Census 2000 Staffing Programs, Recruiting Component

FINAL REPORT

This evaluation reports the results of research and analysis undertaken by the U.S. Census Bureau. It is part of a broad program, the Census 2000 Testing, Experimentation, and Evaluation (TXE) Program, designed to assess Census 2000 and to inform 2010 Census planning. Findings from the Census 2000 TXE Program reports are integrated into topic reports that provide context and background for broader interpretation of results.

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FACTORS AFFECTING CENSUS 2000 RECRUITING

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EXECUTIVE SUMMARY

Our analysis of factors affecting Census 2000 recruiting produced several important conclusions that were strongly supported by our regression analysis, in keeping with reasonable expectations, and consistent with the observations of knowledgeable observers. Our most basic findings were that there was considerable variation in recruiting performance across local census offices (LCOs), and we were able to isolate factors that accounted for about half of that variation. These factors fall into three categories: pay, area characteristics such as the expected nonresponse workload and number of workers available to be recruited, and management factors such as turnover of LCO managers.

Enumerator pay, relative to locally prevailing pay, was a key determinant of recruiting performance. The overall high levels of pay compared to 1990 greatly facilitated recruiting, but it was not possible to eliminate all cross-LCO variation in relative pay. Relative pay was about 77 percent of prevailing pay in LCOs with much below average recruiting performance and about 84 percent of prevailing pay in LCOs with much above average performance. That variation was associated with a 10 percent increase in the number of applicants in the LCOs with high versus low relative pay. This is an important finding since it suggests that pay increases could have been relied upon to further enhance recruiting performance had that been necessary.

In terms of area characteristics, the Non-Response Followup (NRFU) workload (cases-to-complete) strongly influenced recruiting. On average, the NRFU workload was about 80,000 cases per LCO, but many LCOs had fewer than 56,000 cases and many had more than 104,000 cases. An increase in caseload of 24,000, about one standard deviation, was associated with a 13 percent increase in qualified applicants. This result suggests that LCOs appropriately attempted to secure enough applicants to fill the required number of enumerator slots, but other factors very strongly affected recruiting success.

The number of workers employed by all firms in an LCO's operations area had a positive effect on recruiting, but the effect was small given that employment levels in LCOs showed huge variation—a standard deviation of about 720,000 workers. This suggests that there were plenty of individuals in virtually every LCO's operations area who could be attracted to apply for census jobs, and it was not necessary to take variation in the number of people who can be drawn upon in allocating recruiting resources.

An unanticipated result is that a one standard deviation increase in test scores, an increase from 85.6 to 88.4, was associated with a decrease in the number of applicants of almost 11 percent. We speculate

that this result was due to recruiting being more difficult in areas where many people were likely to do well on the test (even holding relative wages and per capita income constant). If our speculation is correct, the effect is sufficiently large that variation in test scores should be taken into account in setting wages, and managers should anticipate that areas with high test scores will need additional assistance in meeting recruiting goals.

In terms of management factors, resignations, terminations for cause, or leaving for any other reason by local census office management during the recruiting period were associated with a reduction in the number of recruits by about 12 percent. This evidence strongly suggests that LCO management performance is a key determinant of recruiting success and that LCO management needs to be in place for a substantial period in order to be highly effective.

By far, the largest source of variation in recruiting performance was associated with an LCO being in one of three Census 2000 administrative regions. Even after taking other key factors into account, LCOs in the Seattle and Denver regions recruited about one-third more applicants, and LCOs in the New York region recruited about 17 percent more applicants than LCOs in other regions.

We did not have the data needed to statistically link these cross-regional differences in recruiting performance to specific management differences, nor could we entirely eliminate the possibility that the results are overstated because some important exogenous factors were omitted from our database. Nevertheless, we have little doubt that regional management differences were the source of much of the variation in recruiting performance.

We hold this view because our statistical results are consistent with more subjective evidence developed during our own site visits and the direct observations of the U.S. Census Bureau headquarters staff interviewed. In addition, we tested the effect of a broad range of variables, and regression-adjusting the results made a big difference. For example, Los Angeles' unadjusted performance was about as good as the region with the best performance, but its adjusted performance was in the average range.

It is our view that the influence of regional management is so great that it would be very worthwhile to determine precisely what managerial elements led to above-average recruiting performance. Based on our own site visits, we identified six key factors associated with superior recruiting performance:

- Encouraging LCOs to develop plans that will lead to meeting or exceeding the key goals laid out by headquarters, including detailed implementation plans for dealing with unanticipated challenges;
- Providing accurate and timely feedback to the LCOMs about the strengths and weaknesses of recruiting in each area of each LCO;
- Helping LCOMs develop effective strategies to deal with problems as soon as they develop;
- Providing timely direct assistance through use of regional technicians;
- Avoiding micromanagement by giving broad discretion to the LCOMs to meet agreed-upon goals and resolve problems in keeping with general guidelines established by the region; and
- Rapidly replacing LCOMs and AMRs who are unable to effectively identify and resolve problems.

Finally, contrary to our expectations, LCOs substantially exceeded recruiting goals. This suggests that goals were regarded as minimums, which ultimately were exceeded by 82 percent of the LCOs, usually by very large amounts. However, of the 92 LCOs (18 percent) that did not meet their goals, only five fell substantially below 70 percent of their goals; *and every LCO had at least 3.25 applicants for each enumerator slot*.

Because goals were set so that there would be about five qualified applicants for each enumerator slot, and twice the number of enumerators were hired as would be needed if there were no attrition, it is reasonable to believe that a sufficient margin of safety was built in to make exceeding the goals unnecessary. Nevertheless, it would be worthwhile to determine if there were serious shortfalls within subareas of LCOs meeting goals**,** and if acceptance rates (particularly those of individuals recruited in January and February) were unusually low in some LCOs.

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1. INTRODUCTION

This paper describes the factors that affected recruiting performance in 519 of the 520 local census offices (LCOs) during Census 2000.[1] The effect of several different types of factors are examined:

- Census pay relative to locally prevailing pay;
- Recruiting goals set by headquarters;
- Area characteristics such as population density, private firm employment, and per capita income; and
- Manager's start date and turnover.

This work is modeled on Westat's similar analysis of enumeration performance during the 1990 decennial census. However, one new feature is that we use a database we developed that describes turnover of local census office managers (LCOM) and assistant managers for recruiting (AMR).

The next section describes alternative measures of recruiting performance. One measure we use is the ratio of applicants to the recruiting goal in each LCO at the point in February when the goal was reached for the nation as a whole. We selected this point because we felt that recruiting operations might slacken after goals were met; however, this did not seem to be the case. Indeed, recruiting goals usually were exceeded by substantial amounts. Thus, we also use an alternative measure—the ratio of cases to enumerate to applicants in February 2000.

After developing a benchmark for comparing recruiting performance across the LCOs, we then placed each LCO into one of five performance groups based on the extent to which performance deviated from average. About 5 percent of the 519 LCOs in our study fell into group 1, performance much above average, where recruiting goals were exceeded by 60 percent or more; 8 percent are in group 2, performance well above average, where recruiting goals were exceeded by 25 to 60 percent; and 26 percent are in group 3, performance above average, where recruiting goals were exceeded, but by less than 25 percent.

Fifty percent are in group 4, performance below average, where recruiting averaged only 80 percent of the goals, and 10 percent fall into group 5, performance well below average, where recruiting

[1] The Window Rock AZ LCO was omitted from the study because we lacked some critical data for this one LCO.

averaged only 50 percent of the goals. It is important to recognize that by April or early May of 2000, when applicants needed to start enumerator training, almost all LCOs had reached 85 percent of their goals.

Next, we compare the characteristics of the LCOs in each of the five performance groups to obtain a preliminary view of which factors had strong effects on performance and which had weak effects. Finally, we examine the effect of various factors using multiple regression analysis. This analysis produced the most definitive results and suggests that higher levels of recruiting were strongly associated with the following:

- Higher levels of cases to complete during the Non-Response Followup;
- Higher census pay relative to locally prevailing pay;
- Lower test scores; and
- Lower turnover among LCO management.

Our regression analysis also suggests that higher levels of recruiting were weakly associated with the following factors:

- Lower levels of income among the LCO's area residents; and
- Greater numbers of workers employed by all firms in the LCO's area.

It also is worth noting that recruiting performance was strongly associated with the ability to recruit applicants likely to be strongly attached to the labor force. This is consistent with other evidence suggesting that attracting employed individuals can be difficult, but essential, for meeting recruiting goals.

It is important to note that all of the above effects were in the expected direction, and the differences were statistically significant. However, the correlation between high census pay (relative to prevailing pay) and above average recruiting performance was much stronger than we expected. Based on our earlier research, we felt that pay below 70 percent of prevailing rates would create recruiting problems but that there would not be a lot of difference in recruiting performance among areas with pay above 75 percent of prevailing levels. It turned out, however, that where pay was higher, performance was higher, even though relative pay averaged about 78 percent in areas with below average performance, and 84 percent in areas with above average performance. This is an important finding since it suggests that pay increases could have been relied upon to further enhance recruiting performance had that been necessary.

Also of considerable importance, the above factors explained close to 40 percent of the variation across the LCOs. These variables also explain much of the variation across the 12 census regions. For example, relative pay was especially high (and fairly uniform) in New York and Los Angeles, and both regions showed much higher performance relative to other regions when pay and other factors were not taken into account than when other factors were considered. However, even *after taking variation in key factors into account*, there still was very substantial variation in performance across some of the regions. For example, performance was particularly high in the Denver and Seattle regions, and considerably above average in the New York region.

Because the regional differences in performance were far larger than differences associated with any other factor, it would be valuable to know precisely why those differences occurred. It is possible that some factor outside the control of the regional and local offices that we did not take into account could explain many of these differences. For example, it is known that Atlanta and Charlotte regions have had recruiting difficulties in every Census within memory. However, our regional results primarily reflect differences in how LCOs in different regions were managed. If this hypothesis is correct, it would have important implications for designing the 2010 census because it would suggest that finding ways to improve regional management has potential for improving recruiting performance.

One key reason for our view that differences in regional management were of enormous importance is that we have tested extensively the explanatory power of a broad range of exogenous variables and already identified many factors that made a difference. A second is that our econometric findings are broadly consistent with observations we made during our own site visits and those conducted by headquarters staff interviewed. A third is that, while we generally lack specific measures that would capture management differences, one specific management-related variable we were able to include, LCO management turnover, had a large negative association with recruiting performance.

Specifically, LCO management turnover was just under 25 percent in the 54 LCOs with well below average performance and about 12 percent in the 258 LCOs with below average performance; but it was only about 7 percent in the 207 LCOs with average or better performance. In these cases, because management turnover was relatively rare, other factors had a larger effect on overall performance.

2. MEASURING RECRUITING PERFORMANCE

In order to provide an easy-to-understand assessment of the variability in recruiting performance across LCOs and the importance of various factors in affecting recruiting performance, it is necessary to develop a reliable indicator of differences in the ability of LCOs to meet recruiting goals. The measure we selected for this purpose was the ratio of applicants to goals at about the point in February when recruiting goals were met for the nation as whole.

We used this measure to guard against the possibility that LCOs would slacken recruiting efforts after recruiting goals were met. Thus, if we looked at recruiting performance at the point hiring was completed in April, we felt that overall performance might narrow, and thereby mask important differences. In practice, however, recruiting efforts did not appear to slacken. We found there was a very strong correlation between performance in February and performance in April.

It also turned out that there was a strong correlation between recruiting performance and enumeration performance. These correlations suggest that high pay, effective management, and other factors discussed in this paper strongly affected both recruitment and the enumeration. They also suggest that LCOs with problems meeting recruiting goals also were likely to have problems meeting enumeration goals. Thus, effectively dealing with recruiting problems is very likely also to substantially reduce enumeration problems. We hold this view, not because the size of the recruiting pools adversely affected the enumeration, but because local management problems adversely affecting recruiting were likely to have the same effect on all aspects of the LCO's performance.

Interestingly, there was a great deal of variation in the ratio of applicants to recruiting goals. The average ratio was 1.005, but the standard deviation was .425. Using the mean and standard deviation as a guide, we broke the 519 LCOs into five groups based on how many standard deviations they were above or below average. As shown in Table 2-1, the LCOs were not normally distributed. About 50 percent of all LCOs were one standard deviation *below* average, almost twice the percent as were one standard deviation *above* average.

Because so many LCOs had not met their goals, we examined whether there was something about the way the goals were set that might explain the shortfalls. Indeed, our comparison of employment in all firms within an LCO's operating area to its recruiting goals, suggested that meeting goals was far easier in LCOs

with strong performance (relative to goals) and vice versa. As shown in column 4 of Table 2-1, LCOs with much above average performance had to recruit one applicant for each 199 workers employed in an LCO area's private firms, while LCOs with much below average performance had to recruit one applicant for each 89 workers.

Table 2-1. Key measures of recruiting performance

Group	LCOs		Applicants per goal	Area private employment per:		Cases per applicant
	Number	Percent		Goal	Applicant	
	(1)	(2)	(3)	(4)	(5)	(6)
1 Much above	27	5.2	2.204	199	92	8.4
2 Well above	43	8.3	1.617	164	102	9.8
3 Average	137	26.4	1.199	146	122	13.3
4 Below	258	49.7	.794	86	109	20.1
5 Well below	54	10.4	.508	89	176	30.5
	519	100.0				

Notes: All figures are derived from statistics derived from data provided to Westat by the Census Bureau with the exception of area employment which was derived from BLS *Employment and Wages* data. Columns 3 through 6 present averages across all LCOs in each group; thus, they represent the characteristics of an average LCO.

This evidence could indicate that the applicant-to-goal ratio was a not a good indicator of effective performance because the task facing the LCOs was far easier in the LCOs that were performing better. However, the comparison of employment-per-applicant shown in column 5 of Table 2-1 indicates that the LCOs in the much above average group were able to recruit one applicant for each 92 workers employed by private firms in their area, while those in the much below average group were only able to recruit one applicant for each 176 workers.

Nevertheless, it still is a bit troubling that the employment-to-applicant ratio suggests that the LCOs in group 4 with below average performance were able to recruit more applicants per worker than those in group 3 with average performance. On further examination, however, we felt that the applicant-to-goal ratio would be an adequate measure because it was highly correlated with the ratio of the number of cases to complete (households to be visited) during the Non-Response Followup (NRFU), to the number of applicants.

As shown in column 6 of Table 2-1, LCOs in group 1 (much above average) recruited enough applicants so that there was one applicant for each 8.4 cases to complete. The cases-per-applicant ratio

monotonically increased from group to group until there were 30.5 case per applicant for the LCOs in the much below average group.

Our view is that it is reasonable to judge recruiting success on the ability of LCOs to match the number of applicants to the number of NRFU cases needed to be completed. Even though we did not have statistics on the amount of recruiting resources available to each LCO, it seems likely that where more resources were made available to LCOs, the more cases there were to complete and the fewer individuals were available to be recruited. Thus, each LCO would be given sufficient resources to have about an equal chance of matching the number of applicants to the amount of NRFU work expected to have to be completed.

3. FACTORS ASSOCIATED WITH RECRUITING PERFORMANCE

Once we were able to place the LCOs into groups with distinctly different recruiting performance, we then were able to compare the characteristics of the LCOs across these groups. These comparisons provide considerable insight into the influence of the various factors in an easy to understand way.

Examination of these associations, in turn, provided the set of hypotheses subjected to the more formal statistical tests in the next section. The chief advantage of our multiple regression analysis is that it can far better uncover the independent effect of each factor by taking into account intercorrelations among the various factors. Indeed, several of the hypothesized relationships that are seen in the tabulations presented in this section are shown *not* to hold when regression analysis is applied in Section 4. Thus, the reader should withhold judgment about the "true" importance of various factors until they are more formally tested in Section 4.

Table 3-1 shows how 16 key factors varied across the performance groups. Column 1 reproduces the earlier result that there was a lot of variation in the ratio of applicants recruited in early February to recruiting goals. Even though the LCOs were grouped to maximize the variation in performance, we were surprised by the extent to which large differences existed. We also felt that such large differences increased the chances that some factors had especially large effects.

Columns 2 and 3 show that the absolute number of recruits was much greater for LCOs with above average performance, even though goals were much lower for those LCOs than for LCOs with below average performance. That recruiting performance appeared to be independent of goals strongly suggests that performance was not below average simply because there was far more recruiting to be done in the LCOs with below average performance.

Moreover, the strong correlation between recruiting goals shown in column 3 and cases to enumerate shown in column 4 indicate that, much as expected, recruiting goals were appropriately set to ensure sufficient enumerators were available to handle the number of NRFU cases needed to be completed.

Table 3-1. Variation of key factors across recruiting performance groups

Group	Applicants per goal (1)	Applicants (2)	Goals (3)	Cases to enumerate (4)	Area employment (5)
1 Much above	2.204	6,606	3,301	54,606	488,108
2 Well above	1.617	6,617	4,597	72,298	952,798
3 Average	1.199	5,738	4,514	73,501	623,799
4 Below	.794	4,044	5,152	81,862	475,360
5 Well below	.508	2,869	5,769	89,086	444,879

Group	Density pop./sq. mi. (6)	Census pay relative to prevailing pay (7)	Hourly census pay (8)	Per capita income (9)	Test scores (10)
1 Much above	1,254	.860	$11.80	$18,0733	85.5
2 Well above	1,570	.852	$13.02	$17,274	83.9
3 Average	1,551	.820	$12.87	$19,034	85.0
4 Below	870	.793	$11.65	$17,604	86.1
5 Well below	1,082	.773	$11.73	$18,928	85.2

	LCOM			AMR		
Group	Stable (11)	Turn over (12)	Late start (13)	Stable (14)	Turn over (15)	Late start (16)
1 Much above	74.1%	11.1%	0.0%	41.7%	25.0%	0.0%
2 Well above	75.6	7.3	0.0	66.7	11.9	2.4
3 Average	77.3	6.8	0.0	47.7	19.2	5.4
4 Below	68.8	12.0	2.4	49.6	21.4	5.6
5 Well below	53.8	23.1	3.8	41.5	24.5	3.8

Notes: Columns 1 through 10 display results averaged across all LCOs in each group. Columns 11 through 16 display statistics for all the LCOMs and AMRs in each group. Columns 11 and 14 display the percent of LCOs where employment of LCOMs and AMRs, respectively, were stable. They began work by the beginning of December 1999 and ended work after April 2000, when the most critical recruiting phase had ended. Columns 12 shows the percentage of LCOs where at least one LCOM left, and column 15 the same statistic for AMRs. Column 13 displays the percentage of LCOs where no LCOM was in place by December 1, 1999, and column 16 the same statistic for AMRs. All figures are derived from statistics provided to Westat by the U.S. Census Bureau with the exception of area employment, population density, prevailing hourly pay, and per capita income. The area employment and prevailing pay data came from BLS *Employment and Wages* data. Population density and per capita income were derived from published U.S. Census Bureau reports.

At the same time, column 5 shows that, with the exception of the 5 percent of LCOs whose performance was much above average, there also was a clear correlation between recruiting performance and the number of workers employed at private firms in an LCO's area. This correlation opens up the possibility that the distribution of recruiting resources took into account the absolute number of applicants needed, but may not have adequately considered the difficulty in securing the needed number of applicants.

Column 6, in the middle panel of Table 3-1, shows that LCOs with below average performance, not only had high numbers of cases to complete but also contained low-density areas—suburbs and rural areas, rather than central cities. This result opens the possibility that performance was below average because recruiting was more difficult in low-density areas.

Similarly, column 7 shows that there was a strong correlation between high census pay for enumerators (relative to prevailing pay), and above average recruiting performance. Indeed, the strength of the relationship makes it plausible that differences in relative pay played a major role in explaining differences in recruiting outcomes.

Column 8 shows that census pay was high in LCOs in groups 2 and 3 where performance was average or above average, and low in groups 4 and 5 where performance was below average. This is consistent with the evidence in columns 6 and 7 that recruiting performance tended to be higher in major cities where population density and wages were high.[2]

Column 9 suggests that the per capita income of an area's residents did not have any particularly strong association with performance. However, column 10 suggests that there was at least a weak relationship between high test scores and below average recruiting performance. Such a relationship could come about because recruiters were more selective in some LCOs than others. Alternatively, a higher proportion of individuals in LCOs where recruiting was below average could have tested well, but, because their earnings also were likely to be above average, they were more difficult to recruit.

Finally, the bottom panel of Table 3-1 shows key characteristics of the local census office managers (LCOMs) and assistant managers for recruiting (AMRs). As noted at the bottom of Table 3-1, unlike

[2] The pattern of high pay being correlated with high performance did not hold for the relatively few LCOs with much above average performance. Several other patterns also did not hold for the top and bottom performing groups. These results suggest that some other factor largely accounted for exceptionally strong or exceptionally weak performance. Our results suggest that key factor was exceptionally good or bad management.

the other statistics that reflect performance of an average LCO in each group, these measures reflect the percentage of LCOs in each group with a given characteristic.

Columns 11, 12, and 13 show that LCOs with below average recruiting performance were far less likely to have LCOMs with stable tenure during the key recruiting period, were far more likely to have LCOM turnover, and also more likely to have a late start in assigning an LCOM to the LCO. Columns 14, 15, and 16 reveal similar patterns with respect to AMRs.

It is noteworthy that AMRs show much less stability than LCOMs. We speculate that much of the difference is due to more careful selection of LCOMs and the much higher prestige attached to that position. However, tabulations not included in Table 3-1 show that some of the difference was due to successful AMRs being reassigned to more pressing duties after recruiting goals were substantially exceeded. Indeed, we believe that the high turnover among AMRs (and possibly LCOMs) in the LCOs with much above average recruiting performance is due to such reassignments.

Recruiting Performance by Region

In addition to examining the factors associated with differences in LCO performance, we examined how performance differed across LCOs in the 12 census regions. As shown in Table 3-2, we found that the regions fell into four groups.

Although not presented here, tabulations of the factors present in the 12 regions suggest that the regions not only differed in terms of performance, but they also showed large differences in the factors associated with variation in recruiting performance. Thus, while much of the cross-region differences could be due to differences in factors under the control of regional management, some of the difference could be explained by cross-regional differences in key factors outside of the regional manager's control.

In particular, the above average performance in both New York and Los Angeles regions could be due to those areas having unusually high population density and high census pay relative to prevailing pay. Similarly, the mixed performance in the Boston and Chicago regions might be due to the LCOs being divided between highly urban areas resembling those in New York and Los Angeles versus highly rural areas.

Table 3-2. Percent of LCOs in regions in the four performance groups with above average and much below average recruiting performance

Group	Number of regions	Percent of LCOs with:	
		Above average (groups 1 and 2)	Well below average (group 5)
Above average performance	4	32%	2%
Average performance	3	3%	3%
Mixed performance	2	13%	16%
Below average performance	3	2%	19%

We do not attempt to sort out the effect of cross-regional differences in the distribution of various factors in this section. Rather, we use regression analysis in the next section to determine the extent to which regional differences were due to: (a) management and other operational practices within the control of each region, versus (b) factors outside of regional office control.

4. REGRESSION ANALYSIS OF FACTORS INFLUENCING RECRUITING PERFORMANCE

The data in Table 3-1 clearly show that there are strong associations between factors present in a given LCO and that LCO's recruiting performance. The data in Table 3-2 show that LCOs in the same region often performed similarly to each other, but very differently from LCOs in other regions. Overall, the tabulations indicate that above average performance is associated with:

- High census pay (relative to locally prevailing pay);
- High employment in private firms;
- High population density;
- High stability for LCOMs and AMRs;
- Low test scores;
- Low recruiting goals;
- Low numbers of cases to enumerate;
- Early starts for LCOMs and AMRs; and
- Being in certain regions.

The purpose of this section is to subject these hypothesized relationships to much stronger statistical tests based on use of multiple regression analysis. Table 4-1 displays the results of two regressions using identical specifications, but different dependent variables. The first dependent variable is applicants-per-goal, which was the variable used to group the LCOs by recruitment performance. The second dependent variable is the number of applicants (recruits).

Columns 5 and 8 of Table 4-1 display the percentage change in the respective dependent variables of a one standard deviation change in the continuous dependent variables (variables 4 through 9) and a change from 0 to 1 in the 0/1 (yes/no) variables (variables 10 through 17). Because these percentages are affected both by the extent to which there was variation in a factor, and the effect of that variation on recruiting performance, they provide an excellent indication of how much of the variation in performance is due to each factor.

Importantly, the percentage changes in columns 5 and 8 are almost identical, with only one major exception. Variable 9, the recruiting goal, has a large effect when applicants per goal is the dependent variable,

and virtually no effect when applicants is the dependent variable. This result, coupled with the powerful effect of variable 8, NRFU cases, suggests that LCO recruitment was highly sensitive to the amount of work enumerators would have to perform, but only to the extent goals were correlated with the amount of NRFU work to be done.

These results suggest that recruiting did not slacken at the point goals were reached but appeared to continue until much higher-than-goal ratios of hires to applicants were achieved. In other words, goals appeared to be taken as minimum performance measures, not as their name, maximums, suggests, That goals appear to be regarded as minimums is very important because it explains why the results using the alternative dependent variables are almost identical, and why goals, by themselves, had little effect on recruiting.

Additional factors with particularly strong negative effects on recruiting performance included LCO management turnover and high test scores. The effect of turnover is expected, as management performance is likely to strongly affect all aspects of LCO activities; during the period examined, no task was more important than recruiting.

The effect of test-scores was not anticipated but, as noted in an earlier section, could reflect a conscious quality/quantity tradeoff being made by local recruiters. However, it more likely suggests that recruiting individuals capable of achieving high scores is difficult, and with some areas having heavy concentrations of such individuals.

The effect of the remaining two continuous variables, per capita income and area employment, is much smaller than the effect of the variables so far discussed, but they still have high statistical significance. That it is more difficult to recruit individuals in high income areas is well in keeping with expectations, and it is noteworthy that inclusion of the income variable substantially reduces the strong effect of relative pay on recruiting.

Table 4-1. Regressions showing effect of various factors on the applicant to goal ratio and the number of applicants

	Mean (1)	Standard deviation (2)	Dependent Variable 1: Applicants per goal coefficient (3)	t statistic (4)	(std-dv x coef)/ dep mean (5)	Dependent Variable 2: Applicants coefficient (6)	t statistic (7)	(std-dv x coef)/ dep mean (8)
Dependent Variables								
1. applicant	4,635	1,722						
2. applicants/goal	1.000	0.425						
Independent Variables								
3. intercept	- -	- -	4.676	7.83		15,156	6.03	
4. census pay/prevailing pay	0.807	0.115	0.791	5.13	9.0%	3,874	5.97	9.6%
5. test scores	85.60	2.77	-0.041	-6.46	-11.2%	-177	-6.69	-10.6%
6. employment	551,758	719,898	0.000000049	2.20	3.5%	0.00021	2.23	3.3%
7. per capita income	18,436	5,217	-0.000011	-3.01	-5.7%	-0.034	-2.20	-3.8%
8. NRFU cases	72,209	-23,980	0.0000061	6.24	14.5%	0.025	6.19	13.1%
9. recruiting goal	4,867	1,363	-0.00023	-13.72	-31.6%	0.0058	0.08	0.2%
Yes/No Variables					coefficient/ dep mean			coefficient/ dep mean
10. LCOM turnover	0.110	0.313	-0.105	-2.49	-10.4%	-553	3.11	-11.9%
11. Denver region	0.073	0.260	0.505	9.05	50.3%	1,587	6.75	34.2%
12. Seattle region	0.075	0.263	0.350	6.48	34.8%	1,848	8.13	39.9%
13. New York region	0.076	0.266	0.189	2.58	18.9%	826	2.67	17.8%
14. Atlanta region	0.108	0.310	-0.257	-5.42	-25.6%	826	6.34	-27.3%
15. Chicago region	0.088	0.284	-0.151	-3.06	-15.0%	-543	2.62	-11.7%
16. Philadelphia region	0.082	0.275	-0.078	-1.50	-7.7%	-338	1.55	-7.3%
17. Detroit region	0.082	0.275	-0.094	-1.84	-9.3%	-228	1.06	-4.9%
Adjusted R-square			0.520			0.482		

Notes: 1. All coefficients with "t" statistics above 1.97 are statistically significant at the 5 percent confidence level.. Thus, only variables 16 and 17 were not statistically significant.

2. Omitted from the regression specification were the five regions where performance was about average: Boston, Chicago, Kansas City, Charlotte, and Los Angeles. Had we included any of these regions in the regression, the coefficients would be close to zero and far from being statistically significant.

Expectations are that, other factors being equal, the more workers there are in a given LCO area who are employed in private firms, the easier the recruiting is. However, that the effect is small, even though the variation in employment is huge, is highly reassuring that LCOs were able to meet their recruiting objectives even if the ratio of cases to complete to available labor force was low.[3]

Also of substantial importance, we tested the effect on recruiting performance of other variables in our database, but found those variables to have very small, and statistically insignificant effects. Those factors include:

- Population density;
- Stability of AMRs; and
- Start dates for LCOMs and AMRs

We thus conclude that although each of the four factors appeared to be associated with performance when using tabulations to examine the effect of various factors on performance, those relationships were only important to the extent they were correlated with other factors. For example, it appears that turnover of AMRs only mattered to the extent it was correlated with turnover of LCOMs. Similarly, population density by itself had no effect on recruiting performance, once the effects of factors such as relative pay and NRFU cases to complete were taken into account.

Finally, we note that when the fraction of applicants below 26 years old and older than 65 were entered into the regressions, they had very large negative associations with the number of applicants and ratio of applicants to goals. This result suggests that getting young people and retired people to apply for enumerator positions is relatively easy; what is hard is getting a good response from individuals who are working or otherwise are busy with family responsibilities.

Cross-Region Differences in Performance

Table 4-2 shows the ranking of the 14 factors used in our regressions based on the percentages shown in column 8 of Table 4-1. This ranking indicates how large the effect of changes would be in each factor on recruiting performance. Thus, these measures can serve as a guide to where most attention should be

[3] Technically, an area's labor force is the sum of an area's employment and unemployment. However, unemployment rates and cross-area variation in those rates were so low during the recruiting period that employment alone is very highly correlated with the labor force.

focused in planning and executing the 2010 census. More specifically, Table 4-2 indicates that regional variables have the largest effect on performance even after the affect of other factors are taken into account. Thus, it would be highly desirable to determine precisely which regional differences were responsible for these large effects.

The interpretation of the regional results is that *after taking into account the influence of other key factors*, LCOs in the Seattle region recruited 33.9 percent more applicants than LCOs in the omitted regions—Boston, Chicago, Kansas City, Charlotte, and Los Angeles. LCOs in the Denver region recruited 34.2 percent more applicants than LCOs in the omitted regions. Significantly, the two factors with the next largest effects also were regional variables, and no other factors had effects close to the size of these four factors. At the same time, performance showed small deviations from average in the regions omitted from Table 4-2, and the relatively small deviations in the Philadelphia and Detroit regions were not statistically different from performance in the omitted regions.

Table 4-2. Ranking of the effect of the regression factors

Rank	Factor (1)	Percentage change in the number of applications (2)	Factor type (3)
1.	Seattle region	33.9%	0/1
2.	Denver region	34.2%	0/1
3.	Atlanta region	-27.3%	0/1
4.	New York region	17.8%	0/1
5.	NRFU cases	13.1%	continuous
6.	LCOM turnover	11.9%	0/1
7.	Chicago region	-11.7%	0/1
8.	Test scores	-10.6%	continuous
9.	Census pay relative to locally prevailing pay	9.6%	continuous
10.	Philadelphia region	-7.3%	0/1
11.	Detroit region	-4.9%	0/1
12.	Per capita income	-3.8%	continuous
13.	Area employment	3.3%	continuous
14.	Recruiting goal	0.2%	continuous

Note: Based on a one standard deviation increase in a continuous factor or a switch from “no” to “yes” in a 0/1 factor.

The central issue in interpreting these results is whether the regional variables are picking up correlations with variables omitted from our database that are outside of the control of regional officials, or if the results truly reflect differences in the management and other operational factors under the officials’ control.

While it always is possible that some key underlying factor is omitted from our analysis, we think that it is unlikely that such factors would not be at least partially captured by the factors included in our study, such as relative pay, scale of operations, or population density.

One reason for this view is that we tested a broad array of variables and the factors we did include made very substantial differences in the predicted performance of LCOs in different regions. For example, when we did not control for differences in key factors, Los Angeles' performance was about as strong as New York's and Seattle's, but after taking key factors into account, Los Angeles' performance was about average, and New York's only about half as much above average as Seattle's. Similarly, when we did not control for key factors, Charlotte's performance was below average, but after taking key factors into account, it was average.

A second reason for believing that bias due to omitted variables is a minor problem is that our own site visits suggested that there were very substantial management differences across the regions, and the expected effects of those differences appear to be much in keeping with our regression estimates. The regression results also are broadly consistent with the assessments developed by Census Bureau officials we interviewed who observed performance in the field.[4]

Thus, our overall conclusion is that differences in regional management had a large effect on recruiting performance, even if our regression results somewhat overstate the importance of those differences. Thus, it would be very worthwhile to identify how management in the three regions with especially strong performance differed from management in other regions.

While we did not collect the information needed for a more definitive statistical analysis (because we did not systematically interview regional officials), we can draw upon our site visits to make several key observations. Those visits suggest that regions with above average performance (1) encouraged LCOMs to assiduously follow the basic plan developed by headquarters, (2) provided excellent feedback to the LCOMs about the strengths and weaknesses of recruiting in each area of each LCO, (3) helped LCOMs develop effective strategies to deal with problems as soon as they developed, (4) provided timely direct assistance

[4] Census officials consistently felt that the econometric results accurately reflected differences in regional performance. They also were able to point to specific management differences that they felt were likely to go a long way to explaining why outcomes differed across the regions. However, at least some officials felt that factors we did not identify that were outside of the control of regional managers may have accounted for much of the difference. They often based this view on the fact that the largest performance deviations in previously decennial censuses were similar to the deviations in Census 2000. We agree that it would be worthwhile to see if additional factors with strong explanatory power can be found using administrative data and reports that pinpoint management differences as well as data about the characteristics of the labor force, housing stock, and other factors when they become available from the decennial census itself.

through use of regional technicians, and perhaps most importantly, (5) rather than micromanage, gave broad discretion to the LCOMs to meet agreed upon goals and resolve problems in keeping with general guidelines established by the regions.

5. SUMMARY AND CONCLUSIONS

We have derived several important conclusions from this work that are (1) strongly supported by our statistical analysis, (2) in keeping with reasonable expectations, and (3) supported by the observations of independent observers.

Our main results are the following:

1. There was a lot of variation across LCOs in the extent to which they were able to meet or exceed recruiting goals. At the point in early February when recruiting goals were met for the nation as a whole, roughly 10 percent of the LCOs exceeded goals by 50 percent or more, while roughly 35 percent were 50 percent or more below goals.

2. We were able to explain about 50 percent of the variation in recruiting performance using 14 factors describing relative pay, per capita income, area employment, test scores, recruiting goals, NRFU workload, LCOM turnover, and region. The high explanatory power of our regressions indicates that these 14 factors had powerful effects on recruiting performance.

3. Relative pay, which is defined as enumerator pay relative to locally prevailing pay, was a key determinant of recruiting performance. Our analysis of relative pay indicated the following:

    - Increases in enumerator pay rates to over 75 percent of locally prevailing pay greatly facilitated recruiting during Census 2000 relative to the 1990 census.

    - While variation in relative pay across LCOs was far smaller in 2000 than 1990, such variation could not be eliminated entirely.

    - During Census 2000, relative pay was about 77 percent of prevailing pay in LCOs with much below average recruiting performance and about 84 percent of prevailing pay in LCOs with much above average performance. Other factors equal, that variation was associated with a 10 percent increase in the number of applicants in the LCOs with high versus low relative pay.

    - The effect of pay on recruiting is somewhat understated because a one standard deviation (about $5,000) increase in per capita income reduced applicants by about 4 percent, but local pay and per capita income were correlated with each other.

    - Pay increases could have been relied upon to further improve recruiting performance had that been necessary.

4. Much as expected, LCO recruiting was strongly influenced by the NRFU workload (cases to complete). NRFU workload averaged about 80,000 cases, but many LCOs had fewer than 56,000 cases and many more than 104,000 cases. An increase in caseload of 24,000, about one standard deviation, would increase the number of applicants by about 13 percent. This result suggests that LCOs appropriately attempted to match applicants to the number of enumerators that needed to be hired, but other factors strongly affected recruiting success.

5. Contrary to our expectations, LCOs substantially exceeded recruiting goals. Also, since recruiting goals were based on projected mail response rates and housing unit estimates to determine the NRFU workload, they had almost no independent effect on recruiting, once that workload was taken into account. Thus, goals were regarded as minimums**,** which ultimately were exceeded by 82 percent of the LCOs, usually by large amounts.

6. The number of workers employed by private firms in an LCO's operations area had a relatively small, but statistically significant, positive effect on recruiting, even though employment levels in LCOs showed huge variation, with a standard deviation of about 720,000 workers. This suggests that:

   - There were plenty of individuals in virtually every LCO's operations area who could be attracted to apply for census jobs.

   - Areas where NRFU workload was large relative to employment and population were placed at only a slight disadvantage relative to other areas.

7. A one standard deviation increase in test scores, an increase from 85.6 to 88.4, would decrease the number of applicants by almost 11 percent. We speculate that this surprising result is not due to more selective recruiting in some LCOs, but that recruiting was more difficult in areas where many people were likely to do well on the test (even holding relative wages and per capita income constant). If our speculation is accurate, the effect is sufficiently large that variation in test scores should be taken into account in setting wages, and managers should anticipate that alternative methods might be needed to boost recruiting in LCOs with high test scores.

8. We also obtained evidence that management differences strongly influenced recruiting. The most clear-cut evidence is that turnover by an LCOM reduced applicants by about 12 percent. This evidence strongly suggests that LCOM performance is a key determinant of recruiting success and that LCOMs need to be in place for a substantial period in order to be highly effective.

9. By far the largest source of variation in recruiting performance was associated with an LCO being in one of three regions. Being in a fourth region had about as large an effect as that associated with several other factors. Importantly, these results held even, <u>after other key factors were held constant</u>. In particular, LCOs in the Seattle and Denver regions recruited about one-third more applicants than LCOs in other regions, and LCOs in the New York region recruited about 17 percent more applicants.

10. Unfortunately, we did not have the data needed to statistically link these cross-regional differences in performance to differences in specific management practices or other attributes. However, we have little doubt that such differences exist and contributed to the observed effects. These differences might be somewhat overstated because some important factors outside of the control of regional officials were omitted from our database. We hold this view for the following reasons:

    - Our own site visits suggested that there were very large differences in the management practices employed by the regions that strongly affected performance.

    - Our estimates of the effect of differences in regional management on recruiting are broadly consistent with the observations of Census Bureau staff we interviewed who directly observed field operations.

    - We tested a broad array of variables and those we used to hold constant the differences outside of the control of regional officials, had a large effect on measures of regional differences. For example, regression adjusting the results placed Los Angeles in the average category, even though Los Angeles' unadjusted performance was about as good as Seattle's.

11. The influence of regional management appears to be so great that it would be very worthwhile for guiding the 2010 census to determine precisely which management practices substantially boosted performance, and which practices and problems reduced performance. Based on our own site visits we identified six key factors associated with superior performance:

    - Encouraging LCOs to assiduously following the basic plan developed by headquarters;

    - Providing accurate and timely feedback to the LCOMs about the strengths and weaknesses of recruiting in each area of each LCO;

    - Helping LCOMs develop effective strategies to deal with problems as soon as they develop;

    - Providing timely direct assistance through use of regional technicians;

    - Avoiding micromanaging by giving broad discretion to LCO management in order to meet agreed-upon goals and resolve problems in keeping with general guidelines established by the regions; and

    - Rapidly replacing LCOMs and AMRs who are unable to effectively identify and resolve problems.

12. Finally, our analysis makes us wonder if it was reasonable to regard goals as minimums, rather than maximums. Because goals were set so there would be about five applicants for each enumerator slot to be filled, and one backup enumerator was hired for each enumerator opening, it is reasonable to believe that there was no need to exceed goals. In

> Census 2000, only 92 LCOs (18 percent) did not meet their goals by the beginning of April, and of this group only five fell substantially below 70 percent of their goals. However, *there was no LCO for which there were not at least 3.25 applicants for each enumerator slot*. If as we suspect, recruiting goals were more than adequate for staffing NRFU, methods should be developed to conduct the 2010 census without exceeding the goals by such large amounts.

It is important to ensure that goals are met for each LCO as a whole as well as for subareas within the LCO. We understand that there sometimes was substantial variation in an LCO's recruiting performance that usually, but not always, could be balanced by redistributing resources. Examples are in the efforts of recruiting assistants, and use of special mailings to areas where goals were not being met.

It is also important to determine if goals need to take into account variations in acceptance rates and productivity. For example, a case could be made that large numbers of applicants recruited in January or February turned down job offers made in late March or early April. Data on the application date of enumerators suggests that turn-downs of those recruited well before offers were made, were only slightly higher than average. However, we were unable to secure data on which applicants turned down offers of enumerator positions. Thus, it is possible that anticipated differences in acceptance rates should be used in setting goals.