EMPLOYMENT AND INCOME ESTIMATES IN MODELS AND ANALYSES

THE PLACE OF WORK-PLACE OF RESIDENCE PROBLEM

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Perhaps the greatest problem encountered in analyzing the economies of sub-regions has been the lack of current, consistent and complete small area employment and income data.[1] Fortunately, this need increasingly is being met, particularly with the completion of county personal income estimates by the Office of Business Economics of the United States Department of Commerce. However, available regional employment and income data still suffer from certain limitations, including the central theme of this paper, inadequate adjustment for the place of work-place of residence factor.

The place of work-place of residence problem in regional employment and income data arises because employment and, therefore, wages and salaries, are generally reported by place of work. On the other hand, unemployment and, of course, population, are reported by place of residence. These factors cause total personal income and, consequently, per capita income, to be underestimated in most rural areas and overestimated in most metropolitan areas. Since unemployment is generally reported by place of residence and employment is reported by place of work, rates of unemployment tend to be overestimated in rural areas and underestimated in metropolitan areas. Use of regional income and employment data without taking into account the place of work-place of residence factor can lead to a quite erroneous analysis of regional economic conditions. This in turn can lead to a misdirection of public policy.

Regional Employment and Income Data Sources

Five of the most widely used sources of sub-regional employment and income data are (1) the Decennial Census of Population, (2) the Bureau of Labor Statistics' employment and wage estimates, (3) Employment Security Commission "covered" employment data, (4) Old-Age and Survivors Insurance, i.e., Social Security data, and (5) the Office of Business Economics' personal income estimates. Each series varies as to source of data, availability, the effect of seasonal factors, and place of work-place of residence adjustment.

Decennial Census of Population

Employment and income data are two of the many types of information collected by the United States Bureau of the Census during each Decennial Census of Population.[2] The data, derived from questionnaires given in 1960 to a twenty-five percent sample of all households enumerated, until very recently served as the only official source of county income data available on a consistent basis for the entire United States.

The Census of Population employment data are compiled for the census week in April and are subject to a definite seasonal bias, a factor that may be very important for certain industries and certain areas. In addition, the industrial definitions do not follow the Standard Industrial Classification Code that is used as a basis for almost every other employment series. This factor makes direct comparisons somewhat difficult. However, the census employment data do have several favorable characteristics. First, they cover all industrial classifications on a consistent basis. Second, since the data are obtained from employees rather than employers, they do not contain gaps caused by the necessity to withhold confidential information as do series that depend upon reports from employers. Third, the data do not need to be residence adjusted since employment is reported by place of residence.

The Census of Population income estimates are made for the previous year, e.g. 1959 in the case of the 1960 Census. Like the employment data, they are collected on a self-reporting basis and are subject to all of the errors inherent in this type of data collection. Moreover, the data cen be very misleading over time if relative conditions change since they become available only every ten years. However, the Census of Population county income estimates do have the great virtue of having no place of work bias since they are reported by place of residence.

Bureau of Labor Statistics Employment and Wage Estimates

The Bureau of Labor Statistics of the United States Department of Labor makes estimates of "non-agricultural" employment and wages for states and selected sub-state labor market areas.[3] These estimates are derived by applying data obtained from a sample number of business firms to benchmark data obtained as a by-product of the unemployment insurance program. They do not include employment or earnings in agriculture, forestry and fisheries, or in private households. Since the basic data source is employers, the series has a place of work bias.

Employment Security Commission "Covered" Employment

Wage and salary and employment statistics are gathered regularly as a by-product of unemployment insurance programs.[4] Since they are collected on the basis of a 100 percent sample of "covered" employers, the data are quite complete for the types of firms that are included. However, in certain industries omissions range from significant to almost total because coverage under the various state unemployment insurance laws is neither complete nor consistent. Coverage varies from employers having one or more employees to employers having four or more employees, depending upon the particular state. For the United States as a whole, approximately 70 percent of all wage-salary employment is covered by state unemployment insurance laws. In rural areas the percentage is generally much lower.

Because the Employment Security Commission data are considered to be the most complete and most accurate available, they are used as the basic source for Personal Income estimates published by the Office of Business Economics. This gives the OBE estimates a very definite place of work bias since the UI data are reported by the place of the employer.

Old-Age and Survivors Insurance Data

Extensive employment and earnings data are collected by the Social Security Administration and a part of the Old-Age and Survivors Insurance program, and the first quarter industry employment and payroll statistics by county appear in County Business Patterns, published by the Bureau of the Census.[5]

The statistics include information concerning reporting units, payroll, and employment by industry classification and by county location. For the reporting period, coverage is quite complete, including all current wage and salary employment of private non-farm employers and non-profit membership organizations under compulsory coverage by the Social Security System and all employment by religious, charitable, educational, and other non-profit organizations covered under the elective provisions of the Federal Insurance Contribution Act.

The limitations of the OASI statistics are relatively apparent. First, the data have a very definite seasonal bias. No employee contributions are required above the current level of $7,800. Since employees earning more than this amount no longer appear in the OASI compilations, the data are complete only for the first quarter, and thereafter the extent of coverage declines rapidly. For this reason only the first quarter statistics are published in County Business Patterns. Of course, use of only first quarter data may cause an underestimation of employment and wages in industries that have strong seasonal patterns of employment.

Another limitation, also shared by the Employment Security Commission data, is that publication of employment or wage data for any industry in an area that has fewer than three reporting units must be withheld. Understandably, at the county level this requirement causes extensive gaps in the data. Also like the UI data, the OASI statistics have a definite place of work bias since the employer is the basic data source.

Office of Business Economics Personal Income Estimates

Utilizing data from a wide variety of sources, the Office of Business Economics of the United States Department of Commerce estimates quarterly, personal income for the fifty states and the District of Columbia.[6] Furthermore, the Regional Economics Division has recently completed estimates of personal income by county for the years 1929, 1940, 1950, 1959, 1962, 1965, 1966, and 1967.

Many elements of personal income, including proprietors' income, property income, and transfer payments are reported almost exclusively by the place of residence. On the other hand, since Employment Security Commission and Social Security Administration data is the basic source of wage and salary statistics, there is a strong place of work bias in this portion of the OBE personal income estimates. Since wage and salary disbursements and other labor income account for approximately 70 percent of total personal income, estimates of per capita income also have a strong place of work bias, particularly where out-commuting is large.

Unemployment Rate Distortion

When an individual files for unemployemnt compensation, he generally does so at the Employment Security Commission office nearest his home. This means that although he is employed where he works, he is unemployed where he lives. Because of this factor, rates of unemployemnt are generally overestimated in counties that have net out-commuting and underestimated in counties that have net in-commuting.

For example, Lincoln County, North Carolina, was designated as a Redevelopment Area by the Area Redevelopment Administration because of "substantial and persistent" unemployment. In 1961 its rate of unemployemnt stood at 8.2 percent, i.e., the average number of unemployment insurance claims filed in Lincoln County divided by the average number of workers covered by unemployment insurance was 8.2 percent. This did not mean that 8.2 percent of all workers living in Lincoln County were unemployed.[7]

According to the commuting data collected in the 1960 Census of Population, 6,495 non-farm workers were employed in Lincoln County in 1960, 6,017 residents and 478 in-commuters. On the other hand, there were 3,363 out-commuters living in the county, making a total of 9,380 Lincoln County residents who were employed in non-agricultural industries.[8]

If we assume an 8.2 percent rate of unemployemnt among the 6,495 non-agricultural workers reported by the Census to be employed in Lincoln County in 1960, unemployment would have totaled 533. However, many of the unemployed undoubtedly were part of the 3,363 Lincoln County residents employed in other counties. If the 533 unemployed is divided by the total number of employed county residents, 9,380, the rate of unemployment drops to 5.7 percent. This is considerably below the reported 8.2 percent and too low to qualify the county for designation and aid under the Area Redevelopment Act.

A current and more extreme example is Paulding County, Georgia, which at the present time qualifies for aid under the Economic Development Act because of "substantial and persistent" unemployment. However, when adjusted for the 1960 net rate of non-agricultural out-commuting, 101 percent, the October 1968 unemployment rate of 10.6 percent is reduced to 5.4 percent.[9] This adjusted rate would not qualify for the county for designation under the Act.

Short-term migration may also distort unemployment rates. During the 1950's there was a large migration of workers from the mountains of North Carolina to

the automobile assembly plants of the Midwest. When the industry suffered a recession in 1957-58, many of these workers returned to their Appalachian homes and applied for unemployment insurance. Although the state in which they were employed made the actual payment, they were "unemployed" in the county in which they filed. This factor severely distorted unemployment statistics in the area.

For example, in 1958 three counties in the mountains of Western North Carolina, Cherokee, Clay, and Graham, had a reported unemployment rate of approximately 27 percent. However, almost 40 percent of the unemployment insurance claims were inter-state, i.e., they were filed by workers who had been employed in other states. If adjustment is made for these inter-state claims, the unemployment rate drops to 16 percent.[10]

Distortion in Personal Income

The use of unemployment insurance statistics as the primary source of wage and salary data gives the Office of Business Economics' personal income estimates a very definite place of work bias. For states or counties with large commuting flows, distortions in total personal income and per capita income can be quite significant.

For example, unadjusted 1966 per capita income for the District of Columbia was $7,208 while adjoining Maryland and Virginia had per capita incomes of $2,710 and $2,417 respectively. When residence adjusted, using a one percent sample of workers covered under Social Security, District of Columbia per capita income fell to $3,948, or 54.8 percent of the unadjusted figure. On the other hand, Maryland's per capita income rose 18.2 percent to $3,204, while Virginia's per capita income rose 7.8 percent to $2,605.[11]

Altogether, OBE makes twenty-five state to state commuting income adjustments. Data limitations force these revisions to be quite crude, and they probably underestimate the true commuting income flows.

Due to their smaller geographic areas, counties are often very significantly affected by the place of work-place of residence problem, particularly in the case of counties on the fringe of metropolitan areas. Complicating the problem is the fact that county commuting data are more fragmentary and less current.

To illustrate this problem the northwest portion of Georgia has been selected for several reasons. First, the counties in this region are relatively small in geographic area. Second, there is a significant amount of commuting from the outlying counties into the Atlanta SMSA because of a lack of development in the rural counties and the rapidly expanding job market in the Atlanta metropolitan area. Third, one very large firm, Lockheed-Georgia company, attracts large numbers of in-commuters from the entire region.

Figure 1 shows the counties and major traffic arteries of the Lockheed-Georgia commuting area. In 1967 the Lockheed-Georgia company, which manufactures the C5A and C-130 transport planes, employed 23,482 Georgia workers. Of this total 18,543 lived in the Atlanta SMSA, 2,493 in the Ring 1 counties, and 1,732 in the Ring 2 counties. The number of workers commuting to Lockheed-Georgia from each county and their estimated 1966 earnings are shown in Figure 2 and Table 1.

When Lockheed-Georgia earnings are added to non-adjusted personal income, the effect on per capita income levels in surrounding rural counties is quite significant. Table 2 and Figure 3 show that this adjustment would raise 1966 Ring 1 per capita income by 14.3 percent and Ring 2 per capita income by 5.1 percent.

Table 2 presents two different methods of residence adjusting per capita income. Method "A" is very similar to one being used by OBE. The net commuting ratio computed from data in the Census of Population was used to adjust non-governmental earnings for each county. These estimates are probably greatly understated for two principal reasons. First, net commuting rates have undoubtedly increased since 1960. Second, the net commuting ratio is calculated for all industry, i.e., net commuting divided by total employment. The total employment figure is comprised of workers who do little or no commuting across county lines, including agricultural proprietors, unpaid family workers, non-farm proprietors, and a large percentage of governmental employees. The computation of the net commuting ratio used in Method "B" omitted these groups. This omission led to a

FIGURE 1
LOCKHEED-GEORGIA COMMUTING AREA

LEGEND
○———LOCKHEED-GEORGIA PLANT
———ATLANTA SMSA
———RING 1
———RING 2
———MAIN COMMUTING ARTERIES
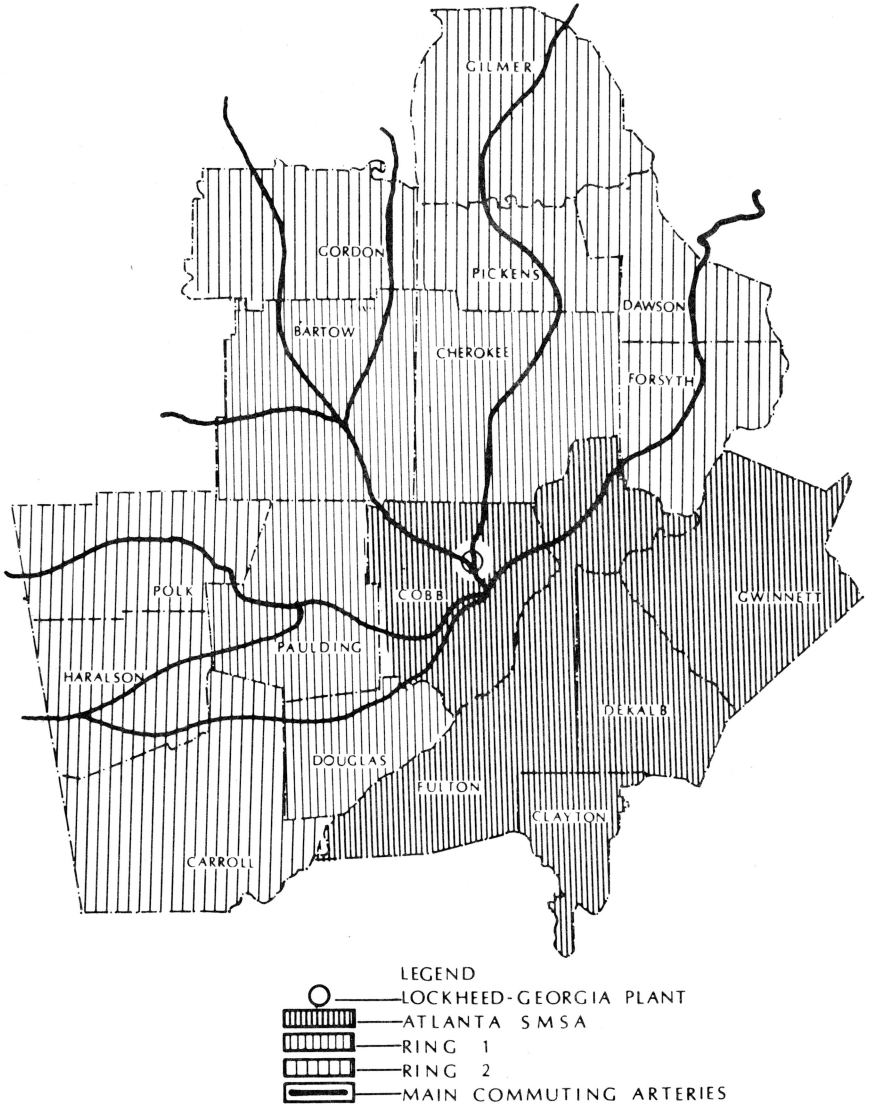
Source See Text

TABLE 1

LOCKHEED-GEORGIA COMMUTING FLOWS

	Estimated Population 1966	Residents Employed at Georgia-Lockheed 1967	Estimated Earnings 1967 (Thousands)
Ring 1 Total	98,600	2,493	26,744
Bartow	33,300	808	6,723
Cherokee	26,700	842	7,006
Douglas	22,800	302	2,513
Paulding	15,800	541	4,502
Ring 2 Total	145,900	1,732	14,411
Carroll	41,700	252	2,097
Dawson	3,600	54	449
Forsyth	15,200	167	1,390
Gilmer	9,800	79	657
Gordon	21,500	309	2,571
Haralson	15,300	240	1,997
Pickens	9,700	250	2,080
Polk	29,100	381	3,170

SOURCE: U. S. Bureau of the Census and Lockheed-Georgia Company.

FIGURE 2
LOCKHEED-GEORGIA COMMUTING FLOWS
SHOWING EMPLOYMENT & EARNINGS IN THOUSANDS

GILMER
79
$633

309   250 $4
$2,475 GORDON $2,002 $432
                PICKENS

                              DAWSON

BARTOW
              CHEROKEE   FORSYTH
808   842   167
$6,471 $6,734 $1,338

381
$3,051
        POLK   541
                  $4,333
                         COBB   GWINNETT

              PAULDING

HARALSON   DEKALB
240   302
$1,922 $2,419
                  DOUGLAS

252   FULTON
$2,018   CLAYTON

        CARROLL

RING 1: TOTALS   2,493 $19,957
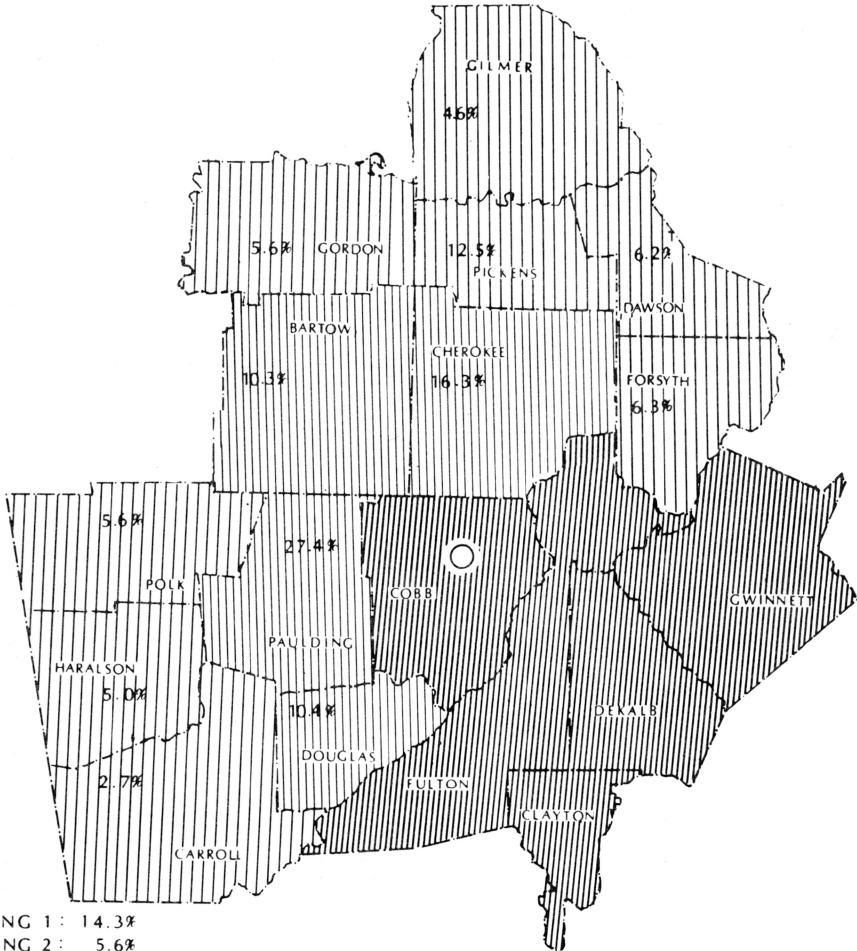RING 2: TOTALS   1,732 $13,871
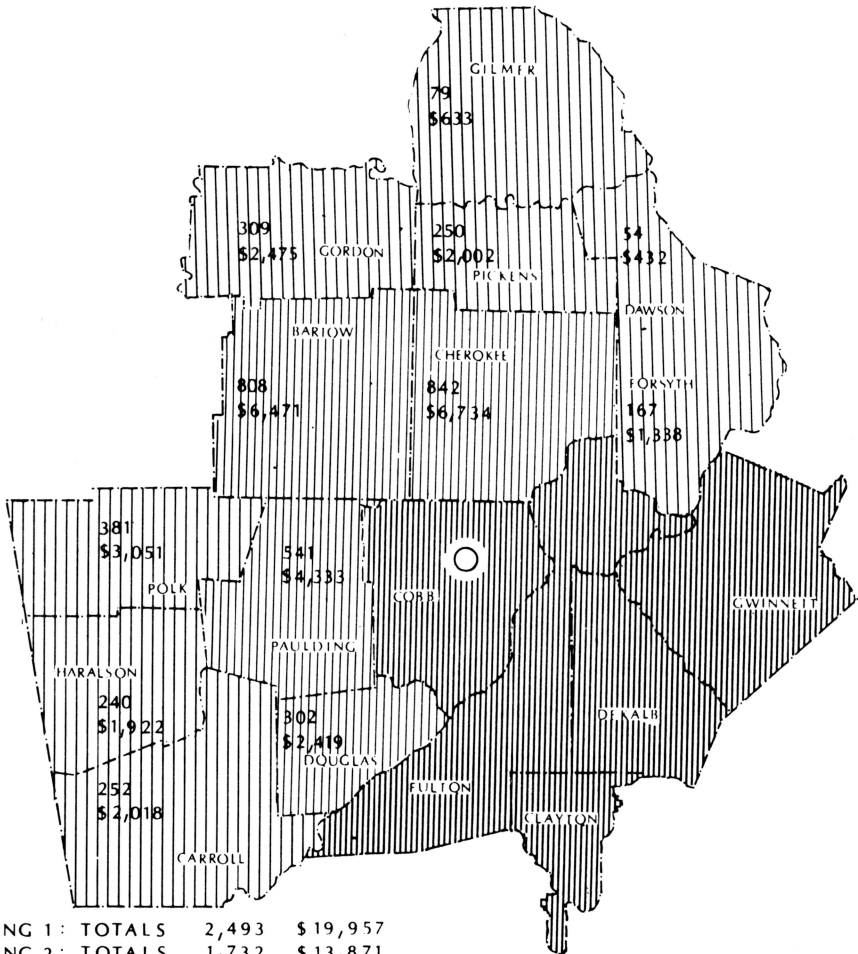
Source: See Text

Table 2

1966 PER CAPITA INCOME -- LOCKHEED-GEORGIA COMMUTING AREA

	Non-Residence Adjusted Per Capita Income	"Lockheed" Adjusted Per Capita Income	Percent Increase	Method "A" Adjusted Per Capita Income	Method "B" Adjusted Per Capita Income
Ring 1	$1416	$1618	14.3	$1705	$1916
Bartow	1779	1973	10.9	1912	1965
Cherokee	1550	1802	16.3	1756	1858
Douglas	1017	1123	10.4	1627	2156
Paulding	1000	1274	27.4	1296	1569
Ring 2	1854	1949	5.1	1966	2008
Carroll	1804	1852	2.7	1882	1909
Dawson	1936	2056	6.2	2091	2145
Forsyth	1388	1476	6.3	1606	1843
Gilmer	1402	1467	4.6	1669	1430
Gordon	2082	2197	5.5	2215	2278
Haralson	2518	2644	5.0	2515	2503
Pickens	1652	1859	12.5	1668	1676
Polk	1860	1964	5.6	1989	2064

Source: Adapted from data supplied by Regional Economics Division, Office of Business Economics, and Lockheed-Georgia Co.

FIGURE 3

IMPACT OF LOCKHEED-GEORGIA EARNINGS
PERCENT INCREASE IN PER CAPITA INCOME

GILMER
4.6%

5.6% GORDON

12.5%
PICKENS

6.2%

DAWSON

BARTOW

CHEROKEE

10.3%

16.3%

FORSYTH
6.3%

5.6%

27.4%

POLK

COBB

GWINNETT

PAULDING

HARALSON
5.0%

10.4%

DEKALB

DOUGLAS

2.7%

FULTON

CLAYTON

CARROLL

RING 1: 14.3%
RING 2: 5.6%

Source See Text

Table 3

ANALYSIS OF PER CAPITA INCOME RESIDENCE ADJUSTMENT

LOCKHEED- GEORGIA COMMUTING AREA

	Increase in Per Capita Income Resulting from Adjustment for:		"Lockheed" Adjustment as Percent of Method "B"	Commuters to Cobb County 1960	Total Out-commuters 1960	Cobb as Percent of Total
	"Lockheed" Commuting	Method "B" Commuting				
Ring 1 Total	$202	$500	40	2964	9139	32
Bartow	194	186	104	649	1719	38
Cherokee	252	308	82	819	1917	43
Douglas	100	1139	9	718	3359	21
Paulding	274	569	48	778	2144	36
Ring 2 Total	793	2099	38	965	8041	12
Carroll	48	105	46	268	2298	12
Dawson	120	209	57	0	290	0
Forsyth	88	455	19	66	1357	5
Gilmer	65	28	232	71(Est.)	230	31
Gordon	115	196	59	179	1141	16
Haralson	126	-15	-	61	871	7
Pickens	207	24	863	125	353	35
Polk	104	304	34	195	1501	13

Source: Table 2 and Regional Economics Division, Office of Business Economics

Table 4

PER CAPITA INCOME AS A PERCENT OF GEORGIA AVERAGE

	Census of Population 1959	OBE Unadjusted 1959	Method "B" Adjusted 1959	Method "B" Adjusted 1966
Ring 1	86	64	86	81
Bartow	89	76	84	83
Cherokee	80	69	82	79
Douglas	88	47	99	91
Paulding	91	51	80	66
Ring 2	79	76	84	85
Carroll	87	78	82	81
Dawson	41	70	77	91
Forsyth	73	78	103	78
Gilmer	58	52	54	61
Gordon	80	72	79	96
Haralson	91	105	105	106
Pickens	74	62	63	71
Polk	87	80	89	87

Source: Table 2 and 1960 Census of Population

larger commuting ratio and thereby increased the residence-adjustment factor.

How adequate are these residence adjustments? Analysis of Table 3 provides a partial answer. For 1966 these data show that the adjustment made in per capita income from Lockheed commuting "explains" 40 percent of the total Method "B" commuting adjustment in the Ring 1 counties. On the other hand, 1960 Census data show that only 32 percent of the out-commuters from the same area worked in Cobb County and that the number working for the Lockheed-Georgia Co. probably did not exceed 13 percent. At the same time, Lockheed commuting accounted for 38 percent of the Ring 2 per capita income adjustment with only 12 percent of the out-commuters employed in Cobb County.

Table 4 demonstrates rather conclusively that non-residence adjusted county per capita income data are greatly understated, at least for an area of large commuting flows. However, it appears that adequate residence adjustment can be made, as is indicated by the similarity between the Census and Method "B" estimates for 1959.[12] However, as commuting patterns change, the residence adjustment data quickly become outdated. This is shown by the decline in relative per capita income for the Ring 1 counties between 1959 and 1966. It is possible that income in these counties was not growing as rapidly as the state average, but it seems more likely that the apparent decline in per capita income resulted from an increase in relative out-commuting flows.

Conclusions

The analysis of this paper leads to the conclusion that if models of small area economies are to be utilized in the formulation of public policy, great care must be exercised in the use of employment and income data because of the place of work-place of residence problem. At the present time it is extremely difficult to make sufficient adjustments for this factor because of the lack of current and adequate data.

[1]The author wishes to acknowledge the assistance provided by Mr. Edwin J. Coleman and Miss Vivian Conklin of the Office of Business Economics, and Mr. Terry Robertson of the University of Georgia.

[2]The United States Department of Commerce, Bureau of the Census, Census of Population, 1960 (Washington: U. S. Government Printing Office, 1960). Summary data are found in the United States Department of Commerce, Bureau of the Census, County and City Data Book, 1967 (Washington: U. S. Government Printing Office, 1967).

[3]Bureau of Labor Statistics, United States Department of Labor, Employment and Earnings Statistics of States and Areas, 1939-1967, Bulletin No. 1370-3 (Washington: U. S. Government Printing Office, June,1968).

[4]Unemployment insurance data are published quarterly in United States Department of Labor, Employment and Wages (Washington: U. S. Government Printing Office).

[5]United States Department of Commerce, Bureau of the Census, County Business Patterns (Washington: U. S. Government Printing Office).

[6]The basic source for personal income data by states in Charles F. Schwartz and Robert E. Graham, Jr., Office of Business Economics, United States Department of Commerce, Personal Income by States Since 1929 (Washington: U. S. Government Printing Office, 1956). The preliminary estimates of personal income by state appear in the April issue of the Survey of Current Business published monthly by the Office of Business Economics, United States Department of Commerce. Revised estimates appear in the August issue of the Survey of Current Business.

[7]Unemployment data on Cherokee, Clay, Graham, and Lincoln County, North Carolina were obtained from the North Carolina Employment Security Commission.

[8]Census of Population commuting data were obtained from the Regional Economics Division, Office of Business Economics and modified to eliminate agricultural workers.

[9]Paulding County, Georgia unemployment data were obtained from the Georgia Department of Labor.

[10]Even the 16 percent figure probably exagerates the severity of Graham County's unemployment in 1958, as do most published rates of unemployment in rural counties. Residence adjustment is, of course, a large problem. In addition, those covered by unemployment insurance often represent a minority of total workers, a minority in industries most subject to unemployment. For example, in Cherokee, Clay, and Graham counties the number of covered workers in 1959 represented only 32 percent of employment reported in the 1960 Census of Population. Coverage exceeded 50 percent of total workers only in manufacturing, and was less than 15 percent in Trade and Services. There was no coverage in Agriculture, Finance, Insurance, and Real Estate, and Government.

[11]Data obtained from the Regional Economics Division, Office of Business Economics.

[12]Some difference between Census and OBE income estimates is to be expected because of differences in definition.