TWO APPROACHES TO COUNTY POPULATION PROJECTIONS

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Introduction

This paper reports the results of a comparative effort to project population by standard demographic procedures and by a nondemographic technique utilizing employment as the critical determinant of population. The objective was to arrive at an estimate of the total population of each county in Colorado in the years 1970 and 1980.

Typically, demographic projections are based on three factors: births, deaths, and net migration. For areas which have been experiencing rapid changes in population, net migration is probably the most important variable in any effort to project population. It is assumed that economic opportunity is the most basic determinant of net migration. Hence, the nondemographic approach attempts to project employment first and then to move to a corresponding population figure based upon the historic relationship between population and employment.

Technological change is the variable most often commented upon in discussions of employment projection. To the extent that technological change drastically reduces the employment required to produce goods and services, the relationship between population and employment will be altered and the employment-based technique weakened. It is assumed that while in the long run, technological change is pervasive and widespread, its short-run influence is likely to vary considerably by industry. Further, the short-run influence of technology is likely to be more important on the skill structure of employment in an industry than on total employment in that industry.

Other factors, while less dramatic than technological change, may be more important as limitations on a population projection technique based upon employment. One of the more obvious arises from the fact that people residing in a county but not employed in that county may not be adequately handled. This is the typical situation in so-called "bedroom suburbs" from which people commute to work in large urban centers. Such a situation clearly prevails in the Denver Metropolitan Area. Highly unstable geographic boundaries create another problem particularly when projecting the population of Denver County which has experienced numerous annexations.

For the purposes of this report it was considered unlikely that major commercial oil recovery operations from shale deposits would be underway by 1980. Construction activity after 1960 and its population consequences are missed in our base period which ends with 1960 but are included in Dr. Leasure's demographic base period which is 1960-1965. One can therefore be confident that his projections for such counties will be larger than the employment-based figures. Here as elsewhere, however, to recognize these differences in base years is not to judge one set of projections more likely to be realized than another. If the five years, 1960-1965, illustrate new influences which will become trends for the intervening years to 1980, then their inclusions in the projection base should make that method more accurate. Conversely, if these
five years are viewed as a temporary diversion from basic longer-term trends which have been developing since 1940, then their exclusion from our projection base will not lead us far astray.

One final point is in order concerning the employment-based methods. While five separate sets of figures were calculated for each county in the years of 1970 and 1980, they are all basically dependent upon the relationship between two classes of persons: employables and dependents. Any conditions which make the historic ratio between employment and population inappropriate will rob the method of some of its validity.

In certain counties unique conditions may exist or develop which make the mechanical application of the long-term ratio of population to employment particularly inappropriate. Such conditions may work through either factor in the relationship. For example, a sharp increase in employment opportunities for women will lead to a reduction in the population/employment ratio. The development of light manufacturing and service industries in the relatively poor counties could easily lead to this result. Changes in average family size may have a similar effect. Perhaps more important than either of these is the growing trend toward heavy concentrations of young single people in particular counties for reasons which typically preclude, or at least inhibit, marriage and child rearing. Examples here may be drawn from counties containing colleges and universities and/or military bases.

Perhaps most of these caveats may be reduced to the simple admonition not to accept any projections as immutable. As Evans and Hoffenberg have put it,

The future is not always seen as through a glass darkly, but sometimes as through a brick wall.\(^3\)

**Techniques**

I. Employment-Based Projections

**Method "A"**

Method "A" is based upon a technique for the analysis of regional growth patterns in employment developed by private scholars during the last 25 years\(^4\) and refined by the Office of Business Economics of the U.S. Department of Commerce.\(^5\) It is frequently referred to as the "shift/share" technique. The method attempts to explain regional variations in the rates of growth of employment by breaking down regional growth into its component parts.

The initial component is attributed to overall growth in the national economy. It is assumed that in the absence of regional differences, each area would grow at the same rate and thus retain its share of the national total. This element of national growth is calculated by applying to regional employment in each industry in the base year the percentage increase in national employment which occurred between the base year and the terminal year. The periods used are the 1940-50 and 1950-60 periods. During the first decade total employment in the United States increased from 45,375,815 to 57,474,912 or by