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"An Annual Cost of Living Index for the American States, 1960-1995"

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Appendix S-1

Methodology for Estimating State-Level Median Housing Value

Median housing value data are available for states only in decennial Census years. Thus, our measurement strategy requires that these values be estimated for each year during the period 1961-69, 1971-79, 1981-89 and 1991-95. Our general strategy is to “track” the best available regional housing value data, and if no regional data are available, to use linear interpolation between Census observations at the state level.

Our tracking procedure assumes that the trajectory followed by each state's housing value series over an unobserved period mirrors the trajectory of an observed regional housing value “target” variable during the same period.¹ The best target available for the years 1970, and 1973 to the present, is the Census Bureau's regional median housing value series [as reported in the *Annual Housing Survey* (later renamed *American Housing Survey*)].² The next best data are NAR regional observations of the median value of houses *sold* in a given year, which are available each year beginning in 1968. Finally, regional Census Bureau data are available for the median value of *new* houses sold, beginning in 1963. As we move down this hierarchy of housing data, we focus on an increasingly narrow subset of the homes in a region.

For the periods (i) 1973-79 and (ii) 1981-90, we estimate state housing values by tracking the Census Bureau's regional figure for all housing between (i) observed 1970 and 1980 state-level values, and (ii) observed 1980 and 1990 state-level values, respectively; for the period 1991-95, we track the trajectory of the same regional variable after 1990. For 1971 and 1972, we track the NAR housing data between the observed 1970 and the previously estimated 1973 state-level values. For 1968 and 1969, we track the same NAR regional variable, assuming that a state's median housing value changes at the same rate over the period 1968-70 as does the NAR variable for the state's region.³ For years 1963-67, we track the regional variable reflecting the value of new homes sold, taking a state's previously estimated 1968 value, and assuming that housing value grows at the same rate between 1963 and 1968 as does the regional variable. Finally, since

¹Assume housing value (H) has been observed in a state in year t_1 and later in year t_2 , but not in any intervening years. Assume a *target* variable (T) is observed in years t_1 , t_2 and year t in between. Then the estimated value of H in year t is denoted H^* and determined by

$$H^*(t) = H(t_1) + [(H(t_2) - H(t_1)) * \frac{T(t) - T(t_1)}{T(t_2) - T(t_1)}] .$$

The situation is different when H can be observed only at the beginning (t_1) of the period for which H is being estimated. [This is the case for 1991-95 values of H^* since the last Census observation of state housing values was in 1990.] Here,

$$H^*(t) = H(t_1) * \frac{T(t)}{T(t_1)} .$$

²These regional values themselves are unavailable for 1982, 1984, 1986, 1988, 1992 and 1994; we estimate these values by linear interpolation.

³For example, $H^*(1968) = H(1970) * [T(1968) / T(1970)]$.

no suitable regional housing value data are available prior to 1963, to estimate 1961 and 1962 state housing values, we interpolate linearly between (observed) 1960 values and (previously estimated) 1963 values.

Appendix S-2

Construction of Data for Nonmetropolitan Regions

Per Capita Income: This variable is the total annual personal income divided by the total population (as of July 1), for non-SMSA counties in each region. We had to align the Bureau of Economic Analysis (BEA) subregions with the Census Bureau regions used in the rest of our analysis. For the Census Northeast region, income and population for the BEA's New England and Mideast subregions were aggregated, and values for Delaware and Maryland were subtracted, before the division was performed. For the Census Midwest region, income and population for the BEA's Great Lakes and Plains subregions were aggregated before the division was performed. For the Census South region, income and population for the Southeast region, Delaware, Maryland, Oklahoma and Texas were aggregated before the division was performed. For the Census West region, income and population for the Far West, Rocky Mountain, and Southwest subregions were aggregated, and values for Alaska, Hawaii, Oklahoma and Texas were subtracted before the division was performed. (Sources: For years 1970-95, *Local Area Personal Income: 1969-92*, U.S. Department of Commerce, Bureau of Economic Analysis, 1994. For 1993-95, we utilize data set CA1-3, available at the BEA's web site: <http://www.bea.doc.gov/bea/dr1.htm>.)

Population and Population Change: Regional population estimates are available beginning in 1969, and were used to compute the percentage change in population over the previous five years for years 1977-95. (Note: The distinction between metropolitan and nonmetropolitan counties is based on the 1993 definition of standard metropolitan statistical areas.) (Sources: *Local Area Personal Income: 1969-92*, U.S. Department of Commerce, Bureau of Economic Analysis, 1994. For 1993-95, we utilize data set CA1-3, available at the BEA's web site: <http://www.bea.doc.gov/bea/dr1.htm>.)

Median Housing Value: This variable is based on owner-occupied housing in urban locales outside of SMSAs in each region. Values are observed for 1970, 1973-1981, 1983, 1990, 1993 and 1995. (Note: The distinction between units inside and outside of SMSAs is based on the February, 1971 definition of SMSAs. This is not the same as the 1993 definition.) (Sources: *Annual Housing Survey, Part A: Urban and Rural Housing Characteristics, 1973-1981*, U.S. Department of Commerce, Bureau of the Census; and for later years, *American Housing Survey for the United States in 199X*.)