COMPARISON OF MODELS FOR HOUSEHOLD RESPONSE IN THE 1990 AND 2000 CENSUS

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Abstract. Slud (1998, 1999, 2001) developed logistic regression models, by state, for block-group housing-unit (HU) response to the 1990 decennial census at several stages (by Mail, and to enumerators within successive intervals of checkin time). Slud (2002) showed how such models could be used in weighting for nonresponse in national surveys like the American Community Survey (ACS). That work showed that while model-based weighting might markedly improve survey estimates if the underlying models fit well, the estimates might also degrade if the models fit as badly as some 1990 state response-models did to data from neighboring states.

The present research extends the modelling approach of Slud (2001) to data from the 2000 decennial Census, leading to (a) quantitative comparison of 1990 vs. 2000 census response models, (b) assessment of Census 1990 models in predicting variation across localities of 2000 response in various modes, and (c) calculation (following Slud 2002) of the magnitudes of errors to which the observed discrepancies would lead if the earlier models were used in nonresponse weighting in a design like that of ACS.

This paper reports on research and analysis undertaken by Eric Slud. It has undergone a Census Bureau review more limited in scope than that given to official Census Bureau publications, and is released to inform interested parties of ongoing research and to encourage discussion of work in progress.

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1. INTRODUCTION

Statistical modelling of responses by mode in the decennial census (such as Mail-response or response to enumerators within a specified interval of local enumerator followup) has several objectives. The most straightforward is to aid in planning the allocation of resources in conducting the decennial census, particularly in drawing distinctions between localities to plan where administrative interventions will be most cost-effective. J. G. Robinson's group in the Bureau's Population Division has advanced this application of response models by creating a *hard-to-count index* within their Targeting or Planning Database (Robinson and Kobilarcik 1995, Bruce, Robinson and Sanders 2001), a database concerning tract-level differential Mail-response which was available for the 2000 census and will also play a role in planning the 2010 census. Models like those of Slud (1998, 1999, 2001) of time to followup-enumerator response can be used analogously in planning the differential timing of local resource allocation in the 2010 census. A second objective of decennial-census response models is to aid in planning and analysis of other national surveys, like the American Community Survey (ACS). A third objective of response models is to help define post-strata for coverage evaluation, since direct use of the models for undercount adjustment is not currently feasible for political and scientific reasons. The primary motivation for the work described here, following Slud (2002), was to study the feasibility of demographic-model-based weighting adjustments to surveys like the ACS, where early-stage nonrespondents are randomly subsampled for followup and data-collection in alternate modes (Alexander et al. 1997). Slud (2002) described a framework within which predictive models for the separate response modes would together generate local weighting adjustments for multiple-mode survey responses, and showed by examples concerning 1990 census response rates in different states that these adjustments would reduce design-based survey mean-squared errors (MSE's) if the underlying models were sufficiently accurate.

This paper compares statewise models for decennial census response between the 1990 and 2000 census, with a view to assessing the accuracy of 1990 models in representing 2000 data. Several problems of correspondence of geographic boundaries and measured variables across the two censuses complicate this comparison. Although the models of Slud (2001) treated 1990 census response at the level of census block-groups, changes in block, tract, and place boundaries in 2000 imply that stable comparisons can be expected only at higher levels of aggregation like census tracts. Since previous Targeting Database research has also been directed to the tract level, in part because the predictor variables rely on long-form variables which are too unstable at lower levels of aggregation, we also specify our models and cross-census comparisons at the tract level.

The models compared here are intended to be used predictively at an aggregated (tract) level, from one census to another survey. Although the predictor variables are associated with individual HU characteristics, they are not known or observable at HU level before actual census enumeration (*cf.* Slud 1998, 1999, 2001). Thus only the tract-aggregated predictors from the earlier census are available for targeting by tract or for weighting adjustment. While such tract-level variables are *not* highly predictive of HU or block-group level outcomes, they do turn out to be good predictors of tract-level response rates.

After describing in the next Section the data-sources and predictor and response variables from both the 1990 and 2000 censuses, we proceed to specify statewise logistic regression models in Section 3. Data results are presented in Section 4 for several states, with conclusions. Section 5 discusses future research on nonresponse weighting adjustment within a sample-survey design like that of ACS, using tract-level predictive models for response like those described in this paper.

2. DATA SOURCES & VARIABLES

Many aspects of census data collection and organization differ between the 1990 and 2000 decennial censuses. The first and most pervasive is that data in 2000 are indexed geographically in two distinct ways, by so-called 'tabulation geography' (subdividision into blocks, tracts, places, and other categories) which is meaningful for most census reporting purposes, and also by 'collection geography' defining the same categories for internal operational purposes to be as similar as possible to those of 1990. While the 1990 census data were largely centralized into the 100% Edited Detail file or HEDF, and compiled into the CENSAS (1996) database, census data in 2000 must be extracted from the Bureau's HCEF and HCUF files indexed by collection geography, and the tabulation-geography HDF files. The effect of this change is that blocks, enumerator assignment areas, tracts, and even counties in 2000 tabulation files do not correspond uniquely to the geographic entities either in 1990 or 2000 collection files, while the latter usually but not always correspond very closely. While the Bureau's Geography division has compiled files detailing the precise mapping from 1990 to geographic blocks and tracts, and for some purposes of direct comparison researchers must use these files to form subsets of directly comparable geographic units, we do not map tracts in this way because our purpose is not to match predictions for specific tracts but to compare statewise **models** between 1990 to 2000 at the (collection-geography) tract level.

In future research, but not in this paper, we will also study predictive models for decennial-census response defined through intervals of followup duration. Changes in the method of recording enumerator work-assignments in 2000 makes the task of computing followup durations slightly different from that of 1990, when the local time-origin for non-mail-returns was the earliest form checkin date in the Address Register Area (`ARA`). In 2000, the unit of enumerator assignments was the Nonresponse Assignment Area (field `NRAA` on HCUF), defined unambiguously for all but a tiny proportion of occupied non-mail-responding HUs.

There are also definitional changes in some census-form variables from 1990 to 2000. In particular, the `race` variable appearing on all census forms has a different meaning in 2000 than in 1990, with individuals in 2000 selecting up to 8 racial categories. We adopt the Bureau's re-codes of these variables for *Hispanic* background and *Black* race (in the latter case, reflecting *at least one* black racial category) designed to match the 1990 definitions as closely as possible. A further relevant variable change is the Bureau's dropping of the 1990 CENSAS housing-type variable (`htyp`, encoding *Mobile, Single*, and *Apartment* HUs) from the 2000 short-form. This variable appears only on the census long-form in 2000 (HCUF field `RBLDGSZ`). Thus, while in research on 1990 response it was possible to cross-tabulate housing units (HUs) according to block-group or tract and `htyp`, in 2000 and therefore in comparative models we must treat housing-type in terms only of the tract-aggregated fractions (respectively, `fsng` and `fapt` defined below) of long-form HUs which are single-family houses or apartments *among long-form HUs for which* `RBLDGSZ` *is not missing.* Since long-form versus short-form HUs have different mail response rates, and these differences interact with other demographic characteristics, the change of `htyp` to a long-form variable might impair the comparability of 1990 and 2000 models.

We restrict attention here to the MAF universe of HUs (HEDF in 1990, HCEF in 2000) in *mail-back areas* (i.e., areas where HUs had the possibility of responding by mail). Both universes include vacant HUs. In both census years, HUs are recorded as responders only if their short-form (100% population) data were not substituted, i.e., not wholly imputed. The response variables modelled are the indicators of HU response by mail or, in our future work, by enumerator within 0–20 or 21–40 days following initiation of enumerator followup within `NRAA`.

It is by now well known that the mail response rate in the 2000 census was remarkably higher than expected beforehand, and was comparable to that in 1990. In the seven states considered here (DE, AZ, IL, MD, NH, AL, NE), the mail-response rates in our data were respectively 70.8, 64.0, 71.4, 72.3, 65.9, 65.8, and 76.3 percent in 1990 and 65.6, 65.0, 72.0, 70.6, 68.8, 64.0, and 76.3 percent in 2000.) Changes in demographic predictor variables between 1990 and 2000 will be addressed below.

2.1. PREDICTOR VARIABLES

The predictor variables used now to model census response in both 1990 and 2000 are very close to those defined in Slud (1998, 2001). The geographic variables are:

`county, tract, NRAA, plcod, plsz`

where `county` and (collection) `tract` are index- or cluster- variables, `plcod` is a categorical variable indicating urban vs. rural and small vs. large vs. central city, and `plsz` is a geographic code which is 0 for localities not designated metropolitan 'places', and which ranges from 1 to 23 and encodes roughly the logarithm of population size for such 'places'. The variable `plcod` allows for an 'Indian-reservation' code, which was needed in 1990 at block-group level in some states but is so uncommon at tract-level that we change it to 'rural'; thus `plcod` has either 2 or 3 levels. Next, the variables

`fhisp, fb, fown, fspo, funr, fsng, fapt`

respectively denote the fractions of enumerated persons within tract who are Hispanic or who are black; the fractions of occupied HUs within tract which are owners (vs. renters), are 'spousal' (i.e., a husband/wife live there together or the householder lives alone and is aged at least 50), or contain unrelated persons; and the fractions of occupied HUs (in 2000, only long-form HUs with non-missing information) which are single-family or apartments. All of these predictor variables other than `fsng` and `fapt` are transformed to *logit* scale without altering the variable names; thus in what follows, the square of the logit of the fraction of black persons in the tract is denoted by $\texttt{fb}^2$, and `fspo` or `fhisp` are also logits of tractwise fractions, but `fsing` is a fraction between 0 and 1. In addition, the recoded indicator variable `Bsng = I(fsng > 0.66)` capturing the extent to which tracts predominantly consist of single-family homes, was found to be a highly significant predictor.

2.2. CHANGES ACROSS CENSUS YEAR

Several of the neighborhood-aggregated predictor variables introduced above show systematic changes between 1990 and 2000, not attributable simply to changed variable definitions. Table 1 shows means for 1990 and 2000, in 7 states, of each of the fraction variables (all except `fsng, fapt` having been transformed to *logit*). These means are calculated as weighted averages, with weight for each tract equal to its number of MAF HUs.

The fractions of black and Hispanic persons have clearly increased from 1990 to 2000. Slightly less predictably, the fraction of spousal HUs has decreased (except in Nebraska), and the fraction of HUs containing unrelated individuals has increased. The fraction of single-family homes increased everywhere, as did the fraction of home-owners. Since the first five columns of the Table represent weighted-average logit values, the reader can confirm that all of the average changes in the underlying fractions are at most a few percent.

3. MODELS AND METHODS

For computational simplicity, the data within (mailback areas of) each state within each census are tabulated as matrices (**Splus** data-frames) with one row for each 'stratum' defined as a `plcod` × `plsz` × `tract` combination, and with columns consisting of the predictor variables listed above — defined to be constant over HUs within each such stratum — together with `mrcellct` (the total number of occupied data-defined HUs) and `mrrspct` (the count of mail-responding HUs). In 1990 data, which were originally compiled at block-group level, small block-groups (with $\texttt{mrcellct} \le 20$) and tracts (with total $\texttt{mrcellct} \le 50$) had been discarded. As a result, in 1990 Delaware (DE) had 150 tracts and 180 distinct `plcod` × `plsz` × `tract` combinations (for a total of 219509 HUs). By contrast, the 343072 HUs in 2000 DE data fall into many very small `plcod` × `plsz` × `tract` strata, for example 46 with $\texttt{mrcellct} \le 20$ which have total population of 310 HUs. In DE in 2000, there are 380 strata but only 169 tracts.

Table 1: Average values, for 1990 and 2000, of tract-level aggregated fraction and logit variables for each of 7 states. For each state and variable, 1990 average is given first, with 2000 average below it.

	funr	fhisp	fb	fown	fspo	fsng
DE	-3.10	-3.97	-2.12	0.90	0.78	0.70
	-2.94	-3.38	-1.94	1.16	0.72	0.73
AZ	-2.96	-2.10	-4.08	0.63	0.80	0.60
	-2.70	-1.58	-3.90	0.94	0.76	0.65
IL	-3.35	-3.58	-3.44	0.65	0.83	0.61
	-3.08	-3.06	-3.17	0.86	0.70	0.64
MD	-2.95	-4.15	-1.84	0.72	0.72	0.72
	-2.80	-3.79	-1.50	0.89	0.60	0.73
NH	-2.97	-4.71	-5.26	0.80	0.94	0.61
	-2.91	-4.53	-5.13	1.00	0.86	0.67
AL	-3.72	-5.16	-1.61	0.75	0.85	0.70
	-3.47	-4.43	-1.78	1.08	0.77	0.70
NE	-3.24	-3.91	-4.25	0.54	0.84	0.71
	-3.13	-3.50	-4.70	0.80	0.91	0.76

The modelling approach consists primarily of logistic regression

$$Y_i \sim Binom(n_i, \, (1 + e^{-\beta' \mathbf{X}_i})^{-1}) \qquad (1)$$

where i indexes stratum, n_i is the `mrcellct` cell-count, and Y_i is the `mrrspct` response-count for the stratum, $\mathbf{X}_i$ denotes the vector of fixed-effect predictor values including dummy-variables created from the predictor variables and some of their two-and-three-way interactions. Logistic models as in Slud (1999) with a random, normally distributed intercept were also fitted for comparison but are not discussed below.

4. DATA RESULTS

The first issue we address, in analyzing DE data, is how much if any predictive power is lost in modelling mail-response data without the `htyp` variable. Recall that individual enumerated HUs had `htyp` recorded only in 1990, so this analysis refers to 1990 DE data only. First, the model (1) *with* `htyp` is specified with terms as in Slud (1998, 1999), omitting less important predictors not mentioned above. This model has 39 fitted coefficients, including interaction-terms and including `fsng` and `fapt` only through the recoded variable `Bsng = I(fsng` $>$ `0.66)`, and at the tract level yields a correlation of 0.88 between fitted and actual tract response-rates. A slightly more parsimonious step-down version of the model, with only 29 fitted coefficients corresponding to an increase of deviance of only 36.3, still had a correlation of 0.88 between observed and fitted rates. Next, a very similar model was fitted to 1990 DE data without `htyp` but with `fsng` and `funr` variables (and some interaction-terms involving them). This model had highly significant coefficients for the variables

`fown` `fspo` `plcod` `plsz` `fsng`
`I(plsz=0)` `funr` `fhisp` `fb`^{2} `Bsng`
`fown:fspo` `fhisp:fown` `fsng:funr`
`funr:fb` `funr:plcod` `fb:Bsng`
`fown:plcod` `plcod:plsz` `fown:fspo:plcod`

with tractwise correlation of 0.89 between fitted and observed response rates. The high predictability of tract-level rates using either the model with or without `htyp` is displayed graphically in Figure 1.

The correlations between actual and fitted rates from these models are extremely high, not because individual HU responses are well predicted by a model involving only tract-level regressor variables, but rather because of aggregation of responses to the tract level. For example, when the corresponding correlations were calculated not across the 150 tracts but across the 367 `tract` × `plcod` × `plsz` × `htyp` strata, they were 79% for the 29-variable model with `htyp` but only 59% for the 21-variable model without `htyp`. See Slud (2001) for further discussion of model predictions and predictor variables at different levels of aggregation.

Now we turn to the comparable models fitted (necessarily without `htyp`) to the 2000 data. As in the 1990 analyses of Slud (1998, 1999), the approach here is to choose predictor-variables for inclusion based on general considerations of plausibility together with a few exploratory analyses in very few states (usually just DE), and then to compare results with the same models across different states (DE, AZ, IL, MD, NH, AL, NE).

Models were fitted at three different levels of detail (**H, M** and **L**). The most detailed (**H**) included the variables

`Intercept` `fb` `fown` `fb`^{2} `fspo` `plcod`
`I(plsz=0)` `fhisp` `Bsng` `funr` `plsz` `fsng`
`fown:plcod` `fown:fspo` `fspo:plcod` `fb:Bsng`
`fb:fspo` `fsng:funr` `plcod:funr` `fhisp:fown`
`funr:fb` `fb:fown` `fb:plcod` `fown:plcod:fspo`

which resulted in 24 coefficients in states and years with 2 levels of `plcod` (DE and NH in 1990 and 2000, and AL in 2000) and in 30 coefficients in all other cases, where `plcod` has a third, large-urban, level. Although all of these coefficients were highly significant (e.g. at 0.01 level) in most states, the degree of significance and even the signs of many coefficients varied across different states and years. It seemed likely that simpler models might have more stable coefficients and would therefore provide better correspondence between observations and predictions of 2000 mail-response rates using 2000 predictor variables. A second set **M** of models was fitted, now without higher-order interactions and only the 12 single-variable terms

`Intercept fb fown` fb^2 `fspo plcod`
`I(plsz=0) fhisp Bsng funr plsz fsng`

resulting in 12 and 13 coefficients respectively when `plcod` has 2 and 3 levels. Finally, a still simpler model **L** was fitted, with only 7 variables

`Intrcpt fb fown plcod fhisp fsng Bsng`

We display the results of model-fitting in a few ways. Table 2 contains the correlations of tract-level fitted and observed rates within each of the census-years and states, and Table 3 the corresponding correlations across census-year. These correlations show (and residuals plots confirm) that in all states, possibly excepting NH, and both census years, the models **M** are very successful and just as good as models **H**, in reproducing tract-level mail-response rates from tract-level predictors. Models **L** generally show worse agreement (notably in AZ and NE) between observed mail-response rates and fitted ones. Since the variables (`funr, plsz, fspo`) dropped from **M** in passing to **L** were not extremely significant in **M**, the remaining coefficients might be expected to be more robust and interpretable. We address in Table 4 the relative stability of coefficients for models **M** and **L**.

Judging by the evidence in Table 3, 2000 census mail-response rates were still highly predictable from 2000 tract-aggregated predictor variables, using state-wise models whose fitted coefficients are taken from 1990 data. Figure 2 illustrates the comparison between the actual 2000 DE mail-response rates and those fitted using the model **M** coefficients from 1990 (asterisks) or the model **H** coefficients fitted on 2000 data (hollow diamonds). Model **M** provides correlations between 1990-model predictions and 2000 observed rates which are at least as high as those for model **H**; and models **M** do about as well as **L** in terms of consistency of standardized coefficients across states and years, as shown in Table 4. (However, the signs of individual variables, e.g. `fhisp`, seem to make a little more sense in model **M** than in **L**.) The erratic behavior of coefficients across years and states seems not to be due primarily to collinearity of predictors, as suggested by a reviewer, in view of the very large magnitudes of most standardized coefficients. Differing coefficients may indicate real demographic differences, but may also reflect fitting to statewise between-tract noise, which in models with many terms, especially interaction terms as in **H**, renders individual coefficients nearly uninterpretable.

Table 2: Correlations between observed tract-level mail-response rates in 7 states, in 1990 and 2000, and fitted rates from each of the model-types **H**, **M**, **L**. The numbers of nonconstant variables in these models are respectively 23, 11, and 6: add 1 to find the number of coefficients for DE and NH and for AL in 2000, and add respectively 7, 2, 2 to obtain the numbers of coefficients in other states and years.

	1990			2000		
	H	**M**	**L**	**H**	**M**	**L**
DE	.899	.873	.870	.749	.744	.524
AZ	.790	.782	.644	.782	.762	.708
IL	.926	.914	.907	.899	.876	.867
MD	.855	.833	.826	.813	.777	.745
NH	.723	.660	.618	.677	.629	.604
AL	.777	.779	.767	.778	.789	.777
NE	.898	.888	.843	.774	.773	.727

The conclusions of this data analysis can be stated succinctly.

(i) Decennial census mail response rates at the tract level are highly predictable (correlation between predicted and actual values by tract ranging from 0.7 to 0.9 depending on state and year) from logistic regression models involving tract-level predictor variables `fb, fown, plcod, fspo, fsng, fhisp, Bsng, plsz, I(plsz=0), funr`, and fb^2. Housing-type for individual HU, or interaction-terms between these variables, do not materially improve tract-level predictions.

(ii) Logistic regression models for 2000 census mail-response rates, in terms of 2000 tract-level predictors but with coefficients fitted on 1990 data, are also fairly accurate, with tract-level correlations within state generally ranging from 0.6 to 0.85.

(iii) A 12-variable logistic regression model (**M** of Section 4) appears adequate both for within- and between-census prediction of mail-response rates. Coefficients of model **M** generally are significant with the anticipated signs, but anomalies in coefficients (hardly affecting the quality of tract-level predictions) across states and census-years do occur.

5. MODEL-BASED WEIGHTING ADJUSTMENT IN AN ACS-LIKE DESIGN

A primary motivation for this research has been the possibility of using aggregate-level predictions

Table 3: For each of 7 states, the first three columns of this Table contain correlations between observed tract-level mail-response rates in 2000 and the predicted rates from the 1990 predictive model for the same state using 2000 predictor variables, within each of the model-types **H**, **M**, **L**. The final column reproduces the next-to-last column of Table 2, giving the correlation between tract-level observed mail-response rates in 2000 and those fitted using model **M** on 2000 data.

	H90	**M**90	**L**90	**M**00
DE	.728	.730	.715	.744
AZ	.735	.739	.685	.762
IL	.885	.873	.860	.876
MD	.714	.714	.705	.777
NH	.572	.608	.615	.629
AL	.742	.737	.747	.789
NE	.661	.727	.683	.773

of response in model-based weighting adjustment for nonresponse within a large-scale recurrent sample survey like ACS. The theoretical basis for such weighting adjustment, within a survey like ACS where response comes in at least two modes and early-mode nonrespondents are subsampled for response in later modes, was worked out in Slud (2002). The key ingredients are adequately fitting predictive models for mode-specific response rates at an aggregated level such as the census tract, as well as the availability of aggregate-level demographic variables like those in models **M**.

The models such as **M**, developed in earlier sections of this paper, would provide a first-stage predictive model for the survey design just described, using predictor variable values which would likely be taken from the most recent decennial census or ACS. The development of analogous predictive models for followup response within a specified number of days of followup within NRAA, represents the next stage of this research.

We plan to use decennial 2000 census files as a frame for a hypothetical survey design which roughly imitates the current ACS, as follows. First, within each state MAF, HUs would be randomly sampled with an inclusion rate something like 1/200 (the approximate 2001 national HU sampling rate for ACS). HUs can respond in a mail-return mode, which we model by mail-response in the census files. Nonresponding HUs in this mode would be randomly subsampled with inclusion rate 1/3, and recorded as followup-responders if an enumerator-completed census form is checked in within 12 days of followup within their NRAA. The 12-day horizon is chosen for similarity of overall response rate to that of ACS: currently, ACS followup-response is 82% nationally among occupied HUs (86% overall), while, as an example, the 11-day followup census response within AZ among occupied non-mail-responding HU's is 0.795. It is reasonable to specify a followup response rate which is smaller for a census-based study imitating ACS than for ACS itself, because mail-response rates in the census (65% in AZ) are larger than first-stage response rates (roughly 50% nationally) in ACS.

Comparative evaluations of model-based weighting adjustments versus adjustments made by the current ACS approach (Alexander et al. 1997) will be undertaken in the near future. Response variables of interest, estimators of which will be compared in terms of MSE as in Slud (2002), are primarily the numbers of persons in enumerated HU's, or numbers of such persons in various demographic (e.g., racial and age) groups.

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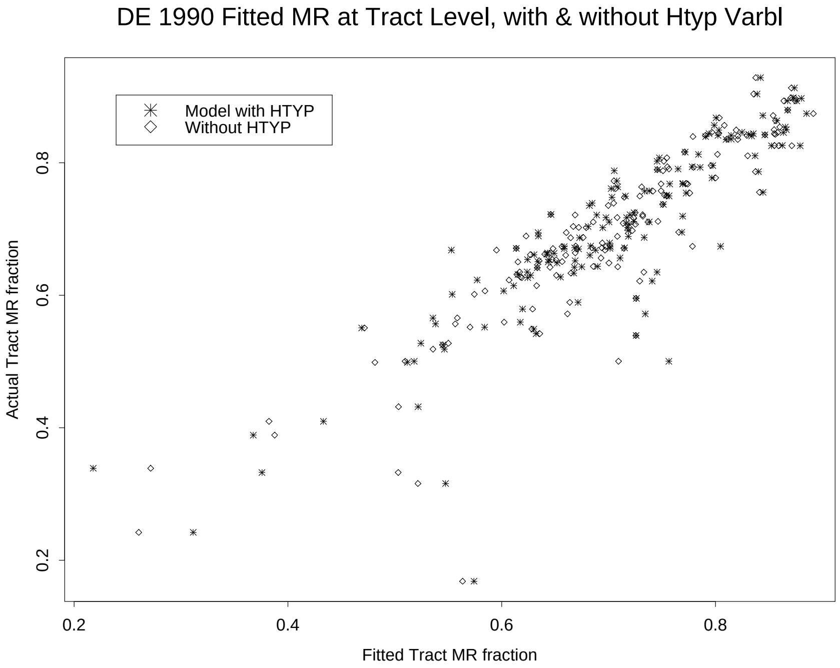

Figure 1: Scatterplot of actual versus fitted DE Tract-level Mail-response rates in 1990 census. Asterisks are plotted for fitted values generated from logistic regression model *with* **htyp** predictor variable, and hollow diamonds for model *without* this variable. One point of each type is plotted for each of the 150 tracts.

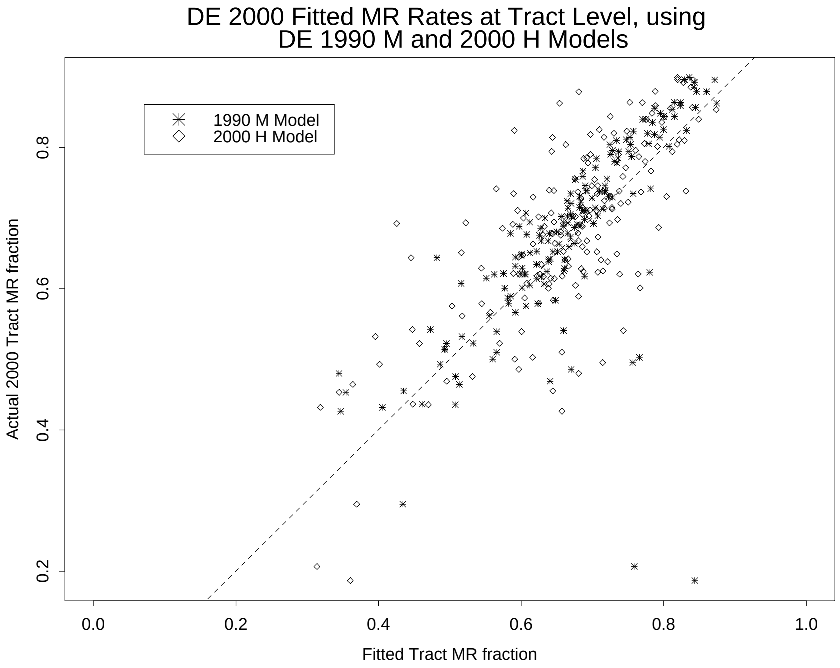

Figure 2: Scatterplot of actual versus fitted DE Tract-level Mail-response rates in 2000 census. Asterisks are plotted for fitted values generated from 12-coefficient 1990 logistic regression model **M**, and hollow diamonds for 24-coefficient 2000 model **H**. One point of each type is plotted for each of the 169 tracts.

Table 4: For 4 states and 2 models **M**, **L**, standardized logistic-regression coefficients for 1990 and, immediately underneath, for 2000. Standardized coefficient squared gives approximate deviance increment after all other model terms. Residual model deviances, divided by 1000, are given at the bottom of the Table.

	M Models				**L** Models			
	AZ	IL	MD	NE	AZ	IL	MD	NE
Int	-51	-73	-18	-23	-8	-54	10	-14
	-59	-66	-42	-17	4	-20	94	-9
fb	-58	-174	-35	-37	27	-167	-53	-24
	-39	-140	1	-40	49	-106	21	-11
fb^2	-59	-59	7	-31	0	0	0	0
	-48	-80	-24	-39	0	0	0	0
fown	10	54	49	13	82	90	60	20
	27	63	12	10	109	103	61	27
plcod2	64	78	45	19	-5	78	71	49
	62	81	36	19	-24	56	100	38
plcod4	54	8	3	12	72	84	41	22
	40	8	-46	6	77	103	31	37
fhisp	-62	-121	0	-29	68	27	22	21
	-71	-106	47	-35	53	33	-9	18
fsng	75	26	-5	9	-64	-112	7	-24
	97	22	38	14	-78	-106	83	-29
Bsng	-1	-4	1	-10	-24	26	37	5
	-14	3	0	-9	48	21	23	30
fspo	1	47	57	17	0	0	0	0
	-37	33	33	25	0	0	0	0
funr	-8	-10	9	-5	0	0	0	0
	-33	-29	-8	5	0	0	0	0
plsz	5	60	50	21	0	0	0	0
	10	60	83	23	0	0	0	0
plsz=0	13	55	39	20	0	0	0	0
	0	58	80	13	0	0	0	0
Deviance	35.2	83.8	41.3	5.3	52.7	91.5	43.0	7.7
/1000	69.3	107	85.6	15.1	89.2	118	95.3	17.5

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