4/10/2012, 4/24/2012, 5/8/2012, 5/22/2012, 6/5/2012, 6/19/2012, 7/3/2012

Figure 4

Forced Turnovers (FTO) for VMSs in non AA HH in the DMA

Legend: Value — Ucl — Center Line — Lcl

2: 2 of 3 beyond 2S   3: 4 of 5 beyond 1S   4: 8 consecutive > or < Center Line

Y-axis: FTO - non AA HH (0.0 to 12.0)

Reference lines: 8.4 (Ucl), 3.0 (Center Line)

X-axis dates: 10/11/2011, 10/25/2011, 11/8/2011, 11/22/2011, 12/6/2011, 12/20/2011, 1/3/2012, 1/17/2012, 1/31/2012, 2/14/2012, 2/28/2012, 3/13/2012, 3/27/2012, 4/10/2012, 4/24/2012, 5/8/2012, 5/22/2012, 6/5/2012, 6/19/2012, 7/3/2012

Figure 5

Forced Turnovers (FTO) for VMSs in AA HH in the DMA

Legend: Value — Ucl — Center Line — Lcl

2: 2 of 3 beyond 2S   3: 4 of 5 beyond 1S   4: 8 consecutive > or < Center Line

Y-axis: FTO - AA HH (0.0 to 3.0)

Reference lines: 1.6 (Ucl), 1.0 (Center Line), 0.4 (Lcl)

Conclusion 3

Scheduled installations of VMSs shown in Figures 6, 7, and 8 are stable for the total HH, non-AA HH, and AA HH.

3

Figure 6

Scheduled Installs of VMSs in the Total HH in the DMA

Figure 7

Scheduled Installs of VMSs in non AA HH in the DMA

Figure 8

Scheduled Installs of VMSs in AA HH in the DMA
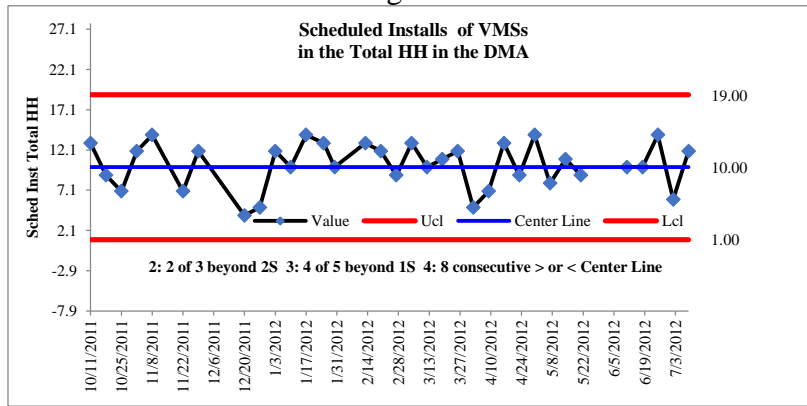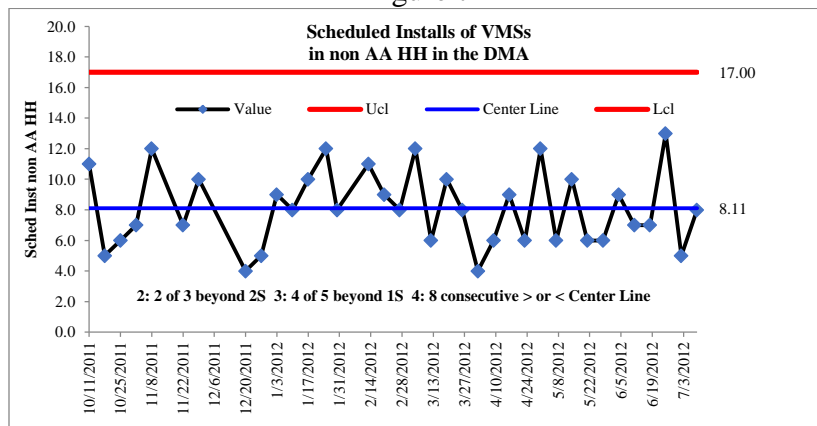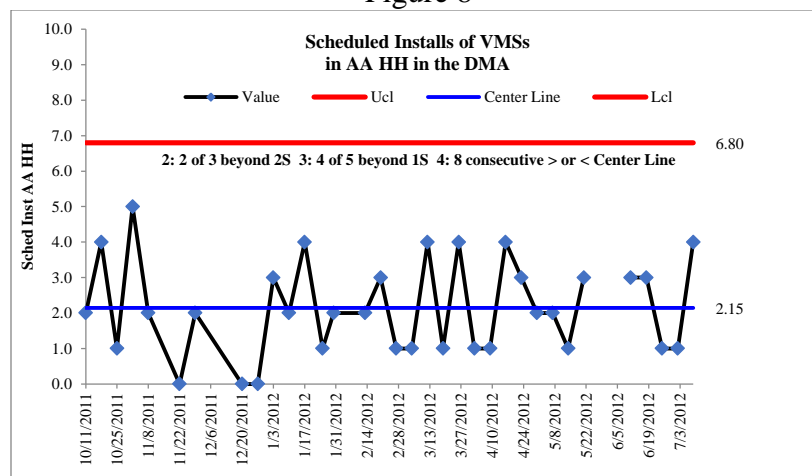
Conclusion 4

The longitudinal analysis of Calibration reports shown in Figures 9, 10, and 11 indicates that the correlation between the number of VMS HH and the number of HH in each zip code based on the 2010 census is positive ($R^2 \approx 0.75$). There are approximately 4 VMS HH per 10,000

HH in the DMA based on the Calibration reports and the 2010 census. This correlation has been stable for the years 2010, 2011, and 2012.
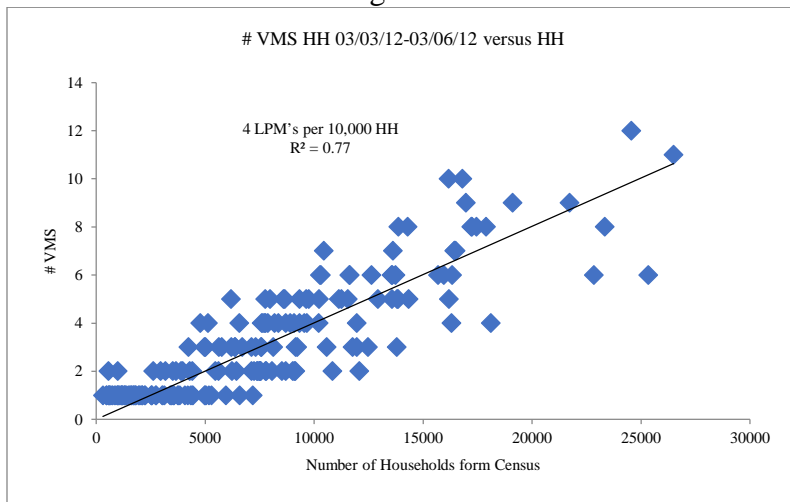
Figure 9

VMSHH 01/24/10-01/30/10 versus # HH

4 LPM's per 10,000 HH
R² = 0.74

#VMS

Number of Households from Census

Figure 10

VMS HH 02/03/11-03/02/11 versus # HH

4 LPM's per 10,000 HH
R² = 0.77

#VMS HH

Number of Households from Census

Figure 11

VMS HH 03/03/12-03/06/12 versus HH

4 LPM's per 10,000 HH
R² = 0.77

#VMS

Number of Households form Census
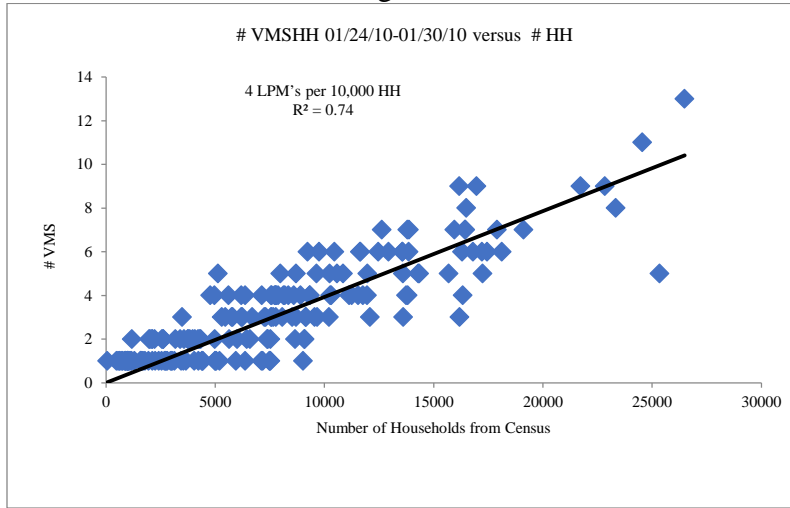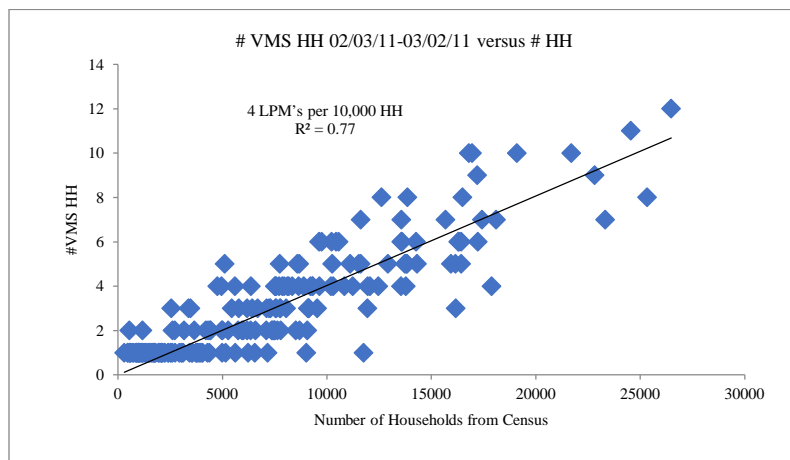
Figures 12, 13, and 14 reveal that the number of AA HH with VMSs does not follow the same correlation that the total number of HH with VMSs has with the number of HH in each zip code, namely 4 VMSs per 10,000 HH in the DMA. This is true in 2010, 2011, and 2012. Thus, the placement of VMSs in AA HH is not representative of the placement of total VMSs in zip code HH based on the 2010 census.
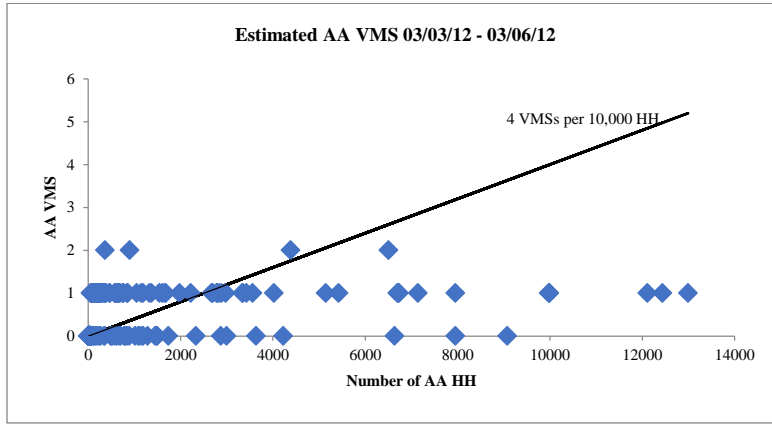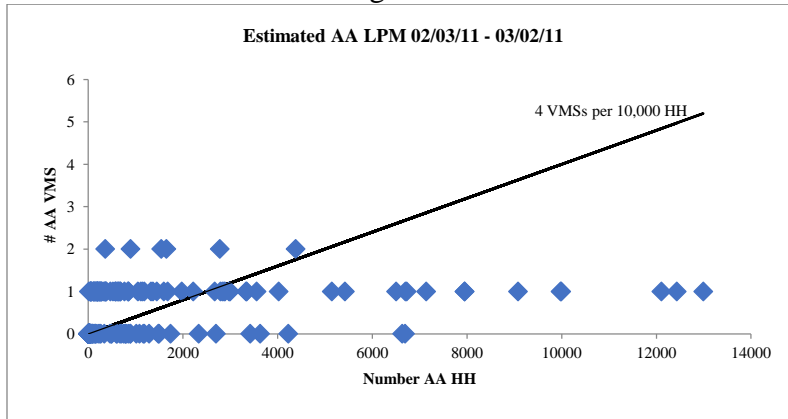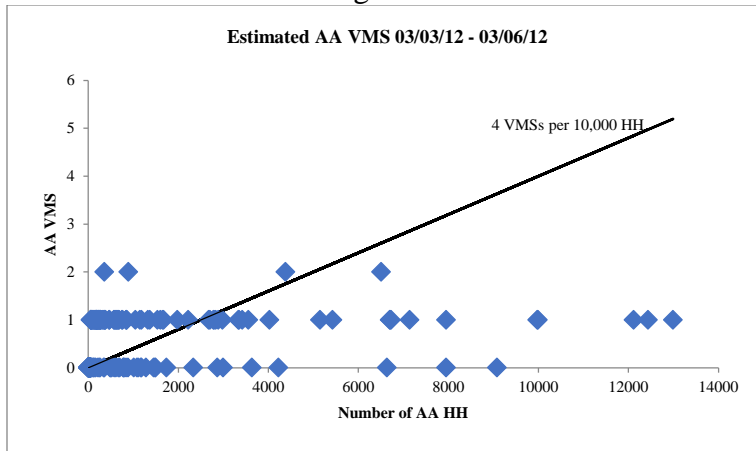
Figure 12

Figure 13

Figure 14

Conclusion 6

Figures 15, 16, and 17 indicates that there is no correlation between the total number of VMSs placed in each zip code and the median income ($) in each zip code based on the 2010 census data. Since there is no census data for the median income of AA in each zip code it was not possible to provide the corresponding scatter plot for AA. Thus, VMSs are not placed in households in each zip code of the DMA based on household income.
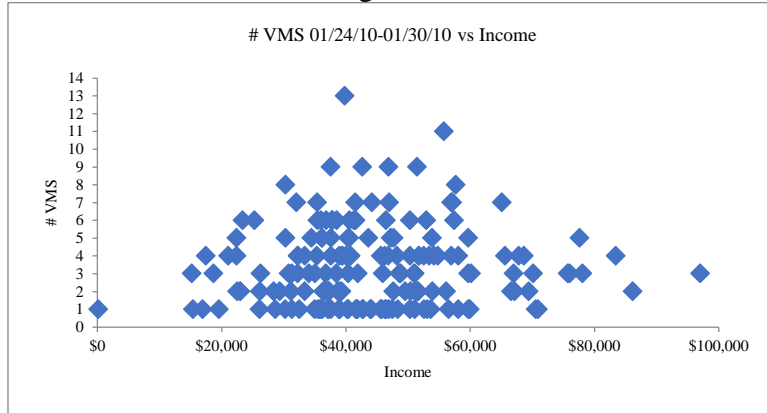
Figure 15

VMS 01/24/10-01/30/10 vs Income

Figure 16

VMS 02/03/11-03/02/11 vs Income
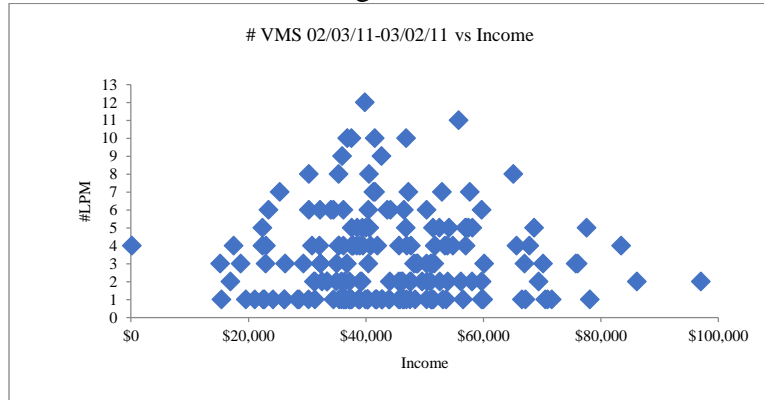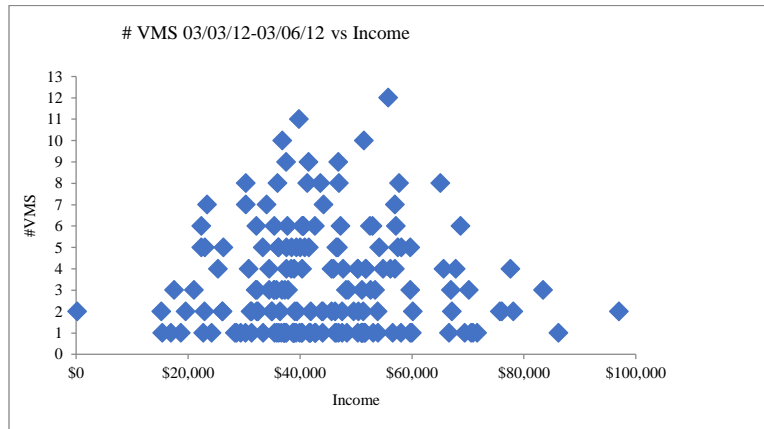
Figure 17

VMS 03/03/12-03/06/12 vs Income

<u>Conclusion 7</u>

Figures 18, 19, and 20 indicates that there is a significant correlation between the total number of VMSs in each zip code and the number of family HH with a male but no wife based on the 2010 census data in each zip code. Since there is no census data on the number of AA family HH with a male but no wife in each zip code it was not possible to provide the corresponding scatter plot for AA. Thus, VMSs could be placed in households in each zip code of the DMA based on number of families with a male but no wife, but this seems unrealistic, illogical, and difficult to arrange.
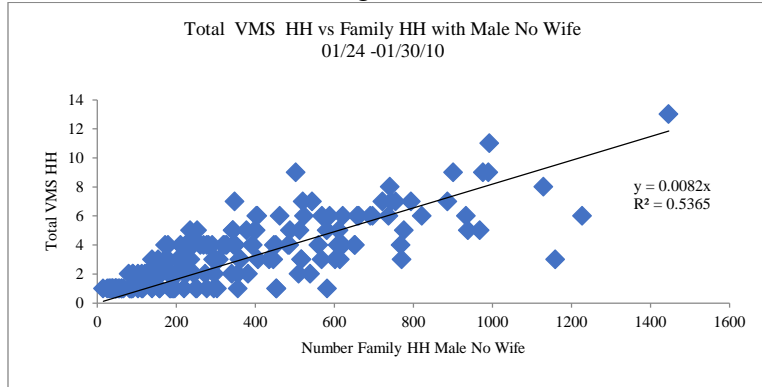
Figure 18

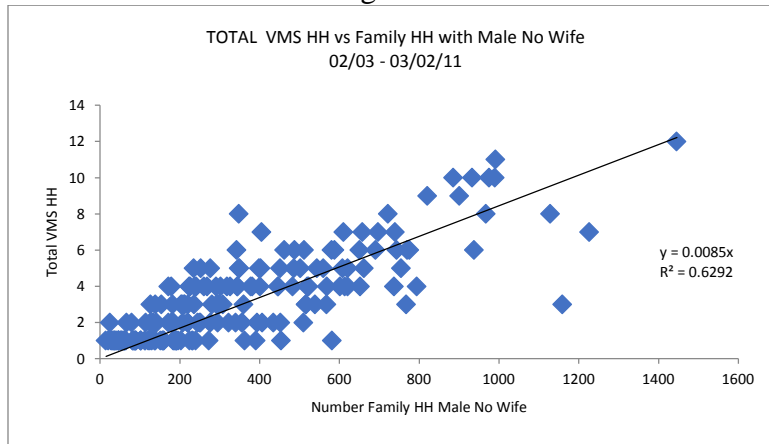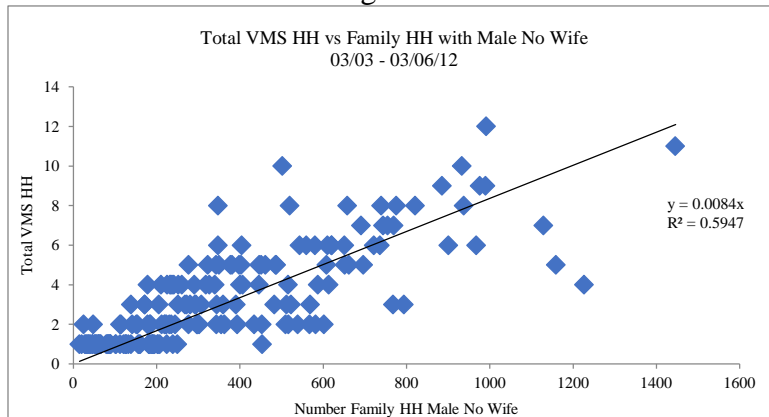Total VMS HH vs Family HH with Male No Wife
01/24 -01/30/10

$y = 0.0082x$
$R^2 = 0.5365$

Figure 19

TOTAL VMS HH vs Family HH with Male No Wife
02/03 - 03/02/11

$y = 0.0085x$
$R^2 = 0.6292$

Figure 20

Total VMS HH vs Family HH with Male No Wife
03/03 - 03/06/12

$y = 0.0084x$
$R^2 = 0.5947$

<u>Conclusion 8</u>

Figures 21, 22, and 23 indicate that there is a significant, but weaker correlation between the total number of VMSs placed in each zip code and the number of family HH with a female but no husband based on the 2010 census data in each zip code. Since there is no census data on the number of AA family HH with a female but no husband in each zip code it was not possible to provide the corresponding scatter plot for AA. Thus, VMSs could be placed in households in each zip code of the DMA based on number of families with a female but no husband, but this is even more unrealistic, illogical, and difficult to arrange.
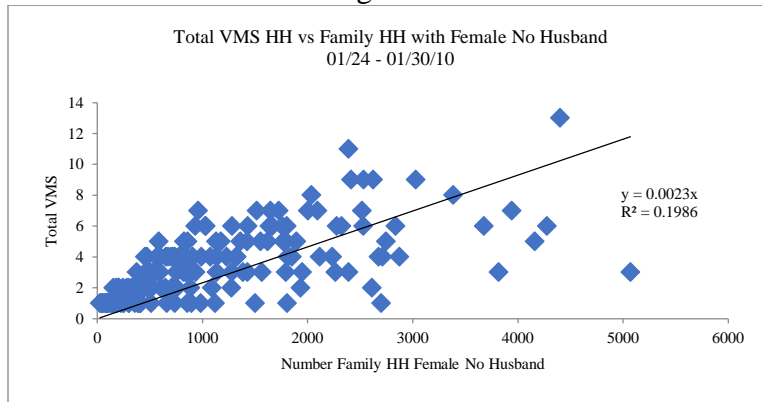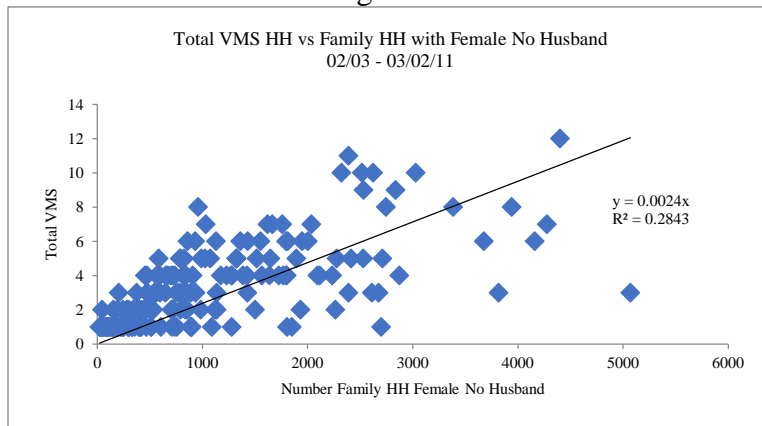
Figure 21

Figure 22

Figure 23