

Residence Adjustment

Personal income is a measure of income by place of residence. The place of residence of individuals is the State and county in which they live. The place of residence of quasi-individuals is defined for the measurement of personal income as the State and county of the residence of the individuals who benefit from the activities of the quasi-individuals or on whose behalf the income is received.

Accordingly, the residence of military personnel is the State and county in which they live while they are on military assignment, not their permanent or legal State of residence. Thus, the income of military personnel on foreign assignment is excluded from the State and local area personal income series, because their residence is outside of the territorial limits of the United States.

The residence of seasonal migrant workers except those working in Alaska is the State and county in which they live while they are working, not their usual place of residence. However, the residence of foreign citizens who work for international organizations, foreign embassies, or consulates in the United States is the country of which they are citizens.

These definitions of residence differ slightly from some of those used by the Census Bureau, which provides source data that are used in the preparation of the estimates of the residence adjustment and the estimates of population that are used to calculate per capita personal income. For example, the residence of seasonal migrant workers is sometimes reported to the Census Bureau as their usual place of residence rather than the State in which they are living and working on April 1 when the decennial census of population is taken.

The source data for most of the components of personal income are recorded, or treated as if they were recorded, on a place-of-residence basis. These components are transfer payments,

personal dividend income, personal interest income, rental income of persons, and proprietors' income.¹

However, most of the source data for the remaining three components, which compose almost 60 percent of personal income, are recorded by place of work. These components are wage and salary disbursements, other labor income, and personal contributions for social insurance. Therefore, the initial estimates of most of the subcomponents of these three components are on a place-of-work basis. Consequently, these initial place-of-work estimates are adjusted so that they will be on a place-of-residence basis and so that the income of the recipients whose place of residence differs from their place of work will be correctly assigned to their State and county of residence.

Correctly assigning the place of residence of the recipient of the income is more statistically significant for the State and county estimates than for the national estimates. For the county estimates, the income of individuals who commute to work between counties is especially important for those counties in multi-county metropolitan areas.

The county estimates of the residence adjustment are prepared for the net labor earnings--or "income subject to adjustment"--of intercounty commuters and for the wages and salaries of border workers. Income subject to adjustment is defined as wages and salaries plus other labor income minus the personal contributions for social insurance by employees. Because a single residence adjustment estimate is prepared for each county, estimates of these components by industry by place of residence are not available.²

1. For specific information about the source data for the estimates of the major components, see the section "Geographic characteristics of the source data" in the "Overview."

2. Reliable estimates of the residence adjustment by industry cannot be prepared because

Procedure for the income of intercounty commuters, 1990-2001

The county estimates for 1990, which are used in the preparation of the estimates for the subsequent years, were derived in two steps. First, the provisional estimate for each county was prepared. Second, the provisional estimates for some counties were modified.

The 1990 estimates were then extrapolated to obtain the county estimates for 1991-2001. The county estimates for 1991-2001 were derived by extrapolation because intercounty commuting data are available only from the decennial censuses of population, with the 1990 Census being the most recent data available.

Provisional estimates for 1990.--The procedure that is used to prepare the estimates of the county residence adjustment for 1990 is illustrated by the following example of the calculation of the provisional estimates for a two-county area that comprises counties f and g. The example is easily generalized to the calculation of the estimates for more complex areas.

The provisional 1990 estimate of the residence adjustment estimate for county f (RA_f) was calculated as the total 1990 inflows of the income subject to adjustment to county f from county g (IN_f) minus the total 1990 outflows of the income subject to adjustment from county f to county g (OUT_f).

$$RA_f = IN_f - OUT_f$$

The estimates of IN_f and OUT_f were prepared in industrial detail.³ The share ($I_{f,k}$) of total

some of the source data that are used to infer changes in intercounty commuting since the last census of population are not available by industry.

3. The inflows and the outflows of wages and salaries and of other labor income were prepared

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wages or of other labor income (OLI) in a particular industry k in county g that were earned by residents of county f was used in the estimation of industry-level inflows to county f . Analogously, the share ($O_{f,k}$) of wages or of OLI in a particular industry k in county f that were earned by residents of county g was used in the estimation of industry-level outflows from county f . Both $I_{f,k}$ and $O_{f,k}$ were calculated from journey-to-work (JTW) data on the number of wage and salary

for the private sector by Standard Industrial Classification divisions and for the public sector by Federal civilian, military, and State and local governments.

The inflows and the outflows of personal contributions were also calculated, but the calculations are at a more aggregated level because the estimates of the contributions by private-sector employees are not made by industry.

workers (W) and on their average wages (A) by county of work for each county of residence from the 1990 Census of Population.

$$I_{f,k} = \frac{\text{wages earned in } g \text{ by residents of } f}{\text{total wages earned in } g}$$

$$= \frac{(W_{(f \rightarrow g),k})(A_{(f \rightarrow g),k})}{(W_{(f \rightarrow g),k})(A_{(f \rightarrow g),k}) + (W_{(g \rightarrow g),k})(A_{(g \rightarrow g),k})}$$

$$O_{f,k} = \frac{\text{wages earned in } f \text{ by residents of } g}{\text{total wages earned in } f}$$

$$= \frac{(W_{(g \rightarrow f),k})(A_{(g \rightarrow f),k})}{(W_{(g \rightarrow f),k})(A_{(g \rightarrow f),k}) + (W_{(f \rightarrow f),k})(A_{(f \rightarrow f),k})}$$

Where two subscripts are used with an arrow, the first subscript identifies the place of residence, and the second identifies the place of work. For example, $W_{(f \rightarrow g),k}$ is the number of workers in industry k who lived in county f but who worked in county g .

The industry-level inflows to county f from county g ($IN_{f,k}$) were calculated as the inflow ratio multiplied by the corresponding component of the income subject to adjustment (ISA) in industry

k in county g ($ISA_{g,k}$). The industry-level outflows from county f to county g ($OUT_{f,k}$) were calculated as the outflow ratio multiplied by the ISA in industry k in county f ($ISA_{f,k}$).

$$IN_{f,k} = (I_{f,k})(ISA_{g,k})$$

$$OUT_{f,k} = (O_{f,k})(ISA_{f,k})$$

Summing the inflows for all industries yields the total inflows to county f (IN_f), and summing the outflows for all industries yields total outflows from county f (OUT_f).

$$IN_f = \sum_{k=1}^N IN_{f,k}$$

$$OUT_f = \sum_{k=1}^N OUT_{f,k}$$

Modifying the provisional 1990 estimates.--The provisional 1990 estimates of the residence adjustment for some counties were modified in three cases. In the first case, the estimates for each of the almost 1100 counties that are in clusters that have high rates of commuting among their constituent counties (mostly multicounty metropolitan areas) were modified to incorporate the 1989 distribution of wages and salaries from the 1990 census.⁴ The

4. The 1989 distribution reflects the place of residence of the income recipients on April 1, 1990, not their place of residence when they received the wages and salaries.

estimates for these counties were modified because in numerous cases, the geographic coding by place of work of the JTW data and that of the source data for wages and salaries are inconsistent.⁵

First, the provisional estimate of wages and salaries by place of residence for each county in each cluster was calculated as the estimate of wages and salaries by place of work plus the net residence adjustment for wages and salaries.⁶ Second, the provisional place-of-residence estimates of wages for the counties in each cluster were summed to a total estimate for the cluster. Third, the total estimate for each cluster was allocated to the counties of the cluster in proportion to the 1989 wage-and-salary distribution from the 1990 census in order to produce the modified provisional estimates of wages and salaries by county of residence. Fourth, the estimate of the residence adjustment for each county in the cluster was calculated as the modified provisional estimate of place-of-residence wages minus the provisional estimate of place-of-residence wages plus the provisional estimate of the residence adjustment.

The difference between the estimate of the residence adjustment and the provisional estimate of the residence adjustment was expressed as a flow between pairs of counties in the same cluster in order to facilitate the extrapolation of the 1990 residence-adjustment estimates to

5. For example, the source data may attribute too much of the wages of a multi-establishment firm to the county in which a firm's main office is located; the source data for the wages of the personnel employed on a military base that extends across county boundaries may attribute the wages to one county, but the JTW data may attribute these wages to the other county.

6. The net residence adjustment that is used for this calculation includes only the intercounty flows for wages and salaries.

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1991-2001. In the simplest situation--a two-county cluster--the additional flow was assumed to be from the county with the negative difference to the county with the (exactly offsetting) positive difference.

In the second case, the provisional estimate of the residence adjustment for pairs of adjacent counties that are not in a cluster was modified because the 1990 provisional place-of-residence estimate of wages for one of the counties exceeded the place-of-residence measure of wages from the 1990 census by a substantial amount and because the census measure for the other county exceeded the provisional estimate by a similar substantial amount. In order to facilitate the extrapolation of the 1990 residence-adjustment estimates to 1991-2001, these adjacent-county modifications were also expressed as intercounty flows.

In the third case, the provisional 1990 estimates of the residence adjustment for nine county equivalents (boroughs and census areas) in Alaska were modified to account for the large amounts of the ISA received by seasonal workers from out of State. The provisional estimates yielded place-of-residence estimates of wages and salaries that were so much higher than the comparable census data that they could not be an accurate reflection of only the wages of the permanent residents. In order to remove the excess amounts, the JTW-data-based outflows from these county equivalents to selected large counties in Washington, Oregon, and California were judgmentally increased.

Extrapolating the 1990 estimates to 1991-2001.--The 1990 estimates of inflows by industry ($IN_{f,k}^{1990}$) and the 1990 estimates of outflows by industry ($OUT_{f,k}^{1990}$) were extrapolated to 1991-2001.

For each industry, the 1990 inflows to county f from county g were extrapolated to the year t

on the basis of the change in $ISA_{g,k}$ for the industry since 1990, and the 1990 outflows from county f to county g were extrapolated to the year t on the basis of the change in $ISA_{f,k}$ for the industry since 1990.⁷

$$IN_{f,k}^t = \left(IN_{f,k}^{1990} \right) \left(\frac{ISA_{g,k}^t}{ISA_{g,k}^{1990}} \right)$$

$$OUT_{f,k}^t = \left(OUT_{f,k}^{1990} \right) \left(\frac{ISA_{f,k}^t}{ISA_{f,k}^{1990}} \right)$$

The final estimate of the net residence adjustment for the year t for each noncluster county and the provisional estimate of the net residence adjustment for the year t for each cluster county were then calculated. The estimate of the net residence adjustment equals total inflows, summed over all industries, minus total outflows, summed over all industries.

$$RA_f^t = \sum_{k=1}^N IN_{f,k}^t - \sum_{k=1}^N OUT_{f,k}^t$$

7. The superscript 1990 is used in the equation in order to distinguish the variables for 1990 from those for 1991-2001; the variables for 1991-2001 are denoted in the text and in the equation with the superscript t .

The 1990 inflows and outflows that were devised to express the modifications to the 1990 provisional estimates are extrapolated with the ISA for the sum of all the industries.

The provisional estimates of the net residence adjustment for the cluster counties for year t are modified in a four-step procedure that is similar to the modification of the 1990 preliminary estimates for the cluster counties. First, the place-of-residence estimate of ISA for each cluster is calculated as the sum of the place-of-work estimates of ISA for all of the counties in the cluster plus the sum of the estimates of the residence adjustment for all of the counties in the cluster. Second, an allocating series for the counties in each cluster is prepared: The 1990 estimate of the place-of-residence ISA for each county is extrapolated to the year t by a wage series that is derived from tabulations of wages and salaries by place of residence from the Internal Revenue Service.⁸ Third, the place-of-residence estimate of ISA for a cluster is allocated to the counties of the cluster in proportion to the allocating series to yield the final estimate of the place-of-residence ISA. Fourth, the final estimate of the net residence adjustment for each cluster county for the year t is calculated as the final estimate of the place-of-residence ISA minus the estimate of the place-of-work ISA.

8. The county tabulations of the wages that are reported by individuals to the IRS and that are recorded by tax-filing address are available to BEA with a 1- or 2-year lag. These tabulations are used to prepare a series of wages and salaries that is used in the extrapolation of the 1990 estimates of inflows and of outflows.

The tabulations through 2000 were available for the preparation of the 2001 estimates.

This series was extrapolated to 2001 by a set of equations that relates the change in the IRS county tabulations to the change in the county total population.

Procedure for the Income of Border Workers

The residence adjustment for the income earned by border workers accounts for the inflows of the wages and salaries earned by U.S. residents who commute to work in Canada and the outflows of the wages and salaries earned by Canadian and Mexican residents who commute to work in the United States.

The national estimates, in the NIPA's, of inflows and outflows of the wages and salaries of the border workers are prepared in the context of the balance of payments accounts. The portion of the wages received by the U.S. resident border workers that is estimated to be spent in the nations where they work is classified as part of imports. The portion of the wages received by the foreign-resident border workers that is estimated to be spent in the United States is classified as part of exports.

The State and county estimates of the inflows and the outflows of the wages and salaries of border workers are allocations of the national control totals that are drawn from the rest-of-the-world account.⁹ The allocated inflows are added to, and the allocated outflows are subtracted from, the estimates of the net residence adjustment for the income of intercounty

9. The national rest-of-the-world account includes several estimates that are omitted from the State and county estimates. These are estimates of the wages and salaries of (1) U.S. residents working temporarily (for 1 year or less) abroad, (2) foreign residents working temporarily in the U.S., and (3) foreign students enrolled in U.S. colleges and universities. In addition, the rest-of-the-world account includes an estimate of the wages and salaries received by U.S. citizens who are employed in the United States by foreign embassies and consulates and by international organizations; this estimate is included in the State and county estimates of wage and salary disbursements.

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commuters to obtain the final residence-adjustment estimates.

The national estimate of the inflows of the wages and salaries earned by U.S. residents who commute to work in Canada are assigned to Michigan, New York and the New England region on the basis of fragmentary information from the Immigration and Naturalization Service of the Department of Justice. The Michigan portion is assigned to Wayne and Oakland counties, and the New York portion is assigned to Erie and Niagara counties. The New England portion is allocated to the border counties of Maine, New Hampshire, and Vermont in proportion to data for employment in the forest product industries.

The national estimates of the outflows of the wages and salaries earned by residents of Mexico and Canada who commute to work in the United States are allocated to States and counties in proportion to the data from the Immigration and Naturalization Service.