METROPOLITAN STRUCTURE AND COMMUTATION

HENRY D. SHELDON AND SIEGFRIED A. HOERMANN
Bureau of the Census

RESUMEN

El Censo de los Estados Unidos incluyó por primera vez en el año 1960 una pregunta respecto al transporte hasta el lugar de trabajo. Este estudio examina el fenómeno del movimiento diario de personas entre la ciudad central y el anillo suburbano. Se advirtió que la característica general de este movimiento está determinada en gran medida por la distribución de la población entre el anillo y la ciudad central. A medida que disminuye la proporción de la población en la ciudad central, aumenta el porcentaje de aquellos que viven y trabajan en el anillo suburbano y el porcentaje de los que se trasladan diariamente desde el anillo a la ciudad central. En las áreas metropolitanas en que el número de personas que se trasladan diariamente desde el anillo suburbano a la ciudad central constituye una proporción relativamente mayor que el número esperado, la población del anillo parece tener, en contraste con la de la ciudad central, índices más elevados de categaría socio-económica que en aquellas en que este porcentaje es bajo.

An examination of the data for SMSA's on place of work suggests that the proportion of workers living and working in the central city, living and working in the ring, commuting from the central city to the ring and commuting from ring to central city is, in large part, a function of the distribution between central city and ring of residence and workplace. Since people work where jobs are located, the distribution by workplace may also be regarded as a distribution of employment opportunity or jobs. This paper attempts a preliminary and exploratory examination of this notion in a restricted universe of SMSA's. Excluded from consideration are SMSA's in New England, SMSA's adjacent to other SMSA's, workers who worked or lived outside the SMSA, and workers for whom place of work was not reported. The New England SMSA's were excluded on the grounds that any scheme of analysis applicable to them would not be applicable to the rest of the country, and *vice versa*.

Data on workers working in, but living outside, the SMSA's were not readily or completely available, and in view of this situation it seemed advisable to ignore the complementary group—persons living in but working outside the SMSA. If the examination were limited to the simplest situation—the SMSA's in which the patterns of commutation were not complicated by the existence of adjacent SMSA's—then the proportions in these categories could not be large and their absence materially affect the conclusions. We are concerned then with 85 SMSA's which exist in splendid isolation outside New England.

With the disposition of workers living or working outside the SMSA's, the data reduce to a fourfold table cross-classifying place of residence by place of work. A fourfold table, in turn, suggests that it might be of interest to compare the observed frequencies in the 4 internal cells with those implied by the rim totals (Table 1). These expected internal frequencies are those expected on the assumption that the locations of workplace or job and residence are independent. The measure, T, a variant of the coefficient of contingency, provides an indication of the departure of the observed frequencies from those expected on the assumption of independence. The range of this continuum can be illustrated as follows:

1. Every worker who lives in the central city works there, and every worker who lives in the ring works in the ring. $T = 1$. This situation suggests complete separation of the central city and ring and the existence of two separate economies if an economy can be defined in terms of commutation.

2. Workers commute between central

city and ring in accordance with expectation and $T = 0$. This situation suggests reasonably complete integration in the sense of the term as it has been used in the official definition of SMSA's. The boundary of the central city simply cuts out a part of an undifferentiated whole.

3. All workers living in the central city work in the ring and *vice versa* and $T = -1$. This situation might be described as hyperintegration in which the central city and ring are locked in a necropolitan embrace, and urban civilization, clogged with traffic, is grinding to a stop.

The three illustrative theoretical distributions and empirical examples are presented in Table 1. Obviously, none of the theoretical extremes are found in the SMSA's under consideration. The values of T ranged from .23 to .83, and it is only when we examine the daily movement of members of the Armed Forces in the Huntsville SMSA that we find a tenuous suggestion of hyperintegration. These findings are not surprising; although we all know individuals who perform prodigies of commutation, it seems reasonable to assume that there is some element of inertia (sometimes referred to as the "friction of space") and that fewer persons than expected, on the assumption of independence, will cross a given boundary on the way to work. Generally, high T's indicate an appreciable element in the population of the ring which is clearly detached from the economic activities of the central city—the Armed Forces living in barracks outside of El Paso but in El Paso County, the workers on the Iron Range in St. Louis County, Minnesota, and the farm population of the hinterland of the Fargo-Moorhead SMSA.

Although T provides a convenient summary measure of the relation between the observed and expected distribution of workers by residence and workplace, as an abstraction it obscures much of the detail in which there is the greatest interest. We, therefore, turn to this detail but examine it in the context of observed and expected rates.

In Table 2, the SMSA's are ranked by the per cent expected to be living and working in the central city and the array is divided into four groups. The figures serve to elaborate in some detail the initial

Table 1.—INDEX OF INTEGRATION SUGGESTED BY PLACE OF WORK DATA

THEORETICAL

SEPARATION ($T = 1$)

Working	Living		
	Central city	Ring	Total
Central city	50	...	50
Ring	...	50	50
Total	50	50	100

INTEGRATION ($T = 0$)

Working	Living		
	Central city	Ring	Total
Central city	25	25	50
Ring	25	25	50
Total	50	50	100

HYPERINTEGRATION ($T = -1$)

Working	Living		
	Central city	Ring	Total
Central city	...	50	50
Ring	50	...	50
Total	50	50	100

OBSERVED

SIOUX CITY SMSA ($T = .83$)

Working	Living		
	Central city	Ring	Total
Central city	82	3	85
Expected	72	13	
Difference	+10	-10	
Ring	3	12	15
Expected	13	2	
Difference	-10	+10	
Total	85	15	100

LEXINGTON SMSA ($T = .23$)

Working	Living		
	Central city	Ring	Total
Central city	39	31	70
Expected	34	36	
Difference	+ 5	- 5	
Ring	9	21	30
Expected	14	16	
Difference	- 5	+ 5	
Total	48	52	100

ARMED FORCES IN HUNTSVILLE SMSA ($T = -.05$)

Working	Living		
	Central city	Ring	Total
Central city	27	92	119
Expected	35	84	
Difference	- 8	+ 8	
Ring	267	614	881
Expected	259	622	
Difference	+ 8	- 8	
Total	294	706	1000

proposition that the pattern of commutation within the SMSA's examined is, in large part, a function of the distribution of workers and jobs between central city and ring. As the per cent expected to be living and working in the central city declines, the corresponding observed per cent also declines at a level some 10 percentage points above the expected, and the per cent observed living and working in the ring increases, as does the observed per cent commuting from ring to central city. Thus, the expected per cent of persons working and living in central cities declined from a high of 84 for Amarillo to a low of 11 for Pensacola. The corresponding observed values ranged from 88 to 20 per cent. Conversely, the per cents of persons living and working in the ring increased from 5 for Amarillo to 53 for Pensacola and the per cent commuting from the ring to the central city increased from 2 to 18 per cent, respectively.

The figures in Table 3 summarize by groups the materials presented in Table 2 and, in addition, show group means for additional characteristics. The mean percentage of workers living in the central city shows, at a somewhat higher level, the same gradient from Group I to Group IV as shown by the means for the per cent expected to be living and working in the central city. This relationship suggests that if, in general, the pattern of commutation is determined by the distributions of residence and jobs between central city

Table 2.—COMMUTATION RATES FOR SELECTED STANDARD METROPOLITAN STATISTICAL AREAS, 1960

(SMSA's outside New England and not adjacent to any other SMSA ranked by percent expected to be living and working in central city)

SMSA (Listed by name of principal city)	Percent expected CC to CC	Percent observed				T	Years CC = 50,000+	Size in 000's
		CC to CC	R to R	CC to R	R to CC			
GROUP I; $\bar{X}$...	68	75	10	5	10	52	40	268
Amarillo.....	84	88	5	5	2	58	20	149
Austin.....	81	85	6	4	6	48	30	212
Sioux City.....	72	82	12	3	3	83	40	108
El Paso.....	71	80	13	5	2	73	40	314
Memphis.....	71	77	8	3	12	44	70	627
Montgomery.....	71	77	8	6	8	50	30	169
Jackson, Miss....	70	78	11	4	7	60	20	187
Des Moines.....	70	76	10	5	9	49	70	266
Lubbock.....	69	79	13	5	3	69	10	156
Lincoln.....	69	76	10	9	4	54	40	155
Springfield, Mo..	69	75	9	3	14	46	30	126
Wichita Falls....	68	77	13	3	6	64	10	130
Topeka.....	66	72	10	12	6	43	40	141
Charlotte.....	66	72	8	4	16	37	30	272
Albuquerque.....	65	70	9	9	12	32	10	262
Savannah.....	62	69	12	13	7	43	60	188
New Orleans.....	61	70	15	3	12	59	120	868
Baton Rouge.....	60	65	9	5	20	31	10	230
Cedar Rapids.....	59	68	14	2	16	56	30	137
Little Rock.....	59	67	13	4	16	50	40	243
Indianapolis.....	58	64	12	4	20	47	80	698
GROUP II; $\bar{X}$..	53	63	17	7	14	51	44	312
Abilene.....	58	70	18	7	4	69	...	120
Toledo.....	58	65	12	6	17	38	80	457
Ft. Wayne.....	58	64	12	7	17	38	50	232
Corpus Christi...	56	68	18	9	5	62	20	222
San Antonio.....	56	67	17	13	4	59	60	687
Columbus, Ohio...	56	64	15	5	15	47	80	683
Terre Haute.....	56	64	14	7	16	42	50	108
Evansville.....	55	66	19	5	10	61	70	199
Mobile.....	55	65	17	4	14	57	50	314
Rockford.....	55	61	12	4	24	44	40	210
Wichita.....	54	60	13	18	9	34	50	343
Oklahoma City....	51	61	18	4	17	52	50	512
Fargo.....	50	66	24	4	6	75	10	106
Omaha.....	50	63	21	5	12	60	70	458
Brownsville.....	50	62	21	9	8	61	10	151
Davenport.....	50	60	18	11	11	46	40	270
Muncie.....	50	58	16	6	20	37	10	111
Tulsa.....	49	60	21	6	12	56	40	419
Rochester.....	49	53	9	3	35	26	90	586
Waco.....	48	58	20	8	15	49	30	150
Madison, Wis.....	46	58	21	3	18	56	30	222

Table 2—*Continued*

SMSA (Listed by name of principal city)	Percent expected CC to CC	Percent observed				T	Years CC = 50,000+	Size in 000's
		CC to CC	R to R	CC to R	R to CC			
GROUP III; $\bar{X}$.	38	50	25	6	19	50	40	396
Waterloo	45	57	22	3	18	57	20	122
Spokane	45	56	22	10	12	45	50	278
Richmond	45	51	15	4	29	35	90	408
Minneapolis	44	54	20	4	22	48	70	1482
Tampa	43	56	25	5	13	60	40	772
Roanoke	42	57	28	6	10	66	40	159
Honolulu	41	54	25	6	16	56	50	500
South Bend	41	51	22	7	21	43	50	239
Louisville	38	50	26	5	18	53	100	725
Denver	38	50	25	5	19	51	70	929
Lynchburg	37	50	29	3	18	64	...	111
Erie	36	49	29	6	16	55	60	251
Green Bay	36	48	26	5	21	50	10	125
Kalamazoo	36	44	22	6	28	36	30	170
Atlanta	35	46	26	4	25	48	70	1017
Champaign	34	51	35	5	9	70	10	132
Huntington	34	47	30	4	20	55	40	255
Monroe	34	47	30	6	17	56	...	102
Chattanooga	34	43	24	3	29	42	40	283
Lexington	34	39	21	9	31	23	10	132
Huntsville	33	40	24	26	10	29	...	117
GROUP IV; $\bar{X}$..	23	34	38	7	21	46	47	466
Duluth	32	51	38	3	8	79	60	277
Portland, Ore	32	44	30	4	22	45	60	822
Lima	32	40	27	13	19	34	10	104
Kansas City	31	42	29	6	23	46	80	1039
Jacksonville	31	39	26	6	29	36	50	455
Nashville	29	37	26	7	31	31	70	400
Ashville	28	41	35	8	16	51	30	130
Albany	28	37	31	7	25	41	100	658
Columbus, Ga.	26	36	33	15	16	38	20	218
Buffalo	23	34	37	7	22	45	100	1307
St. Louis	22	34	39	3	23	54	120	2060
Charleston, W.Va.	22	33	39	6	22	48	30	253
Fresno	21	33	40	7	20	47	30	366
Macon	21	32	40	8	19	47	40	180
Binghamton	19	29	40	8	23	40	40	213
Eugene	18	29	44	6	21	47	...	163
Knoxville	18	29	42	4	26	47	40	368
Peoria	17	28	44	10	18	44	60	289
Charleston, S.C.	15	27	49	6	17	53	70	216
Greenville	14	25	48	7	20	45	10	210
Orlando	14	24	46	6	24	43	10	318
Pensacola	11	20	53	9	18	41	...	203

Table 3.—MEAN VALUES FOR CHARACTERISTICS OF SELECTED STANDARD METROPOLITAN STATISTICAL AREAS GROUPED BY PERCENT EXPECTED TO BE LIVING AND WORKING IN THE CENTRAL CITY, 1960

(SMSA's outside New England and not adjacent to any other SMSA)

ITEM	Total	Group I percent expected: 58 to 84	Group II percent expected: 46 to 58	Group III percent expected: 33 to 45	Group IV percent expected: 11 to 32
Number of SMSA's	85	21	21	21	22
Percent of all workers living in central city	62	80	69	56	41
Percent expected to be living and working in central city	45	68	53	38	23
Commutation, observed percentages:					
Total	100	100	100	100	100
Living and working in central city	55	75	63	50	34
Living and working in ring	23	10	17	25	38
Commuting, central city to ring	6	5	7	6	7
Commuting, ring to central city	16	10	14	19	21
T	50	52	51	50	46
Years since central city reached 50,000	43	40	44	40	47
Size (in thousands)	362	268	312	396	466
Population of area annexed to central city 1950-60 as percent of total population of SMSA	10	15	14	6	4
Percent increase, 1950-60:					
Total area	30	35	26	31	28
Central city	29	42	32	34	10
Ring	34	21	22	48	45

and ring, then, with some slight increase in generality, it is also determined by the distribution of population between ring and central city. That is to say that the distributions of residence and jobs are so highly correlated that if with some margin of error we can predict the pattern of commutation from the distributions of residence and jobs, we can also, with a slightly wider margin of error, predict the pattern from the distribution of residence by itself. The question then becomes one of explaining why the proportion of the population living in central cities is greater in some SMSA's than in other SMSA's, and there is no very adequate answer short of an intensive historical and case study of each. The materials presented in Table 3, however, give some indication of the characteristics of SMSA's in which the expectation of living and working in the central city is high vs. those in which it is low.

In general, the SMSA's in which this expectation was high, in contrast to those in which it was low, are smaller, had more recently attained SMSA status, had a higher percentage of total population in areas annexed to the central city during the past decade, and had experienced a more rapid population increase in the central city than in the ring during the past decade. These contrasts are not particularly striking. There appear to be definite gradients from Groups I to IV in size and per cent in annexed areas, but not in other characteristics, and it is clear that the classification by the per cent expected to be living and working in the central city does not sort out 4 groups of SMSA's which are internally homogeneous with respect to the characteristics examined.

Although the data presented in Table 2 indicate that the observed per cent working and living in the ring and the observed per cent commuting to the central city from the ring increase as the per cent expected to be living and working in the central city increases, the observed per cent commuting from central city to ring does not show a gradient and with several notable exceptions is relatively low. Among these exceptions is the Huntsville SMSA in which 26 per cent of the workers live in the central city and work in the ring. This figure reflects, presumably, the impact of the Redstone Arsenal on the commuting patterns in the area. Similar situations are indicated by the relatively high rates for Wichita, San Antonio, Savannah, and Topeka. In each of these areas, the percentage of all workers living in the central city is more than the percentage of jobs located there, and the per cent commuting from central city to ring exceeds the per cent commuting from ring to central city. This same pattern is found in an additional six areas, all of them in Texas, and appears to be related to the existence of Armed Forces installations in the ring. In these latter areas, however, the commutation rates in both directions were relatively low.

It is apparent then that extensive commuting from the central city to the ring is a relatively rare phenomenon, and that, generally, commutation, insofar as it exists, conforms to the popular image—the journey to work is typically from the ring to central city.

Turning then to a consideration of commutation from ring to central city, we have used as a measure the observed number of commuters as a per cent of the number expected from the rim totals. This per cent is simply the complement of the per cent deviation from expected. In all the areas examined, the expected number of commuters from ring to central city was greater than the observed number. Thus, for present purposes the expected number may be regarded as an upper limit and the per cents may be interpreted as high commutation rates as they approach 100 per cent.

This index was selected on the assumption that it provided some measure of control over the general effect of the distribution of population between ring and central city. Subsequent investigation has suggested that this assumption may not

be entirely justified, but so far has not provided a satisfactory substitute. The investigation is, however, continuing in an effort to resolve this and several other methodological problems.

In Table 4, the SMSA's are ranked by this percentage and range from 89 for Rochester to 19 for El Paso. As in Table 2, the SMSA's are divided into 4 roughly equal groups.

The item first examined in relation to the commutation rate is designated as "Per cent immobile workers." Operationally, it represents the number of persons working at home and walking to work in the ring expressed as a per cent of the total workers living in the ring. It is meant to identify primarily persons working in agriculture and Armed Forces personnel stationed in barracks in the ring—persons who could not be expected to commute from ring to central city. It is not a very discriminating index, but does show a definite gradient from Group A to Group D. If, however, the persons in question are removed from the fourfold tables and the deviations from expected recomputed, there is still a low but significant correlation.

The next item relates to the observed per cent commuting from the ring to the central city and is the ratio of this per cent for professional and managerial workers to the corresponding per cent for all

Table 4.—Characteristics of Selected SMSA's Ranked by Observed Commutation as Percent of Expected Commutation, Ring to Central City, 1960

(SMSA's outside New England and not adjacent to any other SMSA)

SMSA	Percent observed of expected R to CC	Percent immobile workers in ring	Ratio: prof. & manag. to total (a)	Ratio of medians: Ring to CC		
				Family income	Income of males	Years of school completed, males
GROUP A; $\bar{X}$..	75	10	108	116	123	108
Rochester.....	89	6	130	127	138	125
Lexington.....	86	9	133	163	172	132
Nashville.....	81	6	132	167	180	123
Richmond.....	81	6	113	137	152	121
Rockford.....	79	10	72	94	96	90
Baton Rouge.....	79	8	98	102	111	98
Kalamazoo.....	78	9	97	105	125	102
Jacksonville....	77	13	132	137	135	132
Chattanooga.....	76	8	106	122	121	108
Charlotte.....	75	15	94	103	101	91
Indianapolis....	74	7	126	125	132	121
Albany.....	72	13	117	110	119	105
Toledo.....	71	7	108	112	118	108
Orlando.....	71	9	98	102	105	94
Knoxville.....	70	9	102	122	136	103
Lima.....	70	15	123	102	102	100
Binghamton.....	70	15	108	104	111	108
Albuquerque.....	70	17	54	73	66	96
Muncie.....	70	15	97	106	113	105
Ft. Wayne.....	70	14	102	104	104	100
Atlanta.....	69	7	119	127	142	114
GROUP B; $\bar{X}$..	65	15	101	104	105	99
Memphis.....	69	10	77	99	85	95
Minneapolis.....	69	10	123	113	127	114
South Bend.....	68	15	81	97	94	94
Terre Haute.....	68	14	106	101	100	97
Springfield, Mo.	68	19	70	87	90	89
Buffalo.....	67	10	130	122	125	115
Kansas City.....	67	8	119	113	120	108
Pensacola.....	66	18	111	97	92	95
Green Bay.....	65	25	106	101	94	85
Charleston, W.Va	65	11	73	93	101	78
Greenville.....	65	13	102	100	103	77
Eugene.....	65	12	90	93	109	91
Little Rock.....	65	12	73	89	93	94
Portland.....	64	12	101	100	107	100
Columbus, Ohio..	64	9	126	123	127	124
St. Louis.....	64	9	130	127	132	115
Peoria.....	64	13	122	109	116	103
Oklahoma City...	63	11	104	100	98	105
Cedar Rapids....	63	27	73	93	86	98
Macon.....	63	10	102	136	140	114
Columbus, Ga....	63	40	112	101	78	96

(a) Percent of all professionals and managers who commute from ring to central city.

Table 4—*Continued*

(SMSA's outside New England and not adjacent to any other SMSA)

SMSA	Percent observed of expected R to CC	Percent immobile workers in ring	Ratio: prof. & manag. to total (a)	Ratio of medians: Ring to CC		
				Family income	Income of males	Years of school completed, males
GROUP C; $\bar{X}$..	58	18	88	96	98	92
Denver.....	62	12	104	106	115	102
Fresno.....	62	17	117	88	80	81
Montgomery.....	61	25	60	67	57	73
Madison.....	60	26	102	91	105	94
Huntington.....	60	15	61	84	86	70
Louisville.....	60	8	96	120	121	118
Waterloo.....	60	24	84	95	94	105
Huntsville.....	60	34	49	59	40	80
Waco.....	59	14	65	90	93	87
Charleston, S.C.	58	13	149	131	149	111
Des Moines.....	58	14	102	102	111	100
Austin.....	57	23	93	90	93	77
Wichita.....	57	10	97	103	106	100
Lynchburg.....	56	19	63	82	85	77
Ashville.....	56	15	82	91	88	74
Monroe.....	56	12	96	121	131	92
Mobile.....	56	10	51	83	88	74
Erie.....	55	18	62	100	99	102
Honolulu.....	55	35	106	95	78	100
Davenport.....	54	20	87	96	101	88
New Orleans.....	54	9	129	129	143	117
GROUP D; $\bar{X}$..	37	28	86	86	83	92
Spokane.....	53	22	107	103	100	100
Tulsa.....	51	13	81	78	77	101
Tampa.....	50	11	89	94	102	105
Omaha.....	50	21	100	96	97	100
Topeka.....	49	25	81	87	77	100
Savannah.....	48	12	104	109	110	87
Jackson.....	47	31	77	58	52	88
Evansville.....	46	17	102	92	89	83
Roanoke.....	39	10	85	106	100	95
Wichita Falls...	39	12	84	86	107	81
Brownsville.....	37	28	117	75	71	78
Lincoln.....	36	29	72	75	70	96
Champaign.....	35	39	87	78	112	88
Corpus Christi..	30	27	61	73	59	71
Duluth.....	29	23	61	87	86	91
Fargo.....	28	51	71	74	72	78
Amarillo.....	28	27	135	87	83	89
Abilene.....	26	24	64	73	79	83
Lubbock.....	24	38	45	83	78	81
San Antonio.....	24	56	94	113	75	130
Sioux City.....	19	53	81	74	73	85
El Paso.....	19	51	100	88	49	107

(a) Percent of all professionals and managers who commute from ring to central city.

workers. A ratio of more than 100 indicates a higher rate for the professional and managerial group than for all workers and one of less than 100 the reverse situation. The remaining items are simply ratios of selected medians for the ring to corresponding medians for the central city. These items include estimated median family income, income of males, and years of school completed. In terms of the means for the 4 groups, each of these indexes declines as the commuting rate declines, or more specifically as the observed number commuting falls away from the expected number.

Clearly, the measures relating to socio-economic status need refinement and a ratio is a reasonably primitive device for indicating ring-central city differences. Nevertheless, there appears to be sufficient evidence to support the assumption that in areas in which there were relatively high commuting rates (as here defined) the socio-economic status of the residents of the ring tended to be higher than that of the residents of the central city.

The SMSA's in Groups A and B—those in which the commuting rates were higher and the socio-economic indexes, on the average, were higher in the ring than in the central city—were on the average older and larger than those in Groups C and D; likewise, the per cent of total population in annexed areas was less than in the C and D groups, and the growth of population during the last decade was

greater in the ring than in the central city, whereas the reverse was true of the C and D groups. These findings seem, in general, to be congruent with the position outlined by Schnore in a recent issue of the *American Sociological Review*.[1] His conclusion, greatly oversimplified, for present purposes, is that the tendency for indexes of socio-economic status to be higher in the suburbs than in the central city is, to a large extent, confined to the older and larger SMSA's. Our data suggest that this conclusion might be extended to include high commutation rates to the central city.

The question arises here as to what constitutes the suburbs. Schnore equates them to the census urban fringe, and implicitly we have equated them to the ring of the SMSA. This is essentially a spatial definition which defines as suburban any area which lies outside the central city, be it census urban fringe, suburbs and noncensus urban fringe, or ring. In contrast, suburban areas might be defined as areas of relatively high socio-economic status, wherever they may be. If the first definition is assumed, then it follows that there are many SMSA's in which the ring is not suburban in terms of the second definition. If we proceed from the second definition it can be said that these suburban areas exist everywhere, usually toward the periphery of the built-up area, but that where the city has had an aggressive annexation policy these areas have been swallowed up by the central city and, for many purposes, lost to statistical posterity.

Since the universe of SMSA's considered here is heavily weighted with Southern and particularly Texan SMSA's in which there has been extensive annexation, we are perhaps biased toward the latter hypothesis. A probably atypical, but convincing, example is El Paso. Some 40 per cent (over 125,000 persons) of the total population of the SMSA lived in the area annexed to the city during the decade 1950–60. The median family income was \$5,211 for the central city and \$4,759 for the ring. If the census tracts lying completely within the annexed area are removed from the central city and added to the ring, then the corresponding medians become \$4,889 for the central city and \$5,453 for the ring. In short, in El Paso there do appear to be areas of high socio-economic status on the outskirts of the city which have been absorbed by annexation.

[1] Leo F. Schnore, The Socio-Economic Status of Cities and Suburbs, *American Sociological Review*, Vol. XXVIII, No. 1, pp. 76 ff.

SUMMARY

In conclusion then, the data for SMSA's outside New England and not adjacent to other SMSA's suggest that the general pattern of commuting is, in large part, determined by the distribution of population between ring and central city. As the proportion of population in the central city decreases, the per cent living and working in the ring and the per cent commuting from ring to central city increases. In the relatively few cases in which the number of jobs in the ring is greater than the number of workers living there, the per cent commuting from central city to ring exceeds the per cent commuting from ring to central city. In the SMSA's in which the observed number commuting from ring to central city constitutes a relatively high percentage of the expected number, the population of the ring appears to have, in contrast to that of the central city, higher indexes of socio-economic status than those in which this percentage is low. It is possible that this difference reflects differences in the degree to which the central city has absorbed the areas of relatively high socio-economic status by an aggressive policy of annexation.