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LABOR FORCE AND UNEMPLOYMENT PROJECTIONS AT THE LOCAL LEVEL

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March 1985

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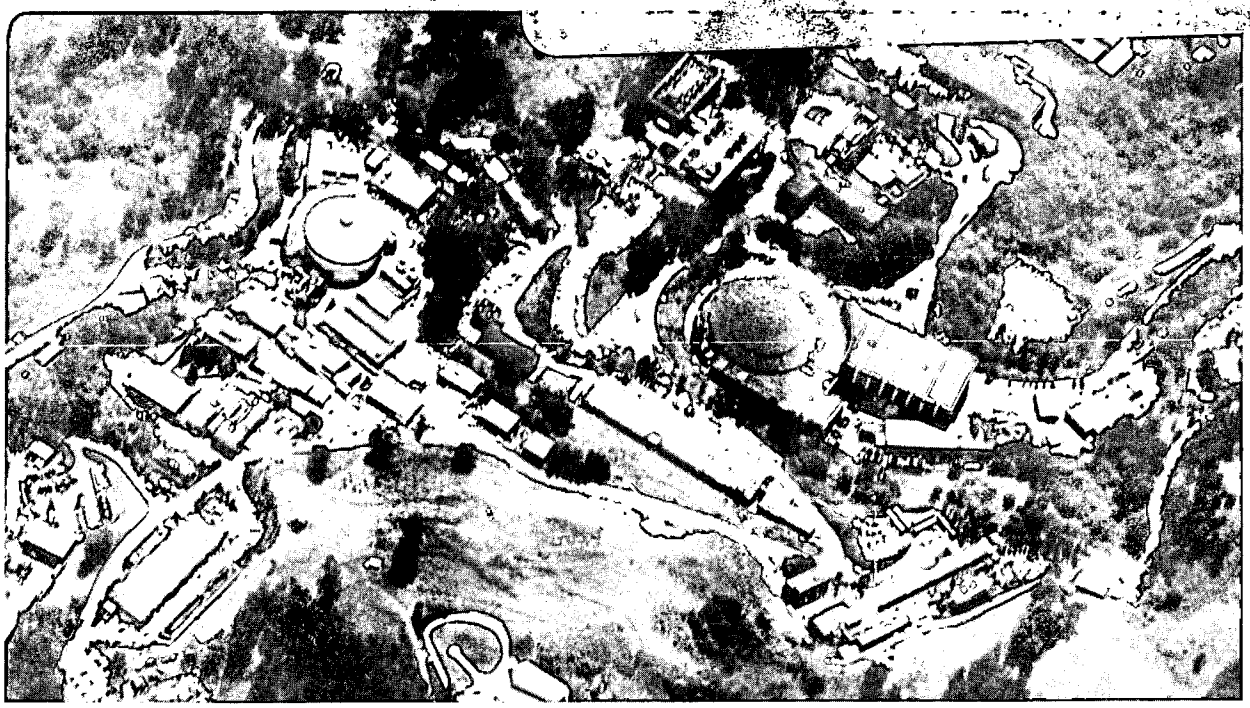

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Labor Force and Unemployment Projections

at the Local Level

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LABOR FORCE AND UNEMPLOYMENT PROJECTIONS

AT THE LOCAL LEVEL

by Esther C. Schroeder

1. Introduction

Since the mid seventies, Lawrence Berkeley Laboratory (LBL) has been collaborating with the US Department of Labor's Employment and Training Administration (ETA) in developing the Labor Market Projections Model or the LMPM. The goal of the LMPM is to provide local planners with estimates of current socio-economic conditions and with short-term demographic forecasts. These estimates and forecasts of the current local labor markets are produced using a uniform methodology for the entire nation.

At the present, the LMPM consists of two independent models. The first model, or Census Updates Model, updates the latest decennial census using the most recent March Current Population Survey (CPS) data [Schroeder, 1984]. The second model, or Projections Model, uses a refined cohort component model to project population, labor force and unemployment by race, sex and age [Schroeder, 1985]. Both models are run at various geographic levels - state, MSAs, Service Delivery Areas (SDAs), and some counties and cities - with particular emphasis on the substate areas.

This paper is concerned with a preliminary testing of some of the results of the Projections Model. The labor force projections are very dependent upon the population projections and the unemployment projections depend upon the labor force projections. The purpose of this paper is to determine how much of the error in each projection process is due to the methodology of the process and how much is due to errors in the data derived through previous projections. To test the methodology of the labor force projections, they were run twice - once using the 1980 population as previously projected and once using the 1980 Census population figures. Similarly, the unemployment projections were also run twice - once using previously projected labor force figures and once using the 1980 Census labor force figures.

Section 2 briefly outlines the methodology of the labor force and unemployment projections. Most of the data sources used and the main assumptions made are covered. Section 3 covers the testing of the models and the results. Both models are quite simple but depend heavily on the results of previous projections. Thus, to show how much of the error is due to the previously calculated projections, and how much is inherent in the models, they are run twice - once using the previously calculated projections, and once replacing these projections by figures from the 1980 Census. Section 4 summarizes briefly the results and suggests what should be studied next.

2. Methodology

The purpose of the labor force and unemployment projections is to provide race, sex and age detail on the projected civilian labor force and unemployment. These models do *not* project the overall level of labor force participation or the total number of persons unemployed. These totals must be obtained from an independent source as inputs for the model. Using the projected total labor force and the total number of unemployed as control totals, the models then estimate the race, sex and age breakdown.

Both the labor force and unemployment projections models rely heavily on the assumption that local changes in labor force participation rates and unemployment rates can be approximated by the corresponding national changes in labor force participation rates and unemployment rates. The national changes in both labor force participation

rates and unemployment rates are race-, sex- and age-specific. These national changes are applied to the latest Census data to yield preliminary labor force and unemployment projections for the target year. The preliminary projections are controlled to independent estimates of the civilian labor force and the number of unemployed persons, respectively, to give the final labor force and unemployment projections.

When this model was developed, it used the 1970 Census as a base.[1] There was more demographic detail for the labor force than for unemployment. For the labor force, data were available for the two sexes, seven age groups ((16-17), (18-19), (20-24), (25-34), (35-44), (45-64), and (65+)), and three racial groups - white, black and other [Census,1972a].

To maximize what unemployment detail could be projected with the data that were available, two sets of unemployment projections were developed. The first set projects unemployment by sex and race only. For all areas, unemployment data were available for the two sexes and the three racial categories - white, black and other [Census,1972a]. The second set projects unemployment by race, sex, and age. Unemployment data with age detail were available only for those counties and places that were in SMSAs in 1970 [Census,1972b]. Thus, for those areas that were in SMSAs in 1970, unemployment projections were also calculated by race, sex and age. The age groups were the same seven as used in the labor force projections; however, there were only two race categories - white and nonwhite.

The first step in both the labor force and unemployment projections is to adjust the base year labor force and unemployment rates, respectively. The rates as obtained from the 1970 Census measure the labor force and unemployment in late March or early April, 1970. They are multiplied by race, sex and age-specific factors to be convert them to annual averages compatible with the annual averages of the Current Population Survey (CPS). These adjusted labor force and unemployment rates are then projected to obtain the average labor force and unemployment by race, sex and age for the target year.

2.1. Labor Force Projections

The labor force projections and both sets of unemployment projections follow the same basic methodology. In order to provide projections of the labor force and unemployment by race, sex and age, they use national changes in labor force participation rates and unemployment rates. To be more specific, the labor force projections are based on

1) the labor force participation rates of the area in the base year,
2) national changes in labor force participation rates by race, sex and age, and
3) the population projections for the target year as already calculated.

National changes in labor force participation rates by race, sex and age can be estimated from the annual averages obtained from the Current Population Survey or CPS [Labor and HEW, 1982]. The annual averages for a given year do not become available until two or even three years after that year. However, the labor force projections are run for a time period 18 to 24 months into the future and require labor force participation rates for that time period. On the assumption that changes in national labor force participation rates over the past 10 or 12 years will continue for another four or five years, the trends in the more recent annual averages are used to estimate the required labor force participation rates. The greatest change is in the increased female labor force participation in the age groups 25-34 and 35-44. The methodology assumes that this trend will continue.

To estimate the national changes needed by the model, a regression line is fitted to the annual change in labor force participation rates as a function of time. For most race, sex and age groups, there are definite linear trends. The fitted regression lines are then

[1]In the early 1980's, the base year 1970 Census data in all models were replaced with 1980 Census data. However, since the purpose of this paper is to compare projections from 1970 to 1980 with 1980 Census data, the following will discuss the model as based on the 1970 Census.

used to estimate national labor force participation rates for the target year. These rates are divided by the corresponding rates for 1970 to obtain the change from 1970 to the target year.

The national changes in labor force participation rates from 1970 to the target year are applied to the labor force participation rates in the local area to obtain estimated labor force participation rates for the target year. By applying these estimated labor force participation rates to the previously projected population, an estimated labor force by race, sex and age is obtained. The final labor force projections are obtained by forcing these estimates to sum to the control total provided independently.

2.2. Unemployment Projections

Both sets of unemployment projections use essentially the same methodology, and this methodology is very similar to that used for the labor force projections. Thus, only the unemployment projections by race and sex will be covered in some detail. The methodology for the unemployment projections by race, sex and age is the same except where otherwise indicated.

The unemployment projections by race and sex are based on

1) the unemployment rates of the area in the base year,
2) national changes in unemployment rates by race and sex, and
3) the labor force projections for the target year as already calculated.

As with the labor force projections, the most important step is trying to estimate national changes from 1970 to the target year. However, current economic conditions have a much greater impact on unemployment rates than on labor force participation rates. To eliminate economic changes and much of the cyclicality of unemployment rates, the 1970 unemployment rate of each race/sex group is divided by the total unemployment rate resulting in a "standardized" proportion. The resultant proportion measures each group's share of unemployment. For a race/sex group whose unemployment is the same as the total unemployment rate, this proportion will be 1. For race/sex groups with less unemployment, this proportion will be less than 1. and for those race/sex groups with more unemployment, this proportion will be greater than 1. National changes are determined by comparing these standardized proportions rather than the actual unemployment rates.

As with the labor force participation rates, the annual changes in these proportions were regressed against time in the hopes of capturing any trend in the changes. In general, the fits were very poor as they were dominated by the two expansion periods of 1971-1974 and 1976-1979. Thus, instead of trying to extrapolate to the target year, the national changes are estimated as the proportions for the latest year for which data are available, divided by the proportions for 1970.

The national changes in unemployment rates are applied to the standardized unemployment rates in the local area to obtain standardized unemployment rates for the local area in the target year. The standardized rates are then multiplied by the total unemployment rate of the area as independently obtained, to yield estimated unemployment rates by race and sex. Applying these estimated unemployment rates to the previously estimated labor force yields an estimated unemployed population by race and sex. The final unemployment projections are obtained by forcing these estimates to sum to the control total.

The above discussion covers the methodology of the unemployment projections by race and sex. The methodology of the unemployment projections by race, sex and age are very similar. The projections for the seven age groups within each race/sex group are controlled to the unemployment rate for the race/sex group as just calculated in the first set of unemployment projections. The standardized rates are calculated by dividing the unemployment rates of each race, sex and age group by the unemployment rate for the race/sex group.

3. Testing of the Projections

Although the main purpose of the Projections Model in the LMPM has been to provide short term projections of the labor force and unemployment by race, sex and age at the local level, most of the effort has gone into improving the population projections. As was shown in Section 2, the labor force projections depend greatly on the population projections, and the unemployment projections depend on the labor force projections. Thus errors in the population projections could lead to even larger errors in the labor force and unemployment projections.

With the release of Summary Tape File 4 (STF4) of the 1980 Census [Census,1982], it is possible to check the labor force and unemployment projections against actual data. To measure the impact of the population projections on the labor force projections, and the impact of the labor force projections on the unemployment projections, the following pairs of projections were made and compared -

1) Labor Force Projections -
   a) Use the 1980 population as projected from the 1970 Census, and
   b) Use the 1980 population as obtained from the 1980 Census.

2) Unemployment Projections by Race and Sex -
   a) Use the 1980 labor force as projected from the 1970 Census and
   b) Use 1980 Census labor force figures.

3) Unemployment Projections by Race, Sex and Age -
   a) Use 1980 unemployment by race and sex, and 1980 labor force, both as projected from the 1970 Census, and
   b) Use 1980 Census labor force figures, and unemployment by race and sex figures.

In summary, within each set, run (a) is based entirely on projections from the 1970 Census - only the control totals are 1980 Census data. Run (b), however, uses 1980 Census data in the place of any projections previously calculated and needed in the current set of projections.

To isolate better the impact of the population projections on the labor force projections and the impact of the labor force projections on the unemployment projections, several data items that had to be estimated when the models were originally run were replaced with actual data. The control totals needed in each set of projections were as determined by the 1980 Census rather than as had been estimated by a state planner. Secondly, in this comparison, the national changes in labor force participation rates and in unemployment rates were obtained by comparing the 1970 CPS annual averages with the 1980 CPS annual averages. A later study will be made to determine what errors are due to the estimation of the national change factors. Thirdly, the base year 1970 Census labor force participation rates and unemployment rates were *not* by adjusted to yield annual averages; instead the actual 1970 Census rates were used. Since the projections were compared with 1980 Census data and not with annual averages, the March/April 1970 rates should be updated and not the 1970 estimated annual averages.

To cover a wide range of geography, the projections were run for all states, except Michigan[2], and for substate areas in Illinois, Massachusetts, New York, Ohio, Pennsylvania, and Washington. The substate areas are the MSAs, county groups, the larger counties, and some cities. These particular states were chosen for the availability of data in the Projections Model and to minimize the the impact of changes in racial self-identification from 1970 to 1980. Other than New York City, most of the areas chosen are not greatly affected by the racial change from 1970 to 1980.

[2]LBL received STF4 for Michigan several months after it had received and processed all the other states. It has not yet been installed in the Projections Model.

3.1. Labor Force Projections

To be able to compare the two sets of labor force projections, a mean absolute percent error is calculated for each area. The percent error is the projected value minus the Census value, with the difference divided by the Census value. The mean absolute percent error is calculated as the weighted average of the absolute value of the percent errors in each race, sex and age group. Each percent error is weighted by the 1980 Census labor force of the corresponding race, sex and age group. It is necessary to consider the absolute value of the error so that the plus and minus errors do not cancel each other.

Although seven age groups are projected for the labor force, the first two age groups (16-17) and (18-19) had to be combined after projecting and before comparing the results with the 1980 Census. STF4 contains only data on the labor force by the desired age groups but not by sex, or for the age group (16-19) by the two sexes. For comparison purposes, the two lowest age groups in the projected labor force were combined.

Table 1 - Mean Absolute Percent Error in the Labor Force Projections

Geographic Areas	Number of Areas	Mean Absolute Percent Error Run (a)	Run (b)
All States	50	6.5%	3.1%
Illinois	40	9.3	2.9
Massachusetts	24	7.5	3.2
New York	82	10.3	3.7
Ohio	32	7.0	2.2
Pennsylvania	62	5.2	3.0
Washington	55	8.4	4.0
Average over 6 states	295	8.4%	3.2%

Table 1 summarizes the mean absolute percent error of the two sets of the labor force projections. In each row, the mean is calculated by weighting the mean in each area by the total labor force of the area. As the first row shows, the mean absolute percent error over the 50 states is quite low - 6.5% - even when the labor force projections are based on the projected 1980 population. It is approximately halved - to 3.1% - when the projections are based on the correct 1980 Census population figures. As the next seven rows show, this pattern is also true for the many substate areas for which the projections were compared. In Illinois, New York, and Ohio, replacing the 1980 population projections with the 1980 Census population figures cut the mean absolute percent error by a factor of three.

Table 2 shows how the mean absolute percent errors of the two runs vary with the size of the geographic area. The total civilian labor force of each area is used as a measure of size of the area. The first pair of rows shows the results for areas with 25,000 or less in the labor force, ie., very small areas. Each successive pair shows results for larger areas ending with the last pair giving the results for areas with 250,000 or more in the labor force. The 295 areas included in this table are the same as in Table 1 - the six states (Illinois, Massachusetts, New York, Ohio, Pennsylvania and Washington) and substate areas in those states.

The first five entries in each row show the distribution of mean absolute percent error for that run type and for areas in a particular size range; the last entry is the weighted mean of the mean absolute percent errors for the run type and size range. The two runs can be compared more easily by looking at percentages rather than the actual counts. By comparing the first row in each pair with the second, there is an obvious improvement in Run (b) over Run (a). Within each set of runs, the mean absolute percent

error is significantly less for Run (b) than for Run (a). As the size of the area increases, the mean absolute percent error for Run (b) decreases faster than the mean absolute percent error for Run (a). For smaller areas, the weighted mean absolute percent error is improved by about a factor of two from Run (a) to Run (b). For larger areas, the improvement is almost a factor of three.

Table 2 - Horizontal Distributions of Mean Absolute Percent Error in the Labor Force Projections

Total Civilian Labor Force	Distribution of Mean Absolute Percent Error <2.5%	2.5-4.9%	5-7.4%	7.5-9.9%	>10%	Weighted Mean
<25,000[3]						
Run(a)	0	0	11	7	82	13.1%
Run(b)	0	14	32	25	9	7.1
25,000-49,999						
Run(a)	0	2	48	20	30	9.0%
Run(b)	0	52	38	10	0	5.2
50,000-99,999						
Run(a)	0	6	31	36	27	10.7%
Run(b)	0	67	30	3	0	4.6
100,000-249,999						
Run(a)	0	13	42	24	21	8.6%
Run(b)	8	82	10	0	0	3.6
>250,000						
Run(a)	0	15	19	28	38	8.1%
Run(b)	17	77	6	0	0	2.9

It must be kept in mind, however, that the low errors of both Run (a) and Run (b) are dependent on someone being able to forecast the total civilian labor force, almost two years in advance. Although the mean absolute percent errors are significantly lower in Run (b) than in Run (a), they are not bad in Run (a) when the 1980 population projections are being used. These figures are particularly low when it is remembered that in each area the mean is calculated over 36 numbers - the two sexes by the three races by the six age groupings. In general, as is to be expected, the percent errors are much lower for the whites than for the other two racial groups.

3.2. Unemployment Projections by Race and Sex

Table 3 summarizes the mean absolute percent error of the pair of the unemployment projections by race and sex. This information corresponds to that presented for the labor force in Table 1. In each area, the mean absolute percent error is calculated by weighting the absolute value of the percent error in each race and sex group by the 1980 Census unemployment of that group. In each row, the mean is calculated by weighting the mean in each area by the total unemployment of the area.

These results are quite different from those for the labor force projections. The mean absolute percent errors are considerably larger and Run (b) shows no improvement over Run (a). The second result is not that surprising. Section 3.1 showed that although the labor force projections were improved by using 1980 population data instead of 1980 population projections, the errors incurred using the 1980 population projections were not bad.

[3]The number of areas within each set is as follows - 56 for <25,000, 40 for 25,000-49,999, 67 for 50,000-99,999, 79 for 100,000-249,999 and 53 for >250,000.

Table 3 - Mean Absolute Percent Error
in the Unemployment Projections
by race and sex

Geographic Areas	Number of Areas	Mean Absolute Percent Error Run (a)	Run (b)
All States	50	8.4%	8.0%
Illinois	40	13.6	13.6
Massachusetts	24	4.9	5.2
New York	82	9.2	8.4
Ohio	32	13.0	12.9
Pennsylvania	62	7.6	7.7
Washington	55	8.1	9.0
Average over 6 states	295	9.9%	9.7%

Table 4 shows how the mean absolute percent errors of the two runs vary with the size of the geographic area. This table corresponds to Table 2 for the labor force projections. The size of each area is determined by the total number of unemployed.

Table 4 - Horizontal Distributions of Mean Absolute Percent Error
in the Unemployment Projections
by race and sex

Total Unemployment	Distribution of Mean Absolute Percent Error <5%	5-7.4%	7.5-9.9%	10-14.9%	15-20%	>20%	Weighted Mean
<2,500[4]							
Run(a)	13	14	7	11	19	36	15.7%
Run(b)	16	8	7	16	19	34	15.9%
2,500-4,999							
Run(a)	16	14	16	12	25	17	13.0%
Run(b)	14	8	16	27	23	12	13.2%
5,000-9,999							
Run(a)	10	6	18	18	18	30	15.0%
Run(b)	6	9	13	26	15	31	15.3%
10,000-25,000							
Run(a)	15	25	18	20	6	16	10.5%
Run(b)	13	23	16	30	3	15	10.8%
>25,000							
Run(a)	17	14	23	34	9	3	8.8%
Run(b)	23	14	20	26	14	3	8.5%

Table 4 reinforces the results presented in Table 3 - the mean absolute percent errors are quite high and there is little difference whether the unemployment projections are based on 1980 labor force projections (Run a) or on 1980 Census labor force figures (Run b). Although the size of the error does decrease with the size of the area, the improvement is not as dramatic as with the labor force projections. These errors are

[4]The number of areas included in each set is as follows - 70 for <2,500, 51 for 2,500-4,999, 78 for 5,000-9,999, 61 for 10,000-25,000 and 35 for >25,000.

particularly large as the correct total number of unemployed is input as a control total and only six numbers (two sex groups by three races) are being calculated. There are several possible reasons.

1) One possible explanation is that the numbers involved are considerably smaller than when projecting the labor force. In general the errors are larger when the numbers to be projected are smaller. However, when projecting the labor force by race, sex and age, 36 different groups are being calculated whereas in the unemployment only 6 race/sex groups are being calculated. In an area with about 8% unemployment, the average number in the labor force for each race/sex/age group is only about twice the number of unemployed persons for each race/sex group. Thus, although the mean absolute percent error should be larger than in the labor force projections, the increase from 3.2% to 9.7% can not be explained solely by the difference in size.

2) Another possible source of error is using annual changes in unemployment rates to update seasonal unemployment rates, ie., the March/April 1970 Census unemployment rates are being projected and compared to March/April 1980 Census unemployment rates. Using annual rates to update seasonal changes would cause problems if the seasonal factors changed from 1970 to 1980. The author doubts this is the case but does not have the data necessary to prove it presently.

Table 5 - Percentage with Positive Errors in the Unemployment Projections
by race and sex

Geographic Areas	Male White	Male Black	Male Other	Female White	Female Black	Female Other
Illinois						
Run (a)	8%	45%	38%	95%	60%	50%
Run (b)	8	48	38	90	64	52
New York						
Run (a)	32	65	27	65	53	37
Run (b)	32	63	26	66	53	42
Pennsylvania						
Run (a)	34	57	31	61	28	28
Run (b)	44	56	43	56	28	26
Ohio						
Run (a)	0	62	41	97	72	29
Run (b)	0	60	44	97	72	35
Washington						
Run (a)	36	44	51	62	28	26
Run (b)	33	62	73	53	28	57
Massachusetts						
Run (a)	58	58	37	58	37	17
Run (a)	54	75	33	58	50	12
All states						
Run (a)	34	50	46	82	48	20
Run (b)	26	48	54	68	54	36

3) Another possible explanation is the changes in racial self-identification between the

1970 and 1980 Censuses[5]. Although the areas chosen for study were intended to minimize this problem, could it still have some impact? In an area where there has been a considerable increase in the number of Spanish-origin persons from 1970 to 1980 due to changes in self-identification, the unemployment projections would be tend to overestimate the number of unemployed whites and would underestimate the number of unemployed others.

Table 5 shows the percentage of positive errors in each of the geographical areas studied for both Run (a) and Run (b). If changes in racial self-identification were biasing the results, most of the percent errors for whites would be positive and those for others would be negative. (For each area, the percent error is calculated as the projected value minus the Census figure, divided by the Census figure.) Table 5 does not show such a pattern. Although, the errors are largely positive for white females, they are largely negative for white males. The errors for blacks and others appear to be about half positive and half negative.

4) Another possible cause of error is the basic assumption on which the model depends, ie., that local race/sex changes in unemployment can be approximated by national race/sex changes in unemployment. The author suspects that there is a considerable variation across the county in changes in unemployment rates by race and sex. Some of this change may be explained by the industries that are involved. For example, in states that were hard hit by unemployment in the automotive industry, with traditionally male occupations, one would expect more male unemployment than female unemployment. On the other hand, in areas largely dependent upon textile mills that traditionally hire females, cutbacks would hit females more than males.

The data in Table 5 goes along with this theory. All the estimates for white male unemployment in Ohio were too low. In 1980, Ohio was suffering from closures in the steel and automotive industries, both traditional male employers. In Massachusetts, with a lot of finance and service industries and little heavy industry, the unemployment estimates were not particularly biased one way or the other.

Table 6 - Mean Absolute Percent Error in the Unemployment Projections
by race, sex and age

Geographic Areas	Number of Areas	Mean Absolute Percent Error Run (a)	Run (b)
All States	50	13.6%	9.0%
Illinois	21	16.1	9.8
Massachusetts	12	16.0	14.8
New York	41	16.0	13.3
Ohio	30	16.7	10.8
Pennsylvania	27	14.0	10.7
Washington	11	15.4	11.4
Average over 6 states	143	15.8%	11.8%

[5]In 1980, 40% of the Spanish-origin persons reported in the "Other" category and about 56% reported "White". In 1970, only 1% of the Spanish-origin persons were classified as "Other" and 93% as "White" [Census,1981].

3.3. Unemployment Projections by Race, Sex and Age

Table 6 summarizes the mean absolute percent error of the pair of the unemployment projections by race, sex and age. This information corresponds to that presented for the labor force in Table 1 and for the unemployment by race and sex in Table 3. In each area, the mean absolute percent error is calculated by weighting the absolute value of the percent error in each race, sex and age group by the 1980 Census unemployment of that group. In each row, the mean is calculated by weighting the mean in each area by its total unemployment. Since these projections could only be calculated for those areas that were in SMSAs in 1970, there are fewer areas than in the preceding comparisons. Although the errors are higher than in the labor force projections, Run (b) does show an improvement over Run (a).

Table 7 shows how the mean absolute percent errors of the two runs vary with the size of the geographic area. This corresponds to Table 2 for the labor force and to Table 4 for unemployment by race and sex.

Table 7 - Horizontal Distributions of Mean Absolute Percent Error in the Unemployment Projections
by race, sex and age

Total Unemployment	Distribution of Mean Absolute Percent Error <10%	10-14.9%	15-19.9%	20-30%	>30%	Weighted Mean
<5,000[6]						
Run(a)	0	0	14	43	43	29.1%
Run(b)	0	13	22	39	26	25.2%
5,000-9,999						
Run(a)	0	7	9	54	30	25.9%
Run(b)	2	14	51	33	0	18.0%
10,000-25,000						
Run(a)	0	23	27	41	9	20.0%
Run(b)	12	34	50	4	0	15.0%
>25,000						
Run(a)	0	46	42	12	0	14.1%
Run(b)	42	43	12	3	0	10.7%

This table shows an increase in accuracy for the larger areas as well as an improvement in accuracy when the 1980 labor force and unemployment by race/sex projections are replaced by the 1980 Census labor force and unemployment by race/sex data. Although unemployment is being projected for the two sexes, two races and six age groups or twenty-four race/age/sex groups, the six age breaks within each race/sex group are controlled to a race/sex unemployment total as obtained from the previous projections in Run (a), or from 1980 Census data in Run (b).

Since the unemployment control total is being split into twenty-four different groups, the numbers involved are smaller and the resultant errors are understandably larger than in the labor force projections or in the unemployment projections by race and sex. Once more is learned about the unemployment projections by race and sex, that information may prove to be helpful in these projections.

[6]The number of areas included in each set is as follows - 23 for <5,000, 43 for 5,000-9,999, 44 for 10,000-25,000 and 33 for >25,000.

4. Summary

In conclusion, the labor force projections do very well, even for small areas. Apparently, local changes in labor force participation rates can be well approximated by national changes. In fact, the mean absolute percent errors are not bad even when the previously calculated population projections are used.

The unemployment projections by race and sex do not do as well. Using 1980 Census labor force data instead of previously calculated labor force projections offers no improvement in the results. Several studies should be made to determine why the errors are larger than expected.

1) To determine how much variation there is in changes in unemployment rates by race and sex, the state level changes from 1970 to 1980 should be calculated and compared with the national changes in unemployment rates.

2) State level data on the occupational mix should be obtained to see if there are correlations between the changes in state level unemployment rates by race and sex and the main occupations of the state.

The author feels that step (1) will show that even state level changes in unemployment rates by race and sex can not be well approximated by the national changes. It is hypothesized that step (2) will show that some of this variation can be explained by differences in the occupational mix over the states.

The unemployment projections by race, sex and age do well when the true labor force figures can be used *and* the unemployment figure by race and sex can be used. However, obtaining the correct unemployment figure by race and sex was shown to be quite difficult in the first set of unemployment projections.

Further studies should also be made of all sets of projections to determine how the calculations of the national changes affect the results. Since the changes in labor fore participation rates seem to follow trends, the necessary extrapolation may not affect the results considerably. Using the actual changes in unemployment from 1970 to the latest year available as a proxy for the changes from 1970 to the target year could have a serious detrimental affect for the unemployment projections. However, if some of the variation in the national changes in race and sex can be explained and some adjustments could be made, using the actual changes as a proxy for the desired changes may be sufficient.

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