The 2020 Florida Price Level Index

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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 2020 FPLI, along with the 2019 and 2018 indices.[1]

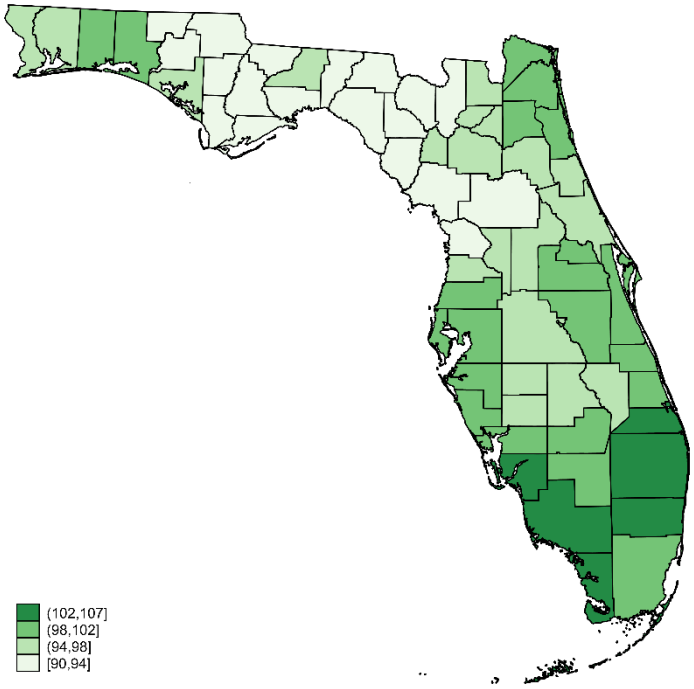
County	2020	2019	2018	County	2020	2019	2018
Alachua	97.12	97.45	97.51	Lake	97.46	97.80	97.52
Baker	96.21	96.45	96.91	Lee	102.75	102.78	102.59
Bay	95.94	95.83	96.53	Leon	96.10	96.40	96.78
Bradford	95.58	95.83	96.28	Levy	93.97	94.28	94.34
Brevard	98.64	98.36	98.59	Liberty	91.52	91.80	92.17
Broward	102.06	102.04	102.41	Madison	90.09	90.37	91.44
Calhoun	91.54	91.43	92.10	Manatee	99.42	98.73	98.45
Charlotte	98.68	98.71	98.53	Marion	93.51	93.37	93.59
Citrus	93.25	92.98	93.67	Martin	102.11	102.17	102.20
Clay	98.13	98.38	98.84	Monroe	106.51	106.07	106.39
Collier	106.45	106.47	106.27	Nassau	98.69	98.62	98.88
Columbia	92.78	93.08	93.82	Okaloosa	98.59	98.89	99.25
Dade	101.96	101.92	101.63	Okeechobee	97.44	97.49	97.53
De Soto	97.55	97.26	97.08	Orange	100.78	101.13	100.85
Dixie	92.23	92.54	92.59	Osceola	98.46	98.81	98.53
Duval	100.43	100.68	101.16	Palm Beach	105.45	105.18	105.26
Escambia	96.79	96.75	96.92	Pasco	98.10	98.01	97.76
Flagler	94.80	94.58	94.69	Pinellas	100.03	99.85	99.61
Franklin	90.81	90.28	92.09	Polk	96.08	96.00	96.05
Gadsden	93.62	93.91	94.28	Putnam	94.38	94.62	95.07
Gilchrist	94.03	94.34	94.40	Saint Johns	100.26	100.95	100.98
Glades	98.77	98.79	98.61	Saint Lucie	100.20	100.26	100.29
Gulf	92.54	92.43	93.11	Santa Rosa	95.85	96.37	96.92
Hamilton	89.99	90.22	90.64	Sarasota	101.94	101.23	100.94
Hardee	96.31	95.64	95.37	Seminole	99.24	99.58	99.30
Hendry	100.25	100.27	100.09	Sumter	96.20	95.74	96.49
Hernando	96.07	95.99	95.74	Suwannee	90.77	91.07	92.40
Highlands	94.65	94.67	94.50	Taylor	90.24	90.51	91.18
Hillsborough	100.73	100.64	100.38	Union	94.37	94.61	95.06
Holmes	92.12	92.40	92.74	Volusia	95.67	96.00	95.73
Indian River	99.93	99.93	100.11	Wakulla	93.73	94.02	94.39
Jackson	90.08	90.30	92.24	Walton	98.03	97.37	98.01
Jefferson	93.33	93.62	94.00	Washington	92.25	92.14	92.81
Lafayette	90.45	90.75	90.80				

[1] This report is available at http://www.fldoe.org/fefp/ and https://floridapoly.edu/_resources/assets/documents/2020fpli.pdf.

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 2020 county FPLI, lives in Hillsborough County, with an index value of 100.73. That is, less than half of Floridians live in counties with index values greater than 100.73, less than half live in counties with index values less than 100.73, 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 22.6% of the state's population. The twenty-one counties with index values within two percentage points of the state average, from 98 to 101.99, contain 55.6% of the state's population. Twenty counties, containing 17.2% of Florida's population, have index values from 94 to 97.99. Finally, 4.6% of the state's population live in the twenty counties with index values below 94.



Methodological Approach[2]

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.

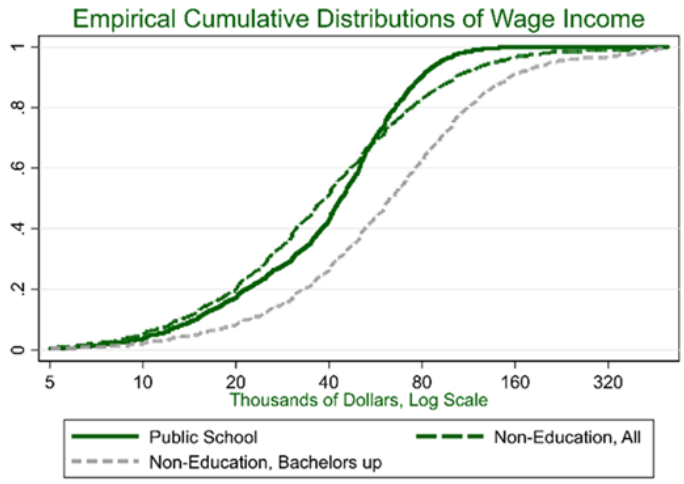
An alternative would be to use data from the American Community Survey (ACS) that allows controlling for individual worker characteristics other than occupation, and to focus on the subset of workers with at least a bachelor's degree, since teachers must possess one. Controlling for other worker characteristics 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 a 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.[3]

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

[2] For details on the methodology see Jim Dewey (2020) *Florida Price Level Index Methodology*, available at https://www.researchgate.net/publication/338390504.

[3] 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.



There were two broad problems with the market basket approach. First, it was subject to numerous challenges to its accuracy. Second, not only was it at best an indirect proxy for labor costs, but it 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.[4] Consequently, the current comparable wage approach unambiguously produces a better measure of relative school personnel costs.

The FPLI Calculation[5]

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 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, measured by population or total employment, and due to differences in land costs or commute times, are more pronounced for occupations that tend to locate at denser locations within a 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 more than justified by the cost of commuting between them. If the wage difference is larger, 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 replaced by the highest statistically smoothed value from a comparison group of counties, adjusted for the lost value commute time, if that value is higher.

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

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

[5] The data and Stata code for the 2020 FPLI calculation are available at https://drive.google.com/file/d/1BeGlLUFf5k-I_CIGa0z35YCKanicvkDK/view?usp=sharing.

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]

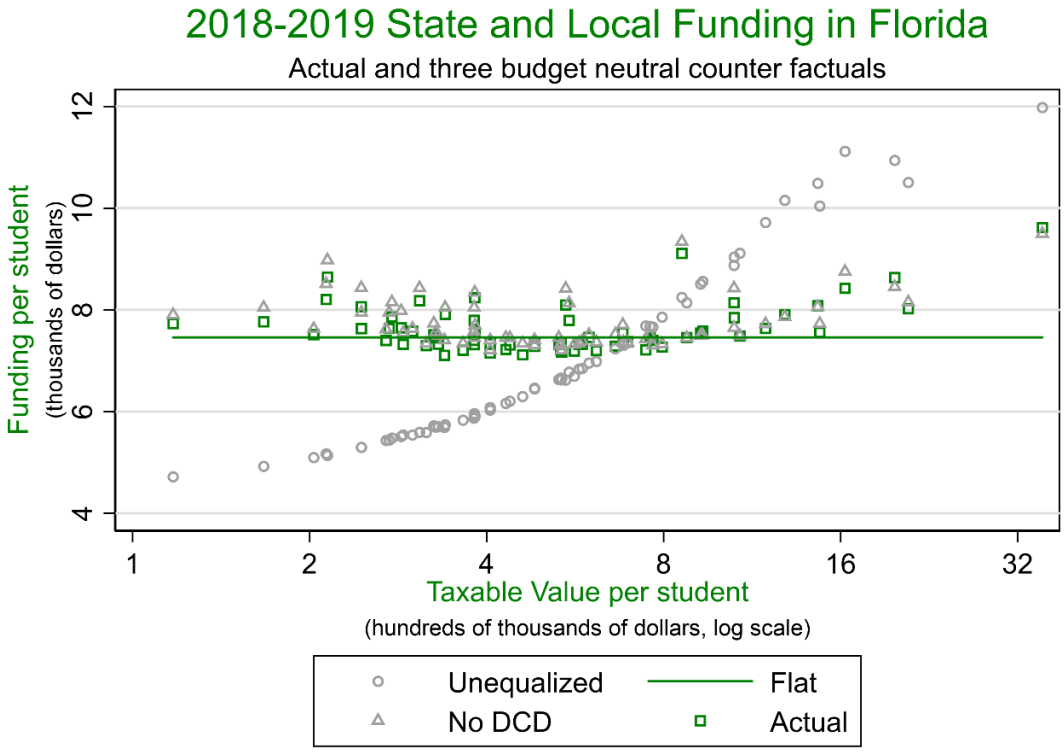
Cost differences depend on differences in the quantity of inputs needed to meet the standard of education and on the per unit cost of those inputs. Differences in the quantity of inputs needed are represented by elements of the funding calculation like Program Cost Factors, the ESE Guaranteed Allocation, 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 adjustments to 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.

The grey triangles indicate funding 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 other than the DCD. The squares indicate actual funding. The difference between actual funding and funding with no DCD indicates the impact of the adjustment for 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-Geographic Smoothing

The methodology has evolved over time to make improvements where possible and to adapt to changing circumstances as needed. This section discusses work to improve geographic smoothing. 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 2020 index, 41 counties containing 29.6% 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.



[6] For more detail on state and local school funding in Florida, see the Florida Department of Education report *2020-21 Funding for Florida School Districts*, available at http://www.fldoe.org/core/fileparse.php/7507/urlt/Fefpdist.pdf.

The change has occurred because of widening differences between wages across counties, which lead to counties with high wages impacting counties that are larger and further away. The method originally used to implement geographic smoothing was not developed for use under these conditions, so an alternative has been developed that is more appropriate. This alternative calculation is follows.

1) Find the four elementary schools in each district closest to elementary schools in every other district, provided the distance is no more than 60 miles. Match each of these schools in the origin district to the nearest four elementary schools in each destination district. Repeat for three middle schools and three high schools in the origin district matched to three schools of the same level in each destination district.

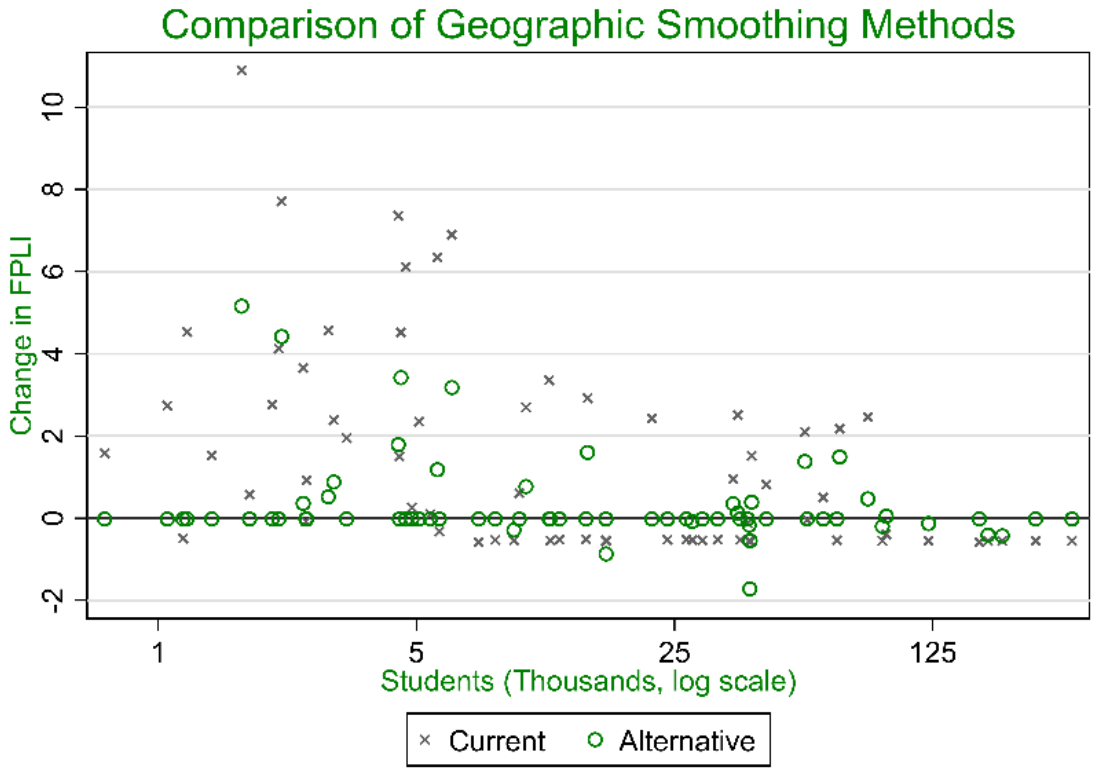
2) For each of these pairs, collect commute time and distance via the Google Maps application programming interface and then calculate the median time and distance for each origin to destination pair.

3) Use these measures of commute time and distance to calculate the commute cost adjusted relative wage a teacher could earn by commuting to each destination district. Monetary costs are the sum of incremental fuel, maintenance, and repair costs. Time is valued at half the wage rate.

4) The statistically smoothed values are then adjusted so each district's index is at least as high as the commute time adjusted final index value for its potential destination districts. Adjustments minimize the sum of squared deviations from the statistically smoothed index needed to meet the geographic constraints on the final index values. Squared deviations are weighted by the number of students and inversely weighted by the standard deviation the statistically smoothed index. While any district might go up or down to meet the geographic constraint, more precisely estimated statistically smoothed values are adjusted less.

This improves the index in three ways. First, a more complete measure of commuting costs is employed. Second, a more precise measure of marginal commuting times and distances is used. Third, all districts are treated symmetrically in a way that respects both the precision of the underlying data and the geographic constraints imposed by commuting possibilities.

The resulting index, and the difference using this method would make to each district, are shown in Columns 10 and 11 of the table on the next page. The figure below shows the impact of geographic smoothing under the current method and the proposed alternative. The alternative has considerably less impact than the current method.



Additional Detail: 2020 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	FPLI	Index	Change
Alachua	323	75801	-0.0267	0.0044	-0.0182	0.0050	-0.0231	0.0033	97.12	97.57	0.45
Baker	26	2405	-0.0803	0.0166	-0.0877	0.0093	-0.0861	0.0081	96.21	95.11	-1.10
Bay	274	46807	-0.0386	0.0050	-0.0326	0.0044	-0.0353	0.0033	95.94	96.44	0.50
Bradford	26	2336	-0.1099	0.0164	-0.0892	0.0083	-0.0935	0.0074	95.58	91.53	-4.05
Brevard	354	141700	0.0052	0.0040	-0.0150	0.0031	-0.0076	0.0025	98.64	99.16	0.52
Broward	424	520488	0.0334	0.0034	0.0204	0.0032	0.0265	0.0024	102.06	102.59	0.53
Calhoun	16	523	-0.1029	0.0222	-0.1212	0.0098	-0.1183	0.0090	91.54	88.76	-2.78
Charlotte	184	28664	-0.0335	0.0060	-0.0538	0.0067	-0.0426	0.0045	98.68	97.36	-1.32
Citrus	166	19251	-0.0617	0.0065	-0.0657	0.0065	-0.0638	0.0046	93.25	93.74	0.49
Clay	152	33158	-0.0252	0.0065	-0.0291	0.0045	-0.0279	0.0037	98.13	97.53	-0.60
Collier	289	97063	0.0723	0.0046	0.0574	0.0081	0.0686	0.0040	106.45	105.31	-1.14
Columbia	133	12261	-0.0916	0.0074	-0.0733	0.0061	-0.0809	0.0047	92.78	92.15	-0.63
Dade	435	684109	0.0211	0.0033	0.0315	0.0037	0.0255	0.0025	101.96	102.49	0.53
Desoto	47	2560	-0.0545	0.0127	-0.1235	0.0084	-0.1026	0.0070	97.55	91.98	-5.57
Dixie	12	605	-0.1416	0.0252	-0.1239	0.0091	-0.1260	0.0085	92.23	88.08	-4.15
Duval	412	316441	0.0181	0.0036	0.0038	0.0034	0.0104	0.0025	100.43	100.85	0.42
Escambia	304	88408	-0.0285	0.0045	-0.0251	0.0035	-0.0265	0.0028	96.79	97.30	0.51
Flagler	100	13013	-0.0560	0.0084	-0.0439	0.0051	-0.0473	0.0043	94.8	95.30	0.50
Franklin	26	1489	-0.0732	0.0167	-0.0959	0.0096	-0.0903	0.0083	90.81	91.28	0.47
Gadsden	73	5932	-0.0865	0.0100	-0.0786	0.0072	-0.0814	0.0058	93.62	92.10	-1.52
Gilchrist	18	934	-0.1096	0.0203	-0.0987	0.0089	-0.1006	0.0081	94.03	90.73	-3.30
Glades	9	174	0.0039	0.0322	-0.1408	0.0098	-0.1286	0.0094	98.77	93.03	-5.74
Gulf	20	1057	-0.0577	0.0189	-0.0888	0.0091	-0.0831	0.0082	92.54	91.94	-0.60
Hamilton	11	392	-0.1074	0.0286	-0.1235	0.0099	-0.1219	0.0093	89.99	88.44	-1.55
Hardee	46	2319	-0.0879	0.0132	-0.1089	0.0088	-0.1026	0.0073	96.31	90.17	-6.14
Hendry	50	3192	-0.0390	0.0122	-0.0824	0.0086	-0.0682	0.0070	100.25	96.53	-3.72
Hernando	99	18679	-0.0801	0.0082	-0.0592	0.0050	-0.0651	0.0043	96.07	93.62	-2.45
Highlands	151	13981	-0.0960	0.0069	-0.0843	0.0072	-0.0905	0.0050	94.65	91.27	-3.38
Hillsborough	389	396888	0.0166	0.0036	0.0108	0.0034	0.0134	0.0025	100.73	100.85	0.12
Holmes	19	621	-0.1142	0.0205	-0.1064	0.0088	-0.1077	0.0081	92.12	90.61	-1.51
Indian River	230	33734	-0.0025	0.0054	0.0199	0.0073	0.0054	0.0044	99.93	100.45	0.52
Jackson	97	6730	-0.1270	0.0089	-0.0840	0.0069	-0.1002	0.0054	90.08	90.38	0.30
Jefferson	14	459	-0.0919	0.0244	-0.0843	0.0093	-0.0854	0.0087	93.33	91.73	-1.60
Lafayette	6	158	-0.0501	0.0383	-0.1375	0.0114	-0.1305	0.0110	90.45	87.69	-2.76
Lake	220	64559	-0.0511	0.0053	-0.0345	0.0040	-0.0408	0.0032	97.46	96.33	-1.13
Lee	354	171964	0.0103	0.0040	-0.0035	0.0041	0.0035	0.0029	102.75	100.76	-1.99
Leon	310	91163	-0.0468	0.0045	-0.0159	0.0051	-0.0337	0.0034	96.1	96.60	0.50
Levy	51	3380	-0.0993	0.0120	-0.0827	0.0068	-0.0868	0.0059	93.97	91.60	-2.37
Liberty	6	233	-0.1512	0.0388	-0.1374	0.0119	-0.1387	0.0114	91.52	86.97	-4.55
Madison	21	567	-0.1126	0.0209	-0.1009	0.0088	-0.1027	0.0081	90.09	90.15	0.06
Manatee	275	74629	-0.0018	0.0047	-0.0200	0.0036	-0.0134	0.0029	99.42	98.58	-0.84
Marion	277	63979	-0.0761	0.0048	-0.0502	0.0055	-0.0651	0.0036	93.51	93.61	0.10
Martin	214	37318	0.0272	0.0056	0.0270	0.0077	0.0270	0.0045	102.11	101.80	-0.31
Monroe	174	22331	0.0786	0.0065	0.0398	0.0116	0.0692	0.0057	106.51	107.07	0.56
Nassau	76	9665	0.0019	0.0097	-0.0116	0.0070	-0.0071	0.0057	98.69	99.21	0.52
Okaloosa	269	52130	-0.0016	0.0049	-0.0147	0.0051	-0.0081	0.0035	98.59	99.11	0.52
Okeechobee	68	5541	-0.0886	0.0104	-0.0945	0.0073	-0.0927	0.0060	97.44	92.27	-5.17
Orange	410	494525	0.0176	0.0035	0.0086	0.0043	0.0139	0.0027	100.78	100.92	0.14
Osceola	181	57617	-0.0266	0.0058	-0.0435	0.0050	-0.0364	0.0038	98.46	97.74	-0.72
Palm Beach	416	391859	0.0580	0.0035	0.0626	0.0054	0.0592	0.0029	105.45	106.01	0.56
Pasco	210	73848	-0.0669	0.0053	-0.0289	0.0036	-0.0410	0.0030	98.1	97.41	-0.69
Pinellas	382	295908	0.0035	0.0037	0.0090	0.0033	0.0064	0.0025	100.03	100.38	0.35
Polk	338	141962	-0.0335	0.0041	-0.0373	0.0045	-0.0353	0.0030	96.08	96.52	0.44
Putnam	90	7275	-0.0858	0.0091	-0.0861	0.0062	-0.0862	0.0051	94.38	92.45	-1.93
Saint Johns	189	42943	-0.0030	0.0057	0.0225	0.0062	0.0087	0.0042	100.26	100.64	0.38
Saint Lucie	246	48526	0.0087	0.0051	-0.0405	0.0039	-0.0227	0.0031	100.2	97.82	-2.38
Santa Rosa	150	21717	-0.0503	0.0066	-0.0283	0.0050	-0.0363	0.0040	95.85	96.35	0.50
Sarasota	320	113133	0.0340	0.0043	0.0115	0.0055	0.0253	0.0034	101.94	101.95	0.01
Seminole	268	118951	-0.0286	0.0046	-0.0016	0.0036	-0.0121	0.0029	99.24	98.71	-0.53
Sumter	154	17135	-0.0208	0.0067	-0.0524	0.0088	-0.0326	0.0054	96.2	96.71	0.51
Suwannee	55	3951	-0.1302	0.0117	-0.0857	0.0068	-0.0972	0.0059	90.77	90.65	-0.12
Taylor	37	1783	-0.1289	0.0146	-0.1066	0.0085	-0.1124	0.0074	90.24	89.29	-0.95
Union	7	251	-0.1301	0.0347	-0.1436	0.0110	-0.1425	0.0104	94.37	91.08	-3.29
Volusia	317	109457	-0.0684	0.0043	-0.0247	0.0036	-0.0431	0.0028	95.67	95.69	0.02
Wakulla	22	1471	-0.0382	0.0180	-0.0733	0.0086	-0.0668	0.0078	93.73	93.45	-0.28
Walton	108	15017	-0.0209	0.0080	-0.0056	0.0084	-0.0138	0.0058	98.03	98.28	0.25
Washington	45	2027	-0.0953	0.0134	-0.1037	0.0087	-0.1014	0.0073	92.25	90.28	-1.97