Case Studies in the Application of Adjusted Census Data for Planning Projects

Victor Siaurusaitis and Larry Saben, COMSIS Corporation

Abstract

This paper details the reasons for differences between locally collected data and 1990 Census data as determined from a detailed analysis of model development efforts in two planning studies. Agencies around the country are beginning to use Census data that has been adjusted based on newly released Federal Highway Administration publication. A number of issues persist on why it is so difficult to match locally collected data and Census data.

A recently completed publication, *Transportation Planner's Handbook on Conversion Factors for Use of Census Data* has been published to assist planners in using the 1990 Census to develop and calibrate local travel demand models. Collecting new data to complete the development of a local model is not always an option. The 1990 Census provides another source of information to assist in traffic model estimation. Potential users of the Census need to be aware that there would appear to be a variance between results obtained from the Census journey-to-work files and locally developed home interview surveys, even after the use of the Census adjustment factors.

Recently completed projects in Hampton Roads, Virginia and Atlanta, Georgia involved detailed traffic model development and calibration, in conjunction with factor adjusted Census data. Because of the intimate understanding of the data for the study area, and the development of the model sets from the beginning, differences between the locally collected data and Census were explainable.

This paper details possible problems that can arise when comparing the data as they relate to geography, data definition and accuracy of the data collection process.

The 1990 Census Transportation Planning Package (CTPP) is the latest version of a program established for the 1970 Census and continued for the 1980 Census (Urban Transportation Planning Package) in the same general format. The 1990 CTPP is produced by the Bureau of the Census and funded by the various state departments of transportation. Planning and administrative costs were funded by the Federal Highway Administration and the Federal Transit Administration. The Federal Highway Administration also provides project coordination and technical support on the use and application of the Census. Census data as presented in the CTPP cannot be used directly for comparison to traffic forecasting models. Adjustment factors have been developed by the authors so that this data can be directly compared to traffic models and is detailed in the publication *Transportation Planner's Handbook on Conversion Factors for the Use of Census Data* (DTFH61-91-C-00079). This paper details the application of those factors to CTPP and then comparing those results to a traffic model developed in Atlanta, GA. Databases used for this analysis included:

CTPP

The Census Transportation Planning Package (CTPP) is a collection of Census data summary tables developed to meet the needs of transportation planners. The CTPP is primarily based on responses to the long-form Census questionnaire which is completed by one in six households. The long form includes 34 population questions for each person in the household and 19 housing questions. Due to the scale and complexity of the data, the CTPP is divided into two elements:

statewide and urban. The data contained in each element are comparable, and generally differ only in geographic scale. The statewide package was developed for each state and the District of Columbia. The urban package was developed for each CTPP "region" as defined by the region's Metropolitan Planning Organization (MPO).

PUMS Data

Another Census resource which is invaluable to transportation planners is the Public Use Microsurvey (PUMS) data. These files consist of random samples of individual disaggregate household records. Samples are provided at the 1 percent and 5 percent levels, the latter being of greatest interest for transportation planners. In order to ensure privacy of the individual data records the identification of geographic area is limited in the latter data set to areas not smaller than 100,000 population, referred to as Public Use Microsurvey Areas (PUMAs). These areas normally consist of counties or aggregations of counties. Where counties are large enough, PUMAs consist of subdivisions of counties. These data items provide the planner with the capability of aggregating household records in any form that is convenient for analysis. This is particularly useful in the generation of cross-classification trip generation models where information by individual travel zone is not important.

NPTS Dataset

The Nationwide Personal Transportation Survey (NPTS) was used to derive Census conversion factors. The sample size was large enough to permit stratification of some factors by metropolitan area size and normal travel mode. Normal mode is defined as the mode which the survey respondent indicated was their customary mode of travel to work. More important is the fact that the NPTS mode of travel was asked both in terms of an individual's normal mode-to-work during the past week, and in terms of a more conventional travel diary for all household members on a random day of the week. Thus the NPTS files contain all of the data necessary to generate conversion factors directly. Further, the definition of worker in the NPTS includes anyone who was working at all during the past week. This is consistent with the worker definition used by the Census.

TIGER Files

Procedures are currently available to apply Census Topologically Integrated Geographic Encoding & Referencing (TIGER) files to help determine the traffic analysis zone (TAZ) structure for a travel demand model. All major geographic information system (GIS) packages on the market currently have import functions for TIGER files. If traffic analysis zone boundaries are properly related to Census tract boundaries, then both model run results and Census data can be imported to the GIS for analysis.

Atlanta, Georgia Case Study

This paper provides a direct comparison of the application of Census data as adjusted using the factors developed in the Census factors study, to the actual four step model process as developed and calibrated in the greater Atlanta area for the Georgia Department of Transportation. Atlanta was chosen for study for several reasons. First, it is typical of a large growing metropolitan area with a full range of transit modes. Second, the models developed for Atlanta were based on a full range of carefully developed surveys undertaken in 1990 to be contemporary with the Census. Third, the analysts doing the comparison were intimately involved with the development of the models for Atlanta limiting the possibility that there might be inconsistencies in definitions that

could bias the comparison; e.g., area coverage or trip type definitions. The comparison follows the conventional four-step modeling process and applies the Census data as it might be used to develop model components in the absence of locally collected survey data.

Trip Generation

The trip production models used by Atlanta are typical of what is considered to be good practice today. The model as currently applied is a cross-classification model that uses four categories of household size and four categories of auto ownership. The model was developed from relationships derived from a 1990 home interview survey conducted in the Atlanta metropolitan area.

A similar model was derived for comparison purposes from the 1990 Census Public Use Microsurvey (PUMS) files, for the Atlanta region, using identical definitions of household size and autos per household. A trip "production" is normally defined as a trip which begins or ends at home by a member of the household. Consequently, the Census is an excellent source of this data. The resulting Census derived model is compared with the model derived from local surveys in Table 1. The PUMS data sets are random samples of disaggregate Census data and as such are extremely useful products that complement the CTPP. These data sets provide ultimate flexibility in generating any possible cross section of data collected by the Census. Since PUMS data sets are derived from the same set of Census questions as the journey-to-work tabulations; this data must be adjusted using the same adjustment factors recommended for the journey-to-work files. Trip attraction models are normally derived as a statistical function of employment. The Census, unfortunately, can be of little help in this area as employment by place of work is not reported by the Census.

For most cells in the matrix the comparison is excellent with comparatively little variation between the two models. For zero auto households and for the two smallest household sizes the differences are more substantial. Viewing the progression of trip generation rates by auto ownership and household size in each row and column, there would appear to be irregularities in the progressions of both models, which might suggest the utility of using some composite of both models in a further refinement. Some cells also contain small sample sizes contributing to the differences.

Aggregate comparisons of the numbers of trips generated by the two models, illustrated in the row and column totals of Table 2, show an excellent match with an overall difference across the metropolitan area of only about four percent. Differences by county are almost as good with few differences in county to county movements exceeding five percent. Census derived estimates for the inner most counties, Fulton and Dekalb tend to be lower than the survey derived estimates. Conversely, the more rural counties tended to be somewhat overestimated. This difference between the inner and the more rural counties is predictable. A separate home interview survey conducted for the rural counties in 1993 showed lower overall trip generation per household than the survey of the inner counties in the region conducted in 1990. These same conclusions are supported by NPTS data.

The Census PUMS data is a powerful, inexpensive tool for metropolitan transportation planners that should not be ignored in the development of such trip generation models. Even if locally based survey data is available, comparisons with this readily available resource will provide an excellent quality control on the model to be developed.

Table 1: Atlanta HBW person trip generation by socio-economic classification

Survey					
Persons per household	Autos per Household				
	0	1	2	3	4+
1	0.16	0.82	1.02	0.82	0.86
2	0.27	0.99	1.77	1.86	1.94
3	0.37	1.71	2.29	2.70	3.06
4+	1.56	1.90	2.18	2.93	3.43

Census PUMS Data					
Persons per household	Autos per Household				
	0	1	2	3	4+
1	0.43	1.02	1.06	1.01	0.91
2	0.95	1.39	2.01	1.99	1.98
3	1.12	1.67	2.28	2.79	2.87
4+	1.04	1.88	2.30	2.86	3.42

Survey/Census Difference					
Persons per household	Autos per Household				
	0	1	2	3	4+
1	-0.27	-0.20	-0.04	-0.19	-0.05
2	-0.68	-0.40	-0.24	-0.13	-0.04
3	-0.75	0.04	0.01	-0.09	0.19
4+	0.52	0.02	-0.12	0.07	0.01

Percent Difference					
Persons per household	Autos per Household				
	0	1	2	3	4+
1	-170%	-25%	-4%	-24%	-6%
2	-251%	-40%	-14%	-7%	-2%
3	-203%	2%	0%	-3%	6%
4+	33%	1%	-5%	3%	0%

Table 2: Regional Distribution
Atlanta Home-Based-Work Trip Productions - By All Modes

Total Person Trip Productions Estimated from Census Data											
External		14.2	47.8	29.8	5.2	5.9	79.6	28.5	4.8	7.8	223.4
Clayton	2.7	58.1	3.3	11.8	0.3	2.9	46.3	1.9	2.9	0.5	130.6
Cobb	13.4	8.5	167.5	24.0	3.7	0.2	111.0	8.6	0.1	0.4	337.5
DeKalb	7.3	10.6	13.3	178.9	0.4	0.3	151.2	29.2	0.6	2.9	394.7
Douglas	2.7	1.6	8.3	2.6	15.5	0.1	18.6	0.7	0.1	0.0	50.1
Fayette	2.3	11.4	0.9	1.3	0.1	13.2	12.5	0.3	0.5	0.0	42.4
Fulton	8.3	19.1	26.1	55.6	0.8	1.2	284.7	17.3	0.4	0.6	414.2
Gwinnet	9.1	3.6	9.0	71.7	0.2	0.1	51.8	124.5	0.2	1.8	272.0
Henry	1.7	11.2	0.7	5.0	0.0	0.3	9.2	0.7	11.1	0.5	40.4
Rockdale	3.2	1.4	0.6	10.1	0.1	0.0	6.0	1.9	0.4	14.3	38.1
Total	50.7	139.7	277.5	390.8	26.3	24.1	770.7	213.6	21.2	28.9	1,943.6

Total Person Trip Productions Estimated From the Local Model											
External		13.9	50.0	29.9	5.2	5.7	79.6	28.5	4.4	8.0	225.1
Clayton	2.7	59.5	3.3	12.4	0.3	2.9	49.7	1.9	2.9	0.5	136.2
Cobb	13.5	8.7	170.4	25.0	3.8	0.2	114.2	8.8	0.1	0.4	345.1
DeKalb	7.0	11.9	13.3	187.1	0.4	0.3	169.0	29.5	0.6	3.0	422.0
Douglas	2.7	1.8	8.4	2.7	15.8	0.1	19.2	0.7	0.1	0.0	51.7
Fayette	2.3	11.7	0.9	1.3	0.1	13.4	12.8	0.3	0.5	0.0	43.4
Fulton	8.1	21.7	26.5	64.8	0.8	1.1	308.8	17.4	0.4	0.6	450.3
Gwinnet	9.1	3.9	9.2	73.7	0.2	0.1	54.9	126.7	0.2	1.8	279.9
Henry	1.7	11.4	0.8	5.1	0.0	0.3	9.4	0.7	11.3	0.5	41.2
Rockdale	3.2	1.5	0.7	10.4	0.1	0.0	6.3	1.9	0.4	14.6	39.0
Total	50.3	145.9	283.6	412.3	26.7	24.2	823.8	216.6	21.0	29.5	2,033.8

Census Based Estimate - Local Model Based Estimate											
External		0.3	-2.2	-0.1	0.0	0.2	0.0	0.0	0.4	-0.2	-1.7
Clayton	0.0	-1.3	0.0	-0.6		0.0	-3.4	0.0	-0.1	0.0	-5.5
Cobb	-0.1	-0.2	-2.9	-1.0	-0.1	0.0	-3.2	-0.2		0.0	-7.6
DeKalb	0.3	-1.2	-0.1	-8.2	0.0	0.0	-17.8	-0.3	0.0	-0.1	-27.3
Douglas	0.0	-0.2	-0.2	-0.1	-0.3		-0.6	0.0			-1.5
Fayette	-0.1	-0.3	0.0	0.0		-0.2	-0.3		0.0		-0.9
Fulton	0.2	-2.6	-0.4	-9.2	0.1	0.0	-24.1	-0.1	0.0	0.0	-36.1
Gwinnet	0.0	-0.3	-0.2	-2.0		0.0	-3.1	-2.2		0.0	-7.9
Henry	0.0	-0.3	0.0	-0.1		0.0	-0.2	0.0	-0.2	0.0	-0.8
Rockdale	-0.1	0.0	0.0	-0.2		0.0	-0.3	-0.1		-0.3	-0.9
Total	0.3	-6.2	-6.0	-21.5	-0.4	-0.1	-53.0	-2.9	0.1	-0.6	-90.2

Difference in Estimates / Local Model Based Estimate											
External		2%	-4%	0%	-1%	3%			9%	-2%	-1%
Clayton	0%	-2%	0%	-5%	-2%	-2%	-7%	-2%	-3%	-7%	-4%
Cobb	-1%	-2%	-2%	-4%	-2%	5%	-3%	-3%	-3%	-2%	-2%
DeKalb	4%	-11%	0%	-4%	7%	2%	-11%	-1%	-1%	-2%	-6%
Douglas	-1%	-13%	-2%	-4%	-2%	-1%	-3%	-3%	-1%	-4%	-3%
Fayette	-2%	-2%	-4%	-3%	-2%	-2%	-2%	-2%	-4%	-5%	-2%
Fulton	3%	-12%	-2%	-14%	8%	1%	-8%	-1%	2%	4%	-8%
Gwinnet	0%	-8%	-3%	-3%	-3%	3%	-6%	-2%	-3%	-3%	-3%
Henry	0%	-2%	-3%	-2%	-3%	1%	-2%	-3%	-2%	-3%	-2%
Rockdale	-2%	-2%	-3%	-2%	-3%	3%	-4%	-3%	-1%	-2%	-2%
Total	1%	-4%	-2%	-5%	-1%	0%	-6%	-1%	1%	-2%	-4%

Trip Distribution

One of the most powerful applications of the Census journey-to-work files is often in the validation of the regional work trip distribution model. While local home interview surveys can be useful in many aspects of model development, typically there is not enough data acquired to provide accurate estimates of trip distribution at the county level in an area the size of the Atlanta region, much less at the traffic analysis district or zone level. Normally such surveys for an area this size might contain 1,500 to 4,000 completed household records. The magnitude of the Census data make it particularly useful in this context.

Table 2 compares the trip distribution of the gravity model for Atlanta aggregated to the county level with a comparable distribution of trips extracted from the 1990 journey-to-work files for Atlanta and expanded by the factors suggested in this report. The maximum differences between the two distributions are in the range of 10 to 15 percent with the vast majority of the cells having differences of less than 5 percent. Clearly, the use of Census data is appropriate for this purpose, even if the total trips as derived from the Census are to be factored to match regional totals derived locally.

Note: The tables are arranged so that county name listed on the vertical y-axis of each table is in the same order for the x-axis which is not shown in the tables.

Mode Choice

Another valuable application of Census data could be the development, and/or validation of a region's mode choice model. Unfortunately, it would appear to be in the area of identification of mode of travel that the Census journey-to-work data may be weakest. In most of the cities reviewed, there were significant differences between transit trips as reported by the Census and those reported by transit operating agencies, with substantial underestimates of transit ridership commonplace with Census data. The situation is even worse when estimates by transit submodes are considered. These problems are particularly apparent in the Atlanta area where regional bus trips appear to be greatly overestimated while trips on the regional rail system, MARTA, are underestimated.

Tables 3-1 through 3-3 provide a comparison of total transit trips for the Atlanta area, bus trips and rail trips, respectively, as derived from the Census journey-to-work files and expanded by the conversion factors suggested by this report, with totals as reported by on-board surveys completed by MARTA, the regional transit operator, supplemented by data from the Cobb County transit system. The comparison is quite disappointing. Total transit trips as reported by the Census and adjusted are 36 percent lower than those reported locally.

Part of this is to be expected and can be explained by the instructions in the Census to report a trip made by more than one mode as the mode on which the greatest time was spent. Thus a long drive access trip to a MARTA Rail station and a comparatively shorter rail trip would be recorded as an auto trip by the Census. That same trip would be reported as a transit trip in most urban planning models, including Atlanta's.

The differences between these sources is even greater by submode. It appears that bus is substantially over reported while rail trips are under reported. Part of this can, again, be explained by the Census rule of reporting the mode on which one spent the most time on a trip using both bus and rail, but the magnitude of the differences cannot be accounted for entirely from this source.

Table 3-1: Regional Distribution
Atlanta Home-Based-Work Trip Productions - All Transit Sub-Modes

	Total Person Trip Productions Estimated from Census Data										
External	0	94	146	62	0	3	965	44	0	0	1314
Clayton	0	145	81	88	0	0	1198	26	0	0	1537
Cobb	71	83	888	36	0	0	1245	0	0	0	2323
DeKalb	258	545	507	9920	37	0	19437	417	0	12	31134
Douglas	16	0	12	0	25	0	100	0	0	0	154
Fayette	0	0	0	0	0	59	89	0	0	0	148
Fulton	304	1262	1381	6178	83	0	43571	492	0	37	53308
Gwinnet	60	18	10	45	0	0	1025	282	0	0	1441
Henry	12	11	0	14	0	0	38	0	68	0	142
Rockdale	0	0	0	14	0	0	36	0	0	50	99
Total	721	2157	3025	16357	145	62	67704	1261	68	99	91599

	Total Person Trip Productions Estimated From the Local Model										
External	0	0	0	0	0	0	0	0	0	0	0
Clayton	0	175	18	363	0	0	3582	24	0	21	4183
Cobb	0	49	0	391	0	0	1697	0	0	0	2137
DeKalb	0	1552	233	14100	0	0	34007	60	0	0	49952
Douglas	0	205	0	53	0	0	311	0	0	0	569
Fayette	0	0	0	0	0	0	0	0	0	0	0
Fulton	0	3885	1255	14423	0	0	64028	228	0	0	83819
Gwinnet	0	219	0	322	0	0	2614	0	0	0	3155
Henry	0	0	0	0	0	0	0	0	0	0	0
Rockdale	0	0	0	0	0	0	138	0	0	0	138
Total	0	6085	1506	29652	0	0	106377	312	0	21	143953

	Census Based Estimate - Local Model Based Estimate										
External	0	-94	-146	-62	0	-3	-965	-44	0	0	-1314
Clayton	0	30	-63	275	0	0	2384	-2	0	21	2646
Cobb	-71	-34	-888	355	0	0	452	0	0	0	-186
DeKalb	-258	1007	-274	4180	-37	0	14570	-357	0	-12	18818
Douglas	-16	205	-12	53	-25	0	211	0	0	0	415
Fayette	0	0	0	0	0	-59	-89	0	0	0	-148
Fulton	-304	2623	-126	8245	-83	0	20457	-264	0	-37	30511
Gwinnet	-60	201	-10	277	0	0	1589	-282	0	0	1714
Henry	-12	-11	0	-14	0	0	-38	0	-68	0	-142
Rockdale	0	0	0	-14	0	0	102	0	0	-50	39
Total	-721	3928	-1519	13295	-145	-62	38673	-949	-68	-78	52354

	Difference in Estimates / Local Model Based Estimate										
External											
Clayton		17%	-349%	76%			67%	-7%		100%	63%
Cobb		-69%		91%			27%				-9%
DeKalb		65%	-118%	30%			43%	-595%			38%
Douglas		100%		100%			68%				73%
Fayette											
Fulton		68%	-10%	57%			32%	-116%			36%
Gwinnet		92%		86%			61%				54%
Henry											
Rockdale							74%				28%
Total		65%	-101%	45%			36%	-304%		-373%	36%

Table 3-2: Regional Distribution
Atlanta Home-Based-Work Trip Productions - Bus Transit

	Total Person Trip Productions Estimated from Census Data										
External	0	84	121	52	0	3	610	35	0	0	905
Clayton	0	134	55	75	0	0	428	0	0	0	691
Cobb	43	83	880	28	0	0	860	0	0	0	1893
DeKalb	144	236	457	9292	37	0	12757	346	0	12	23281
Douglas	0	0	12	0	25	0	25	0	0	0	62
Fayette	0	0	0	0	0	59	37	0	0	0	97
Fulton	159	969	1234	5378	83	0	36040	359	0	37	44258
Gwinnet	26	0	0	40	0	0	127	258	0	0	451
Henry	0	11	0	14	0	0	19	0	68	0	112
Rockdale	0	0	0	14	0	0	36	0	0	50	99
Total	371	1517	2760	14892	145	62	50939	998	68	99	71850

	Total Person Trip Productions Estimated From the Local Model										
	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	41	0	0	0	41	
0	0	156	6492	0	0	5865	0	0	0	12513	
0	0	0	0	0	0	0	0	0	0	0	
0	0	0	0	0	0	0	0	0	0	0	
0	524	0	2565	0	0	11973	0	0	0	15062	
0	0	0	188	0	0	0	0	0	0	188	
0	0	0	0	0	0	0	0	0	0	0	
0	0	0	0	0	0	0	0	0	0	0	
0	524	156	9245	0	0	17879	0	0	0	27804	

	Census Based Estimate - Local Model Based Estimate										
External		-84	-121	-52	0	-3	-610	-35	0	0	-905
Clayton	0	-134	-55	-75	0	0	-428	0	0	0	-691
Cobb	-43	-83	-880	-28	0	0	-819	0	0	0	-1852
DeKalb	-144	-236	-301	-2800	-37	0	-6892	-346	0	-12	-10768
Douglas	0	0	-12	0	-25	0	-25	0	0	0	-62
Fayette	0	0	0	0	0	-59	-37	0	0	0	-97
Fulton	-159	-445	-1234	-2813	-83	0	-24067	-359	0	-37	-29196
Gwinnet	-26	0	0	148	0	0	-127	-258	0	0	-263
Henry	0	-11	0	-14	0	0	-19	0	-68	0	-112
Rockdale	0	0	0	-14	0	0	-36	0	0	-50	-99
Total	-371	-993	-2604	-5647	-145	-62	-33060	-998	-68	-99	-44046

	Difference in Estimates / Local Model Based Estimate										
							-1997%				-4518%
		-193%	-43%			-118%				-86%	
	-85%		-110%			-201%				-194%	
			79%							-140%	
	-189%	-1669%	-61%			-185%				-158%	

Table 3-3: Regional Distribution
Atlanta Home-Based-Work Trip Productions - Rail Transit

	Total Person Trip Productions Estimated from Census Data										
External	0	10	24	10	0	0	355	10	0	0	409
Clayton	0	11	26	13	0	0	770	26	0	0	845
Cobb	28	0	7	9	0	0	386	0	0	0	429
DeKalb	115	309	50	628	0	0	6681	71	0	0	7853
Douglas	16	0	0	0	0	0	76	0	0	0	92
Fayette	0	0	0	0	0	0	51	0	0	0	51
Fulton	145	293	148	800	0	0	7531	133	0	0	9050
Gwinnet	34	18	10	5	0	0	898	24	0	0	989
Henry	12	0	0	0	0	0	18	0	0	0	31
Rockdale	0	0	0	0	0	0	0	0	0	0	0
Total	350	641	265	1465	0	0	16765	264	0	0	19749

	Total Person Trip Productions Estimated From the Local Model										
	0	0	0	0	0	0	0	0	0	0	0
0	175	18	363	0	0	3582	24	0	21	4183
0	49	0	391	0	0	1656	0	0	0	2096
0	1552	77	7608	0	0	28142	60	0	0	37439
0	205	0	53	0	0	311	0	0	0	569
0	0	0	0	0	0	0	0	0	0	0
0	3361	1255	11858	0	0	52055	228	0	0	68757
0	219	0	134	0	0	2614	0	0	0	2967
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	138	0	0	0	138
0	5561	1350	20407	0	0	88498	312	0	21	116149

	Census Based Estimate - Local Model Based Estimate										
External		-10	-24	-10	0	0	-355	-10	0	0	-409
Clayton	0	164	-8	350	0	0	2812	-2	0	21	3338
Cobb	-28	49	-7	382	0	0	1270	0	0	0	1667
DeKalb	-115	1243	27	6980	0	0	21461	-11	0	0	29586
Douglas	-16	205	0	53	0	0	235	0	0	0	478
Fayette	0	0	0	0	0	0	-51	0	0	0	-51
Fulton	-145	3068	1107	11058	0	0	44524	95	0	0	59707
Gwinnet	-34	201	-10	129	0	0	1716	-24	0	0	1978
Henry	-12	0	0	0	0	0	-18	0	0	0	-31
Rockdale	0	0	0	0	0	0	138	0	0	0	138
Total	-350	4921	1085	18942	0	0	71733	48	0	21	96400

	Difference in Estimates / Local Model Based Estimate										
	94%	-42%	96%			79%	-7%		100%	80%
	100%		98%			77%				80%
	80%	35%	92%			76%	-18%			79%
	100%		100%			76%				84%
	91%	88%	93%			86%	42%			87%
	92%		96%			66%				67%
						100%				100%
	88%	80%	93%			81%	16%		100%	83%

Clearly there is no substitute for locally derived transit data for the estimation or validation of a model capable of estimating modal choice. However, where an adequate on-board survey providing true origins and destinations of trips, not just station of boarding and alighting, is not available, the Census may be useful to provide a crude estimate of the distribution of trips. This distribution could then can be factored to an estimate of total linked home-based-work transit trips provided by local transit operators. If all else fails, the Federal Transit Administration Section 15 data source can supply estimates of total daily unlinked transit trips. Estimates of the percent all trips which are home-based work and the percent of transfers on the system can normally be estimated by the transit operator or derived from other similar transit systems nationally.

Note: The tables are arranged so that county name listed on the vertical y-axis of each table is in the same order for the x-axis which is not shown in the tables.

Conclusions

The greatest disparity for comparing the Census adjusted data to the local model data is based upon the inherent problems in the Census data. Because the Census asks for “typical/usual” data and “longest” mode, non-primary modes (transit) suffer from the adjustment and can only be assumed to be a best guess estimation. Comparisons for trip ends and trip distribution for total trips and auto trips proved to be close while the transit sub-modes had erratic results. The definition of the study region also plays a part in the disparities. Regions as defined by the traffic model versus Census boundaries can affect the number of trips used in the comparison. A third issue is the sample size that is available in any given stratification cell (1 auto-5 person households as an example) or distribution exchange (outlying zones-to-outlying zones) which tends to make these increments portray the greatest disparity in the comparison.

Preliminary comparisons have also been made using the Census adjusted data with locally developed model data in Hampton Roads, Virginia and Salt Lake City, Utah. Consistent with the Atlanta data, comparisons for total and auto for trip generation, trip distribution and mode split showed similar results to the Atlanta data set. Cells in the trip generation model with the fewest observations had the greatest differences. Locations with the fewest trip interchanges between zones in the trip distribution model showed the greatest differences. And sub-modes that made up less than 5% of the regional trip making also showed a poor comparison.

Adjusted census has been proven to be a valuable tool in the development of traffic model. For the calculation of cross-classification models or the review of trip distribution it can be as good as locally collected origin-destination data which is both costly and time consuming. Where the Census data falls short is in the analysis of mode. Reviewing the results indicate that Census is only reliable at the total trip or auto trip level. Other modes such as transit would have to rely on locally collected count data to validate transit trip estimates or locally calibrated mode choice models, which are costly, very time consuming and technically complicated.