The 2019 Florida Price Level Index

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Jim Dewey
Director of Economic Analysis
Florida Polytechnic University

The Florida Price Level Index was established by the Legislature as the basis for the District Cost Differential in the Florida Education Finance Program. The FPLI is a comparable wage index that represents the relative cost of hiring comparable personnel among Florida's school districts. The calculation is based on wage data for hundreds of occupations across Florida's 67 counties collected by the Florida Department of Economic Opportunity's Bureau of Labor Market Statistics as part of the U.S. Bureau of Labor Statistics' Occupational Employment Statistics survey. The table below presents the 2019 FPLI, along with the 2018 and 2017 indices.[1]

County	2019	2018	2017	County	2019	2018	2017
Alachua	97.45	97.51	97.45	Lake	97.80	97.52	97.38
Baker	96.45	96.91	96.79	Lee	102.78	102.59	102.23
Bay	95.83	96.53	96.77	Leon	96.40	96.78	97.16
Bradford	95.83	96.28	96.22	Levy	94.28	94.34	94.07
Brevard	98.36	98.59	98.43	Liberty	91.80	92.17	92.08
Broward	102.04	102.41	102.27	Madison	90.37	91.44	91.86
Calhoun	91.43	92.10	92.51	Manatee	98.73	98.45	98.07
Charlotte	98.71	98.53	98.23	Marion	93.37	93.59	93.88
Citrus	92.98	93.67	93.77	Martin	102.17	102.20	101.83
Clay	98.38	98.84	98.83	Monroe	106.07	106.39	105.47
Collier	106.47	106.27	106.01	Nassau	98.62	98.88	98.76
Columbia	93.08	93.82	94.26	Okaloosa	98.89	99.25	99.34
Dade	101.92	101.63	101.79	Okeechobee	97.49	97.53	96.98
De Soto	97.26	97.08	96.68	Orange	101.13	100.85	100.87
Dixie	92.54	92.59	92.10	Osceola	98.81	98.53	98.53
Duval	100.68	101.16	101.18	Palm Beach	105.18	105.26	105.04
Escambia	96.75	96.92	97.29	Pasco	98.01	97.76	97.96
Flagler	94.58	94.69	94.67	Pinellas	99.85	99.61	99.82
Franklin	90.28	92.09	93.11	Polk	96.00	96.05	96.20
Gadsden	93.91	94.28	94.60	Putnam	94.62	95.07	95.06
Gilchrist	94.34	94.40	94.22	Saint Johns	100.95	100.98	101.02
Glades	98.79	98.61	97.87	Saint Lucie	100.26	100.29	99.81
Gulf	92.43	93.11	93.22	Santa Rosa	96.37	96.92	96.95
Hamilton	90.22	90.64	90.89	Sarasota	101.23	100.94	100.39
Hardee	95.64	95.37	94.76	Seminole	99.58	99.30	99.44
Hendry	100.27	100.09	99.58	Sumter	95.74	96.49	96.03
Hernando	95.99	95.74	96.05	Suwannee	91.07	92.40	92.70
Highlands	94.67	94.50	94.18	Taylor	90.51	91.18	92.08
Hillsborough	100.64	100.38	100.66	Union	94.61	95.06	95.15
Holmes	92.40	92.74	92.78	Volusia	96.00	95.73	95.72
Indian River	99.93	100.11	100.18	Wakulla	94.02	94.39	94.66
Jackson	90.30	92.24	93.06	Walton	97.37	98.01	98.06
Jefferson	93.62	94.00	94.35	Washington	92.14	92.81	92.99
Lafayette	90.75	90.80	90.67				

[1] This report is available at https://floridapoly.edu/wp-content/uploads/2019fpli.pdf and http://www.fldoe.org/fefp/.

The Distribution of the FPLI

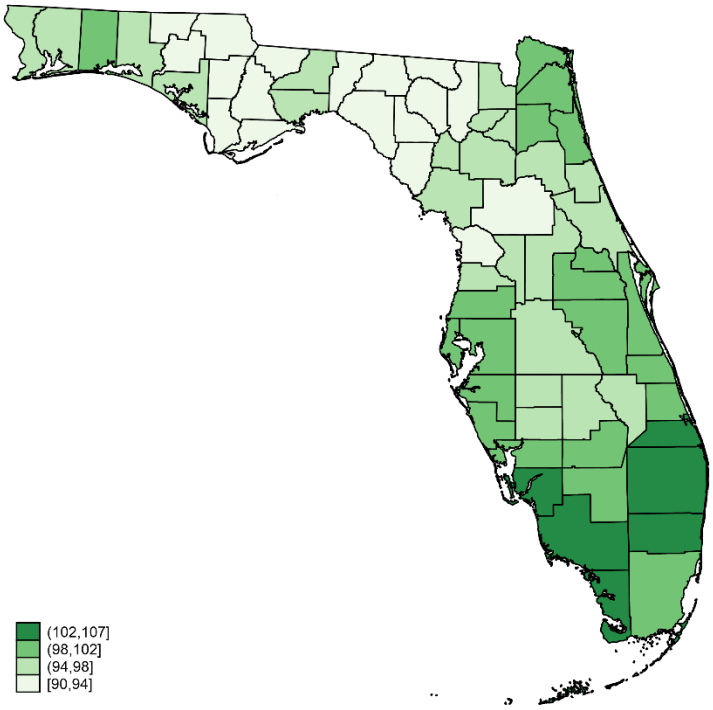
The Florida Price Level Index (FPLI) is constructed so that the population-weighted state average is 100, though this normalization does not impact the relative comparison between any two counties. The median Floridian, ranked by 2019 county FPLI, lives in Hillsborough County, with an index value of 100.64. That is, less than half of Floridians live in counties with index values greater than 100.64, less than half live in counties with index values less than 100.64, and the rest live in Hillsborough County.

The map to the right displays the distribution of the FPLI across Florida. As population density increases, workers face higher housing costs, longer commutes, or both, for which they are compensated by higher wages. Therefore, although many things affect counties' FPLI values, counties that are more urban tend to have higher values. The six counties with FPLI values of 102 or above contain 22.3% of the state's population. The twenty counties with index values within two percentage points of the state average, from 98 to 101.99, contain 55.5% of the state's population. Twenty-three counties, containing 17.8% of Florida's population, have index values from 94 to 97.99. Finally, 4.4% of the state's population live in the eighteen counties with index values below 94.

Methodological Approach

The FPLI is a wage index comparing the cost of hiring a state average worker among Florida's 67 counties. Its use in adjusting school funding assumes the relative wage pattern for school workers is well approximated by the relative wage pattern for the state average worker. It relies on data on wages by occupation from the Occupational Employment Statistics (OES) survey, based on a massive employer sample. Columns 1 and 2 of the table at the end of this document present the average number of occupations and employees represented by responses to a complete OES survey by county.

An alternative would be to use data from the American Community Survey (ACS) that allows controlling for individual worker characteristics other than occupation, and to focus on the subset of workers with at least a bachelor's degree, since teachers must possess one. Controlling for other worker characteristics would increase precision. However, using the ACS data would greatly reduce the number of workers covered by the sample, decreasing precision. Further, approximately 17% of the public-school labor bill is paid to workers without bachelor's degree, which are not represented in that sample. Moreover, the level of income at a given reference location is a potentially important determinant of the relative wage pattern, and public-school workers with a degree earn substantially less than the average worker with a degree.

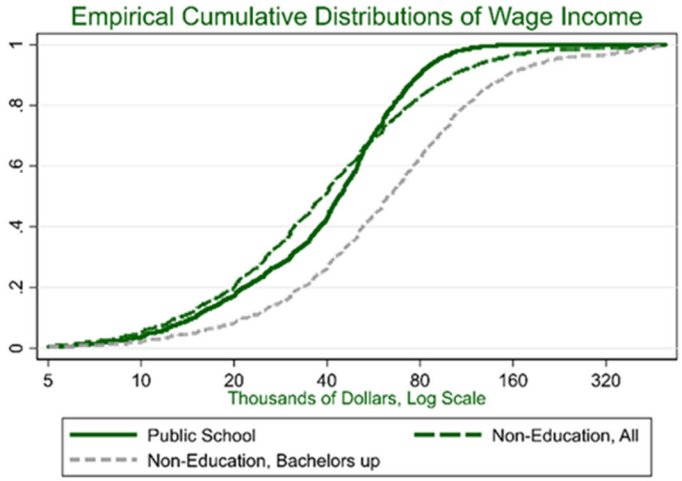


The figure on the next page presents empirical cumulative U.S. income distributions for all public-school workers, all non-education workers, and all non-education workers with a bachelor's degree. The group of all non-education workers appears more comparable to public-school workers than does the subset with a bachelor's degree. Further analysis suggests the gain in precision from using the larger sample available from OES data outweighs the gain in precision from controlling for other characteristics using ACS data.[2]

Prior to the 2003 index, the FPLI was an index of the relative expenditure required to purchase a market basket of goods and services, similar to the Consumer Price Index, albeit in a spatial context. This approach was adopted due to the lack of suitable wage data. The justification for this approach was that, all else equal,

[2] For more information, see Jim Dewey, (2019) *Comparing the Florida Price Level Index and the Comparable Wage Index for Teachers*, available at https://www.researchgate.net/publication/337716504

wages adjust to compensate for differences in the prices of goods and services, particularly housing.



There were two broad problems with the market basket approach. First, it was subject to numerous serious challenges to its accuracy. Second, not only was it at best an indirect proxy for labor costs, but it also systematically mis-measured them. That is because, other things being equal, places that are more productive, and thus more attractive to firms, will have higher wages and prices, while places that are more pleasant in which to live, and thus more attractive to workers, will have lower wages but higher prices. Numerous independently published estimates of relative wage and price patterns imply that the market basket approach yields an index which is a less accurate reflection of relative labor costs than making no adjustment at all.[3] Consequently, the current comparable wage approach unambiguously produces a better measure of relative school personnel costs.

The FPLI Calculation[4]

Initial Estimate The first step in calculating the FPLI is to make an initial estimate of relative wage differences between counties, holding occupation constant. This means that a county's index is not impacted by having more or less workers in high wage occupations, but rather by having higher or lower wages within given occupations compared to the same occupations in other counties.

Wage differences related to labor market size, as measured by population or total employment, and due, for example, to differences in land costs or commute times, are more pronounced for occupations that tend to locate at denser locations within a given labor market. The estimation procedure controls for this tendency.

Statistical Smoothing Prior to adoption of the current methodology, in some cases otherwise similar counties had very different FPLI values though the estimates' margins of error were large, meaning there was little evidence that the difference was real. Statistical smoothing ensures similar counties have similar index values unless the estimates' margins of error provide evidence that the difference is real.

To implement statistical smoothing, the relationship between the initial estimate and county characteristics such as the size and age distribution of the population and per capita income is used to predict index values for each county. This predicted value and the initial estimate are combined by taking a weighted average according to their precision. The weights are calculated to minimize the margin of error of the resulting statistically smoothed index. To illustrate, if the variance of the predicted index is two-thirds the variance of the initial estimate, the weight on the initial index, 0.4, is two-thirds the weight on the predicted index, 0.6. Columns 3-8 of the table at the end of this document present the initial, predicted, and statistically smoothed log indices and their standard errors.

Geographic Smoothing The law of one price implies wages in nearby counties cannot sustainably differ by more than justified by the cost of commuting between them. If the wage difference is larger than that, workers have an incentive to commute from the low wage county to the high wage county, increasing the supply of workers in the latter and reducing it in the former, thereby reducing the wage difference. Prior to adoption of the current methodology, neighboring counties sometimes had implausibly different FPLI values. Geographic smoothing ensures index differences between nearby counties are consistent with their proximity.

To implement geographic smoothing, the statistically smoothed index value for each county is

[3] For details see Jim Dewey, (2005) *Improvements to the 2003 Florida Price Level Index*, available at https://www.researchgate.net/publication/338390730

[4] The data and Stata code for the 2019 FPLI calculation are at https://drive.google.com/open?id=1Miz7PbgmobcG4AP94SqFouGk8nS3YGkb.

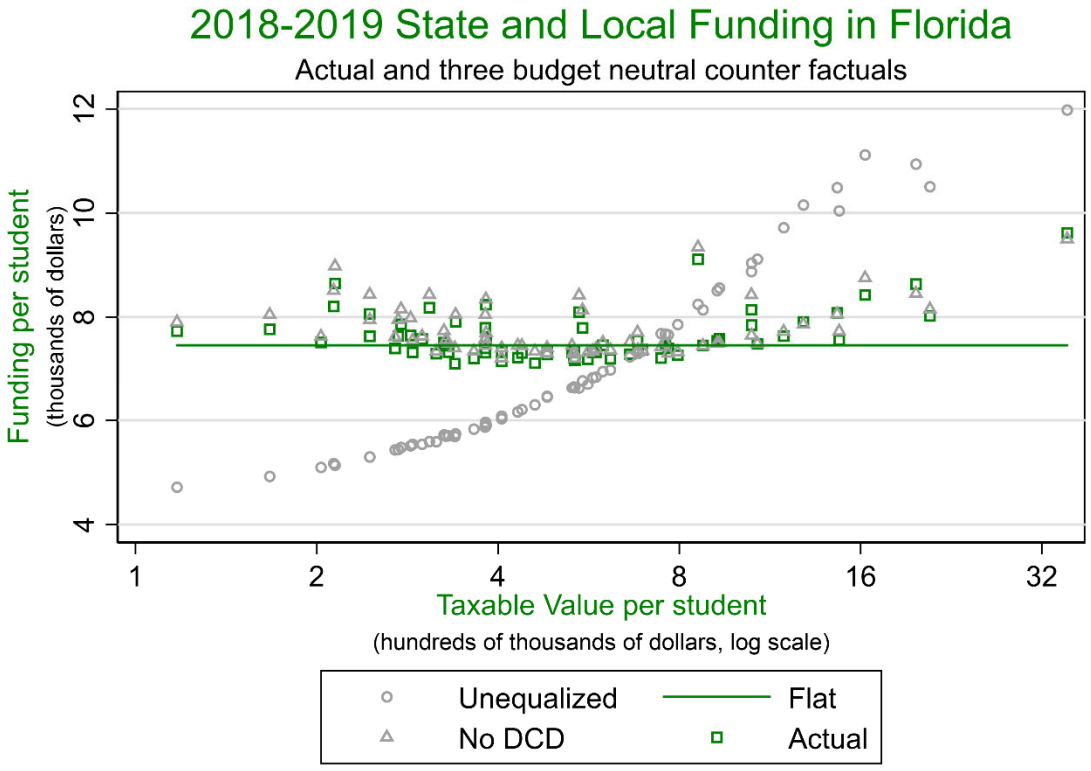
replaced by the highest statistically smoothed index value from a comparison group of counties, adjusted for the lost value of the time to commute between them, if that value is higher. For 2019, index values were geographically smoothed for 40 counties containing 28.9% of the state's population.[5]

Impact on School Funding

Florida adjusts state funding to provide all students access to substantially equal educational services appropriate to their needs. This involves equalization for differences in the value of the local property tax base per student and adjustment for differences in operating costs across districts. Indeed, the very factors that create differences in the property tax base per student also create differences in the cost of education.[6]

Cost differences depend on differences in the quantity of inputs needed to meet the standard of education and on the per unit cost of those inputs. Differences in the quantity of inputs needed are represented by elements of the funding calculation like Program Cost Factors, the ESE Guaranteed Allocation, the Sparsity Supplement, and the Class Size Reduction Allocation. The District Cost Differential (DCD) adjusts for differences in the per unit cost of inputs. It assumes labor makes up 80% of operating costs, relying on the FPLI to represent them, and that the other 20%, for example textbooks, cost the same everywhere.

The figure below illustrates the relative importance of the DCD among the various adjustments to Florida's school funding. The grey circular markers represent what funding would have been if the state engaged in no resource equalization. The flat line represents what funding would have been if all funds were allocated on an equal per student basis with no regard for cost differences. The vertical distance between unequalized funding and flat funding illustrates the largest effect of Florida's funding system—allocating more state funding to students in districts with less taxable value per student.



[5] For further details see Jim Dewey (2020) *Florida Price Level Index Methodology* available at https://www.researchgate.net/publication/338390504.

[6] For more detail on state and local school funding in Florida, see the Florida Department of Education report *2019-20 Funding for Florida School Districts*, available at http://www.fldoe.org/core/fileparse.php/7507/urlt/Fefpdist.pdf.

The grey triangular markers indicate what funding would have been if the DCD were eliminated but all else remained the same. The difference between funding with no DCD and flat funding represents the combined impact of all adjustments to funding other than the DCD. Finally, the square markers indicate actual funding. The difference between actual funding and funding with no DCD indicates the impact of the adjustment for differences in labor costs. While the impact of the DCD is not negligible, for most districts it is tiny compared to equalization for differences in the tax base and smaller than the impact of the other adjustments as well.

Ongoing Study and Improvement

The FPLI methodology has evolved over time to make improvements when possible and to adapt to changing circumstances when needed. For the 2010 index, values in 23 counties containing 12.8% of the state's population were replaced by commute cost adjusted values from another county in geographic smoothing. For the 2019 index, 40 counties containing 28.9% of the state's population were replaced. With the increase in the share of the state's population directly affected, the impact on other counties through the state average grew as well. The change has occurred because of widening differences between wages across counties, which lead to counties with high wages having impacts on larger counties and on counties further away than they did a decade ago.

The approximations used to implement geographic smoothing were not intended to apply to such a large share of the state's population, counties that were not small and rural, or counties that were not very close to one another. Thus, these approximations are not well suited to current labor market conditions. Accordingly, improvements to the geographic smoothing component of the calculation are under consideration.

To illustrate the potential impact of such a change, consider the following alternative. First, identify counties for which, on average, responses to a complete OES survey cover at least 50,000 employees and at least 150 occupations, and for which the standard error of the log statistically smoothed index is at most half a log point, so that the margin of error of the normalized index is (approximately) plus or minus one percentage point or less. For these counties, do not directly apply geographic smoothing. The wage data is rich and the margin of error of the index is small, so there should be no need to do so.

Second, directly compare non-anchor counties only to counties with which they share a border, replacing a county's index with the highest commute cost adjusted index of its neighbors. Then iterate this comparison until no more changes are called for. Third, since only relatively short cross border commutes from sparsely populated counties to outlying schools in neighboring counties are contemplated, reduce the assumed one-way commute distance to one quarter of the distance between population centers, adjusted upward for the ratio of driving distance to straight line distance. Fourth, in addition to the time cost of commuting, include the sum of incremental fuel, maintenance, and repair costs per mile driven.

For the 2019 index, this method would have required only two iterations and would have directly impacted 22 counties that together contain only 5.8% of the state's population.[7] The resulting index, and the difference using this approach would make, are shown in columns 10 and 11 of table on the following page. While this method is likely an improvement relative to the one currently employed, it is not completely satisfactory due to the sensitivity of the results to variation in the assumed one-way commute distance. An approach based on actual distances and drive times between nearby schools in bordering counties would provide a foundation for geographic smoothing that is better suited to current conditions. Work on such a method is ongoing.

[7] For further details see Jim Dewey (2020) *Florida Price Level Index Methodology* available at https://www.researchgate.net/publication/338390504.

Additional Detail: 2019 FPLI Calculation											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
			Log Index Values and Standard Errors								
	Average OES Responses		Initial Estimate		Predicted Value		Statistically Smoothed			Alternative Geographic Smoothing	
County	Occupations	Workers	Value	Std Err	Value	Std Err	Value	Std Err	2019 FPLI	Index	Change
Alachua	333	77994	-0.0227	0.0043	-0.0157	0.0047	-0.0196	0.0032	97.45	97.87	0.42
Baker	25	2310	-0.0924	0.0168	-0.0854	0.0086	-0.0870	0.0076	96.45	94.56	-1.89
Bay	286	49110	-0.0453	0.0048	-0.0295	0.0041	-0.0364	0.0031	95.83	96.25	0.42
Bradford	25	2326	-0.1443	0.0167	-0.0855	0.0075	-0.0956	0.0069	95.83	93.38	-2.45
Brevard	364	139188	0.0019	0.0039	-0.0167	0.0029	-0.0103	0.0024	98.36	98.79	0.43
Broward	435	498816	0.0325	0.0034	0.0220	0.0030	0.0264	0.0022	102.04	102.49	0.45
Calhoun	18	572	-0.1318	0.0211	-0.1225	0.0090	-0.1241	0.0083	91.43	89.24	-2.19
Charlotte	192	28082	-0.0383	0.0059	-0.0582	0.0063	-0.0478	0.0043	98.71	96.65	-2.06
Citrus	162	19425	-0.0640	0.0065	-0.0684	0.0061	-0.0665	0.0044	92.98	93.39	0.41
Clay	147	32307	-0.0193	0.0065	-0.0250	0.0043	-0.0234	0.0036	98.38	97.55	-0.83
Collier	290	94537	0.0757	0.0045	0.0518	0.0073	0.0689	0.0039	106.47	106.94	0.47
Columbia	130	12313	-0.0883	0.0074	-0.0706	0.0056	-0.0772	0.0045	93.08	92.40	-0.68
Dade	449	663513	0.0239	0.0032	0.0274	0.0036	0.0253	0.0024	101.92	102.37	0.45
Desoto	41	2124	-0.0592	0.0136	-0.1256	0.0080	-0.1087	0.0069	97.26	94.93	-2.33
Dixie	10	603	-0.1414	0.0263	-0.1241	0.0084	-0.1259	0.0080	92.54	90.01	-2.53
Duval	420	303864	0.0200	0.0036	0.0078	0.0032	0.0131	0.0024	100.68	101.13	0.45
Escambia	319	86475	-0.0332	0.0044	-0.0230	0.0032	-0.0268	0.0026	96.75	97.17	0.42
Flagler	107	12773	-0.0598	0.0081	-0.0457	0.0048	-0.0495	0.0041	94.58	95.00	0.42
Franklin	26	1458	-0.0816	0.0166	-0.0997	0.0087	-0.0960	0.0077	90.28	90.67	0.39
Gadsden	72	5522	-0.0736	0.0100	-0.0743	0.0065	-0.0743	0.0055	93.91	92.86	-1.05
Gilchrist	18	967	-0.1427	0.0201	-0.0945	0.0082	-0.1015	0.0076	94.34	92.97	-1.37
Glades	11	209	-0.0334	0.0295	-0.1475	0.0094	-0.1371	0.0090	98.79	95.05	-3.74
Gulf	21	963	-0.0591	0.0187	-0.0934	0.0083	-0.0880	0.0075	92.43	91.41	-1.02
Hamilton	12	483	-0.1087	0.0258	-0.1266	0.0092	-0.1247	0.0087	90.22	88.10	-2.12
Hardee	36	2268	-0.0738	0.0143	-0.0984	0.0080	-0.0927	0.0070	95.64	91.99	-3.65
Hendry	51	3590	-0.0433	0.0119	-0.0807	0.0080	-0.0692	0.0066	100.27	97.60	-2.67
Hernando	105	19989	-0.0828	0.0079	-0.0612	0.0048	-0.0672	0.0041	95.99	93.33	-2.66
Highlands	151	15145	-0.0925	0.0068	-0.0851	0.0066	-0.0888	0.0047	94.67	91.33	-3.34
Hillsborough	403	389537	0.0108	0.0035	0.0143	0.0031	0.0126	0.0023	100.64	101.08	0.44
Holmes	17	605	-0.1347	0.0210	-0.1051	0.0080	-0.1091	0.0075	92.40	91.72	-0.68
Indian River	232	33356	-0.0009	0.0054	0.0163	0.0067	0.0056	0.0042	99.93	100.37	0.44
Jackson	91	6711	-0.1136	0.0090	-0.0867	0.0063	-0.0958	0.0052	90.30	90.69	0.39
Jefferson	17	805	-0.1073	0.0209	-0.0785	0.0085	-0.0828	0.0079	93.62	92.41	-1.21
Lafayette	5	118	0.0238	0.0412	-0.1358	0.0105	-0.1263	0.0102	90.75	88.00	-2.75
Lake	225	62153	-0.0508	0.0052	-0.0359	0.0038	-0.0412	0.0030	97.80	95.78	-2.02
Lee	361	171075	0.0022	0.0039	-0.0047	0.0037	-0.0016	0.0027	102.78	99.66	-3.12
Leon	321	90530	-0.0443	0.0043	-0.0130	0.0048	-0.0304	0.0032	96.40	96.82	0.42
Levy	47	3196	-0.0963	0.0124	-0.0828	0.0062	-0.0856	0.0055	94.28	92.87	-1.41
Liberty	6	335	-0.1385	0.0373	-0.1383	0.0109	-0.1385	0.0104	91.80	89.51	-2.29
Madison	19	587	-0.0770	0.0218	-0.1025	0.0080	-0.0997	0.0075	90.37	90.34	-0.03
Manatee	279	71826	-0.0056	0.0047	-0.0214	0.0034	-0.0161	0.0027	98.73	98.21	-0.52
Marion	286	62571	-0.0725	0.0047	-0.0526	0.0052	-0.0637	0.0035	93.37	93.65	0.28
Martin	220	36946	0.0272	0.0055	0.0291	0.0075	0.0277	0.0044	102.17	102.62	0.45
Monroe	176	22378	0.0763	0.0064	0.0370	0.0103	0.0652	0.0054	106.07	106.53	0.46
Nassau	78	9756	0.0031	0.0094	-0.0123	0.0064	-0.0076	0.0053	98.62	99.06	0.44
Okaloosa	272	52283	0.0020	0.0049	-0.0112	0.0048	-0.0049	0.0034	98.89	99.33	0.44
Okeechobee	65	5567	-0.0939	0.0104	-0.0924	0.0066	-0.0930	0.0056	97.49	95.41	-2.08
Orange	420	473941	0.0217	0.0035	0.0123	0.0040	0.0175	0.0026	101.13	101.58	0.45
Osceola	187	54175	-0.0150	0.0057	-0.0433	0.0048	-0.0320	0.0037	98.81	96.67	-2.14
Palm Beach	431	381826	0.0548	0.0034	0.0616	0.0052	0.0567	0.0029	105.18	105.63	0.45
Pasco	217	69466	-0.0647	0.0052	-0.0306	0.0034	-0.0410	0.0028	98.01	95.80	-2.21
Pinellas	392	285992	-0.0003	0.0037	0.0087	0.0031	0.0048	0.0024	99.85	100.29	0.44
Polk	347	138687	-0.0322	0.0040	-0.0378	0.0042	-0.0351	0.0029	96.00	96.37	0.37
Putnam	90	7505	-0.0787	0.0090	-0.0858	0.0057	-0.0839	0.0048	94.62	95.31	0.69
Saint Johns	190	41955	0.0081	0.0057	0.0245	0.0060	0.0157	0.0041	100.95	101.40	0.45
Saint Lucie	247	47581	0.0048	0.0051	-0.0423	0.0036	-0.0267	0.0029	100.26	99.67	-0.59
Santa Rosa	145	22063	-0.0438	0.0067	-0.0240	0.0047	-0.0307	0.0038	96.37	96.79	0.42
Sarasota	324	112039	0.0258	0.0043	0.0080	0.0052	0.0185	0.0033	101.23	101.68	0.45
Seminole	277	112205	-0.0234	0.0045	0.0009	0.0034	-0.0081	0.0027	99.58	99.01	-0.57
Sumter	151	16292	-0.0212	0.0068	-0.0613	0.0083	-0.0373	0.0053	95.74	96.15	0.41
Suwannee	55	3667	-0.1177	0.0116	-0.0865	0.0063	-0.0938	0.0055	91.07	90.88	-0.19
Taylor	36	1951	-0.1108	0.0143	-0.1067	0.0079	-0.1078	0.0069	90.51	89.61	-0.90
Union	10	382	-0.1303	0.0296	-0.1420	0.0102	-0.1409	0.0097	94.61	93.27	-1.34
Volusia	324	110665	-0.0639	0.0042	-0.0270	0.0035	-0.0419	0.0027	96.00	95.71	-0.29
Wakulla	22	1502	-0.0401	0.0176	-0.0710	0.0079	-0.0660	0.0072	94.02	93.44	-0.58
Walton	106	13750	-0.0338	0.0081	-0.0085	0.0075	-0.0204	0.0055	97.37	97.79	0.42
Washington	46	2257	-0.1065	0.0130	-0.1043	0.0079	-0.1051	0.0068	92.14	91.25	-0.89