The 2023 Florida Price Level Index

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Jim Dewey
Director of Economic Analysis
Florida Polytechnic University

The Florida Price Level Index (FPLI) is the basis for adjusting for labor cost differences in the Florida Education Finance Program (FEFP). It is a fixed weight price level index for labor procured by Florida's school districts and is implemented using a comparable wage index methodology. The calculation is based on data for hundreds of occupations across Florida's 67 counties collected through the U.S. Bureau of Labor Statistics' Occupational Employment and Wage Statistics survey (OEWS). Table 1 presents the 2023 FPLI, along with the 2022 and 2021 indices.[1]

Table 1: The 2023 Florida Price Level Index

County	2023	2022	2021	County	2023	2022	2021
Alachua	97.51	97.79	97.77	Lake	96.29	95.40	95.21
Baker	93.19	92.91	92.56	Lee	100.83	100.82	100.96
Bay	97.00	97.13	96.49	Leon	94.08	95.83	96.91
Bradford	92.79	91.84	90.31	Levy	91.90	90.57	90.41
Brevard	99.85	99.90	99.41	Liberty	91.61	90.85	88.37
Broward	103.07	103.38	103.25	Madison	90.40	88.97	89.12
Calhoun	89.67	88.58	87.86	Manatee	100.04	99.46	99.49
Charlotte	96.28	96.06	96.79	Marion	93.01	92.96	93.31
Citrus	91.29	91.69	92.38	Martin	100.06	100.64	101.86
Clay	96.59	96.27	95.90	Monroe	103.42	104.07	106.78
Collier	105.69	105.81	106.70	Nassau	98.63	98.11	97.82
Columbia	93.92	92.64	91.89	Okaloosa	100.26	99.75	98.78
Dade	103.42	102.56	102.34	Okeechobee	93.43	92.30	91.51
De Soto	93.14	91.76	91.89	Orange	101.10	101.25	101.50
Dixie	90.91	89.35	87.40	Osceola	97.75	97.83	97.84
Duval	101.12	101.23	101.05	Palm Beach	104.17	105.35	105.78
Escambia	96.94	97.64	96.94	Pasco	97.73	97.56	96.87
Flagler	93.37	93.32	94.11	Pinellas	100.22	100.59	100.52
Franklin	92.55	91.03	91.73	Polk	97.01	97.06	96.82
Gadsden	92.22	91.25	91.30	Putnam	92.82	92.01	90.56
Gilchrist	91.91	91.22	90.02	Saint Johns	99.07	99.25	99.66
Glades	92.34	91.65	92.46	Saint Lucie	98.03	97.09	97.09
Gulf	93.14	92.36	92.13	Santa Rosa	95.55	95.20	93.81
Hamilton	91.20	90.37	88.58	Sarasota	101.70	101.68	102.55
Hardee	92.46	91.28	91.45	Seminole	99.34	99.02	99.36
Hendry	93.83	93.25	92.83	Sumter	96.87	96.96	97.11
Hernando	95.78	93.99	92.46	Suwannee	91.55	90.29	90.07
Highlands	90.02	89.81	91.52	Taylor	91.99	90.69	89.80
Hillsborough	101.59	101.60	101.33	Union	90.84	89.95	89.08
Holmes	89.56	87.87	87.69	Volusia	93.77	94.26	94.81
Indian River	99.71	99.73	99.75	Wakulla	92.87	92.79	92.36
Jackson	92.42	91.11	90.35	Walton	98.47	98.08	98.74
Jefferson	90.52	89.39	90.39	Washington	91.50	90.40	89.48
Lafayette	90.48	88.83	88.32				

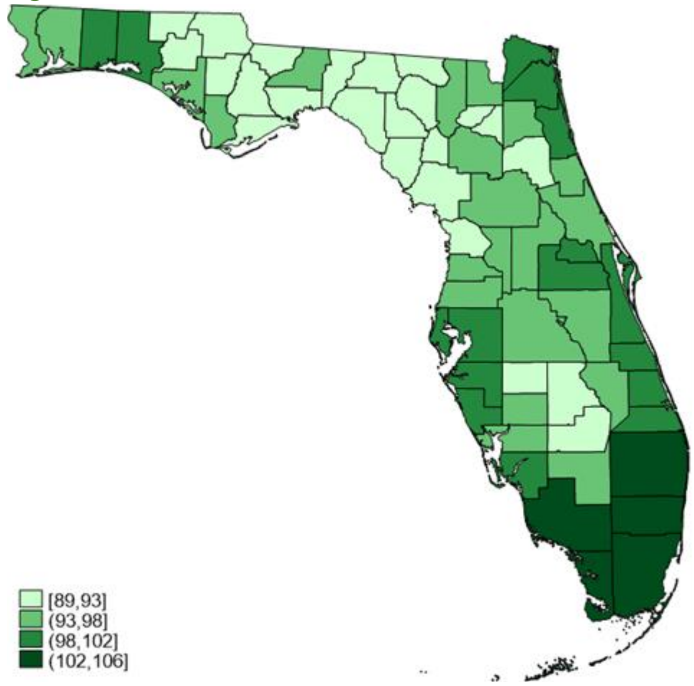
[1] This report is available at http://www.fldoe.org/fefp/.

The Distribution of the FPLI

The FPLI is constructed so that the population-weighted state average is 100, though this does not impact the relative comparison between any two counties. The median Floridian, ranked by 2023 county FPLI, lives in Orange County, with an index value of 101.1. That is, less than half of Floridians live in counties with index values greater than 101.1, less than half live in counties with index values less than 101.1, and the rest live in Orange County.

Figure 1 displays the distribution of the FPLI across Florida. As population density increases, workers face higher housing costs, longer commutes, or both. This reduces the supply of labor, thereby increasing wages. Thus, though many things affect FPLI values, counties that are more populous tend to have higher values. Five counties with values of 102 or more contain 30.14% of Florida's population. Sixteen counties with values from 98 to 101.99 contain 41.07% of the population. Twenty-two counties with values from 93 to 97.99 contain 25.05% of the population. Finally, 3.74% of Floridians live in the twenty-four counties with values below 93.

Figure 1



What the FPLI Measures

To see more precisely what the FPLI represents, imagine there are only two districts, A and B, with equal size classes. Each employs one aide for every two teachers and no other workers. In A teachers cost \$50,000 and aides cost \$30,000. In B teachers cost \$70,000 and aides cost \$50,000. The average cost of a teacher is \$60,000 and the average cost of an aide is \$40,000. Thus, a classroom requires one teacher and half of one aide and the associated state average labor cost for a classroom is \$80,000.

Rounding to tens of thousands of dollars, the teacher share of the state labor bill is thus 6/(6+4/2)=3/4 and the aide share is 1/4. The wage relative to the state average in A is 5/6 for teachers and 3/4 for aides. The relative cost of labor in A is (3/4)(5/6)+(1/4)(3/4)=0.8125 and in B it is (3/4)(7/6)+(1/4)(5/4)=1.1875. If the world were this simple, the FPLI would be 81.25 in A and 118.75 in B.

This example illustrates the construct the FPLI represents—a fixed weight price level index for labor procured by Florida's school districts. However, in practice we cannot use school wage data in the calculation. Why? Districts may reach different decisions regarding qualifications or pay structure. Such differences impact labor expenditures but do not reflect cost conditions. As a result, a district that decided to pay higher wages than required to hire a standard teacher would receive higher FEFP funding, creating an incentive to inflate costs. Instead, a comparable wage index that does not depend on district decisions is used.

The Comparable Wage Approach[2]

The idea behind a comparable wage index is to select occupations that are comparable to school jobs and use wages in those occupations as the basis for measuring relative personnel costs. In what way must they be comparable? The example above makes this clear—in the geographic pattern of relative wages.

What determines whether relative wage patterns are similar? One crucial factor is the state average income for an occupation. Though a worker's actual income depends on where they take a job, their potential income, represented by the state average for their occupation, influences the way the supply of labor in that occupation to a location varies with housing costs and perceived amenities.

The FPLI relies on data from the OEWS survey, which is based on a massive employer sample. The calculation uses all occupations. This is because the distribution of wages for all occupations is similar to the distribution for school workers, as shown in Figure 2. Insofar as the relative wage pattern of school workers depends on income, it should resemble the pattern for all workers.

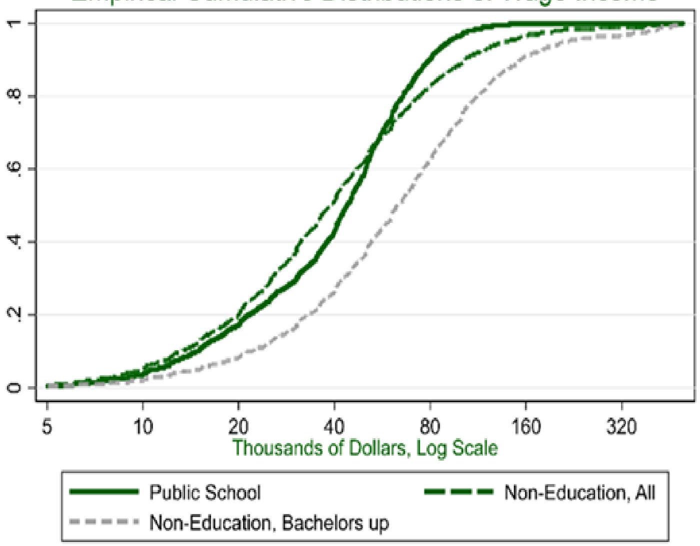
One might argue that the subset of workers with bachelor's degrees is more suitable, since teachers must hold one. Using data from the American Community Survey (ACS) instead of the OEWS would allow

[2] For additional methodological details, see Jim Dewey (2022) *Florida Price Level Index Methodology—Revised January 2022*, available at https://www.researchgate.net/publication/358007872.

selecting that subset. This, however, misses two crucial points. First, 17% of the public-school labor bill is paid to workers without bachelor's degrees. Second, public-school workers with a degree earn less than the average worker with a degree. As Figure 2 shows, the

Figure 2

Empirical Cumulative Distributions of Wage Income



wage distribution for workers with bachelor's degrees is shifted well to the right of the distribution for public school workers.

Using the ACS data would also allow controlling for individual worker characteristics other than occupation, potentially improving precision. However, there is another reason to use the OEWS data—the ACS data represents far fewer workers. Further analysis suggests the gain in precision from using the larger OEWS sample outweighs the gain from controlling for other worker characteristics using ACS data. Moreover, in many counties there is too little ACS data to calculate an index.[3]

The FPLI accounts for another factor that systematically shapes occupational relative wage patterns—employment density at each occupation's typical employment location. Workers in jobs in relatively high-density locations within an area, such as Budget Analysts, face more variation in housing costs between areas than workers in relatively low-density locations, such as Machinists. This moderates the impact of between area differences in housing prices on the supply of workers.

Based on national ACS data, within local labor markets the density at the location of the typical school job is 12% below average. Selecting only occupations with relative employment densities comparable to school jobs would result in insufficient data. Therefore, the FPLI calculation controls statistically for the interaction of occupational relative employment density and county population.

Prior to 2003. From 1973 through 2002, the FPLI was an index of the relative cost of the basket of goods and services purchased by the typical Floridian, similar to the Consumer Price Index, albeit in a spatial context. This approach was adopted since data suitable for a comparable wage index was unavailable. The rationale was that all else equal, wages adjust for differences in prices, particularly housing prices.

That construct was subject to numerous challenges to accurate measurement. Moreover, even if measured perfectly, the construct systematically misrepresents labor costs. Other things being equal, places that are more productive, and thus more attractive to business, will have higher wages and housing prices, while places that are more pleasant in which to live, and thus more attractive to workers, will have lower wages but higher housing prices. Estimates of relative wage and price patterns imply the consumer market basket approach yields an index which less accurately reflects labor costs than would making no adjustment at all.[4]

The FPLI Calculation[5]

Initial Estimate The first step in the FPLI calculation 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 its share of workers in high wage occupations, but rather by having higher or lower wages within occupations.

With perfect data, the calculation would proceed like the hypothetical above. The first step would be to calculate the ratio of the average wage for each occupation in each county to the occupation's state average wage. The second step would be to average these ratios for each county using weights representing each occupation's share in the state labor bill.

However, not every occupation is observed in every county, so this method is infeasible. Therefore, the relative wage ratio is estimated using a linear regression model relating the natural log of the average wage in a specific county and occupation to county and occupation indicator variables. The natural log is used since wages are strictly positive and best thought of in relative terms.

To account for the impact of relative occupational density, we obtain data on worker location within labor markets from the ACS.[6] We use this data to estimate

[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.

[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 FPLI calculations from the 2006 FPLI on are available at https://drive.google.com/drive/folders/146wFMB5jdaHlFuS40Wcz3peFHGUlClqn?usp=sharing.

[6] Steven Ruggles, Sarah Flood, Matthew Sobek, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Renae Rogers, and Megan Schouweiler. IPUMS USA: Version 14.0 American Community Survey

the relative average employment density for each occupation. That is, imagine asking each worker in a city how many workers there are per square mile near their workplace, averaging those answers for each occupation in the city, taking the ratio of that average to the city average, and then averaging these ratios across cities for each occupation. This represents the construct behind the measure used. The interaction of relative occupational density with population is included in the regression to control for the effects of differences in relative occupational density on effective housing cost differentials and thereby on relative wage patterns.

Columns 3 and 4 of Table 2 provide the initial log index estimate and its standard error. An increase of 0.01 in a county's log index represents approximately a 1% increase in the relative wage.[7]

Smoothing. Prior to adoption of the current methodology, otherwise similar counties sometimes had very different FPLI values though the estimates' margins of error were large, meaning there was little evidence that the difference was real. Similarly, the law of one price implies wages in nearby counties cannot sustainably differ more than 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, reducing the wage difference. However, in some cases the difference between FPLI values in neighboring counties was large enough to cast doubt on their plausibility. To improve accuracy, the initial index calculation is smoothed to address both statistical similarity and geographic proximity between counties.

The smoothing process minimizes the population weighted sum of squared differences between the final smoothed index and both the initial index and the index value expected in statistically similar counties. The differences are expressed relative to the indices' standard errors, accounting for the precision of the estimates. Minimization is subject to the constraint that the difference between the wage in every pair of counties is no greater than the cost of commuting between them. The resulting index is thus a geographically constrained minimum mean square error estimate.

Predicted Index. Estimating the relationship between the initial index estimate and other county characteristics using least squares regression is a preliminary step in smoothing. This relationship is used to determine index values expected in statistically similar counties, referred to as the predicted index. For the 2023 FPLI the county characteristics used were labor earnings per employee, the share of dividends, interest, and rents in personal income, and the share of transfer payments in personal income. These characteristics account for 77% of the variation in the initial index. Columns 5 and 6 of Table 2 provide the predicted log index and its standard error.

Commuting Cost. Estimating the cost of commuting between county pairs is accomplished by identifying the two elementary, middle, and high schools in each county nearest two schools of the same level in each other county, provided the straight-line distance does not exceed fifty miles, and measuring the commute time and driving distance between them.[8] These are averaged to estimate incremental commute time and distance. The value of time commuting is assumed to be half the wage rate, based on guidance from the US Department of Transportation. Monetary commuting costs are estimated using cost per mile from the American Automobile Association.

When the Geographic Constraint does not Bind. Most counties are not directly impacted by the geographic constraint. In such cases the smoothed index is a weighted average of the initial and predicted indices. The weights depend on the standard errors of the indices. Consider the entries for Alachua County in columns 3-6 of Table 2. Rounding to three digits, the log index is:

$$\frac{0.005^2}{0.005^2+0.003^2}(-0.033)+\frac{0.003^2}{0.005^2+0.003^2}(-0.007)=-0.024.$$

Generally, the smoothed index is nearer the initial estimate when the initial estimate is more accurate. Differences between statistically similar counties persist only if justified by the precision of the estimates.

When the Geographic Constraint Binds. When the geographic constraint binds, the smoothed index is increased in the lower wage county and decreased in the higher wage county, moving more in counties with less precisely estimated indices. Consider the entries for Collier County and Lee County in columns 3-7 of Table 2. If the geographic constraint were not binding, the log index would be 0.0635 in Collier and 0.007 in Lee. However, Lee borders Collier and that relative wage difference exceeds what is consistent with estimated commute costs. As a result, the estimate for Lee is raised to 0.0095 and the estimate for Collier is lowered to 0.0566.

2021 5-Year Sample. Minneapolis, MN: IPUMS, 2023. https://doi.org/10.18128/D010.V14.0. Accessed 1-16-2024. The ACS survey is conducted by the U.S. Census Bureau.

[7] Note $e^{0.01}\approx 1.01$, where $e\approx 2.718$ is the base of the natural logarithm.

[8] The Florida Department of Education's Master School ID file at https://eds.fldoe.org/EDS/MasterSchoolID/ and the HERE geocoding application at https://www.here.com/ are used to do this.

Table 2: Additional Detail

County	(1) Avg. Annually Represented Occupations	(2) Avg. Annually Represented Workers	(3) Log Initial Estimate Value	(4) Log Initial Estimate Std Err	(5) Log Predicted Index Value	(6) Log Predicted Index Std Err	(7) Log Smoothed Index Without Geo	(8) Log Smoothed Index With Geo	(9) FPLI
Alachua	360	106389	-0.0330	0.0034	-0.0067	0.0047	-0.0240	-0.0240	97.51
Baker	53	3808	-0.0552	0.0102	-0.0737	0.0057	-0.0693	-0.0693	93.19
Bay	308	63880	-0.0349	0.0038	-0.0247	0.0034	-0.0292	-0.0293	97.00
Bradford	51	2894	-0.0549	0.0106	-0.0779	0.0051	-0.0736	-0.0736	92.79
Brevard	383	195565	0.0015	0.0030	-0.0053	0.0052	-0.0002	-0.0003	99.85
Broward	462	727105	0.0344	0.0024	0.0204	0.0047	0.0315	0.0315	103.07
Calhoun	28	1153	-0.1271	0.0143	-0.1041	0.0063	-0.1078	-0.1078	89.67
Charlotte	213	40757	-0.0337	0.0045	-0.0430	0.0061	-0.0370	-0.0367	96.28
Citrus	189	25891	-0.1026	0.0050	-0.0619	0.0074	-0.0899	-0.0899	91.29
Clay	201	41630	-0.0294	0.0046	-0.0368	0.0042	-0.0334	-0.0335	96.59
Collier	326	131301	0.0681	0.0034	0.0461	0.0066	0.0635	0.0566	105.69
Columbia	164	17046	-0.0579	0.0056	-0.0636	0.0043	-0.0615	-0.0615	93.92
Dade	482	1009725	0.0371	0.0023	0.0185	0.0061	0.0348	0.0349	103.42
Desoto	67	4379	-0.0348	0.0090	-0.0826	0.0055	-0.0696	-0.0698	93.14
Dixie	24	930	-0.0794	0.0157	-0.0961	0.0058	-0.0941	-0.0941	90.91
Duval	460	480179	0.0121	0.0026	0.0150	0.0073	0.0124	0.0124	101.12
Escambia	353	119657	-0.0357	0.0034	-0.0143	0.0055	-0.0297	-0.0298	96.94
Flagler	162	18160	-0.0754	0.0056	-0.0535	0.0073	-0.0673	-0.0674	93.37
Franklin	28	1311	-0.0756	0.0143	-0.0763	0.0055	-0.0762	-0.0762	92.55
Gadsden	104	8371	-0.1102	0.0071	-0.0621	0.0054	-0.0797	-0.0798	92.22
Gilchrist	30	1181	-0.0836	0.0140	-0.0831	0.0058	-0.0832	-0.0832	91.91
Glades	20	508	-0.0263	0.0180	-0.0849	0.0063	-0.0785	-0.0784	92.34
Gulf	36	1389	-0.0549	0.0130	-0.0721	0.0051	-0.0698	-0.0699	93.14
Hamilton	15	646	-0.0819	0.0199	-0.0927	0.0088	-0.0909	-0.0909	91.20
Hardee	62	2676	-0.0464	0.0098	-0.0862	0.0053	-0.0772	-0.0772	92.46
Hendry	89	5599	-0.0478	0.0079	-0.0686	0.0052	-0.0624	-0.0624	93.83
Hernando	175	32067	-0.0284	0.0051	-0.0603	0.0059	-0.0421	-0.0418	95.78
Highlands	158	18602	-0.1226	0.0056	-0.0745	0.0070	-0.1039	-0.1039	90.02
Hillsborough	449	631002	0.0199	0.0025	0.0181	0.0060	0.0196	0.0170	101.59
Holmes	29	1064	-0.1323	0.0144	-0.1035	0.0071	-0.1091	-0.1091	89.56
Indian River	243	44326	-0.0107	0.0043	0.0080	0.0045	-0.0018	-0.0016	99.71
Jackson	109	8165	-0.0797	0.0071	-0.0766	0.0049	-0.0776	-0.0777	92.42
Jefferson	25	879	-0.1216	0.0156	-0.0906	0.0090	-0.0984	-0.0983	90.52
Lafayette	10	360	-0.1007	0.0242	-0.0986	0.0073	-0.0988	-0.0988	90.48
Lake	281	83675	-0.0363	0.0038	-0.0372	0.0057	-0.0366	-0.0366	96.29
Lee	385	241792	0.0081	0.0030	0.0035	0.0054	0.0070	0.0095	100.83
Leon	346	124169	-0.0856	0.0034	-0.0063	0.0049	-0.0598	-0.0598	94.08
Levy	76	4751	-0.0875	0.0085	-0.0815	0.0055	-0.0833	-0.0833	91.90
Liberty	12	410	-0.0673	0.0225	-0.0893	0.0088	-0.0864	-0.0864	91.61
Madison	40	1542	-0.1143	0.0122	-0.0966	0.0056	-0.0997	-0.0997	90.40
Manatee	340	109144	0.0104	0.0034	-0.0109	0.0041	0.0017	0.0016	100.04
Marion	308	91377	-0.0775	0.0036	-0.0469	0.0072	-0.0714	-0.0713	93.01
Martin	276	59378	-0.0033	0.0040	0.0123	0.0058	0.0017	0.0018	100.06
Monroe	222	33737	0.0407	0.0047	0.0197	0.0076	0.0349	0.0348	103.42
Nassau	128	16004	-0.0038	0.0062	-0.0176	0.0047	-0.0126	-0.0126	98.63
Okaloosa	322	72944	0.0046	0.0037	0.0010	0.0073	0.0039	0.0039	100.26
Okeechobee	90	6757	-0.0514	0.0078	-0.0726	0.0048	-0.0668	-0.0667	93.43
Orange	460	735116	0.0141	0.0024	0.0127	0.0048	0.0138	0.0122	101.10
Osceola	254	76712	-0.0310	0.0040	-0.0514	0.0070	-0.0360	-0.0215	97.75
Palm Beach	447	547645	0.0403	0.0025	0.0531	0.0062	0.0420	0.0421	104.17
Pasco	284	104549	-0.0329	0.0036	-0.0319	0.0050	-0.0326	-0.0217	97.73
Pinellas	434	400941	0.0021	0.0027	0.0077	0.0046	0.0035	0.0035	100.22
Polk	377	207806	-0.0297	0.0030	-0.0270	0.0055	-0.0291	-0.0291	97.01
Putnam	117	10661	-0.0731	0.0066	-0.0735	0.0056	-0.0733	-0.0733	92.82
Saint Johns	257	65676	-0.0134	0.0040	0.0060	0.0066	-0.0082	-0.0081	99.07
Saint Lucie	291	67266	-0.0093	0.0038	-0.0386	0.0056	-0.0186	-0.0186	98.03
Santa Rosa	206	30133	-0.0654	0.0048	-0.0296	0.0040	-0.0443	-0.0443	95.55
Sarasota	363	153801	0.0210	0.0032	0.0125	0.0045	0.0182	0.0181	101.70
Seminole	355	178296	-0.0078	0.0032	-0.0014	0.0042	-0.0054	-0.0054	99.34
Sumter	181	26597	-0.0303	0.0051	-0.0311	0.0062	-0.0306	-0.0306	96.87
Suwannee	86	6015	-0.1100	0.0080	-0.0784	0.0049	-0.0870	-0.0871	91.55
Taylor	69	3340	-0.0856	0.0092	-0.0808	0.0060	-0.0822	-0.0822	91.99
Union	21	1111	-0.1192	0.0169	-0.0907	0.0069	-0.0948	-0.0948	90.84
Volusia	383	150737	-0.0738	0.0031	-0.0287	0.0056	-0.0632	-0.0630	93.77
Wakulla	41	2023	-0.0990	0.0117	-0.0643	0.0066	-0.0727	-0.0728	92.87
Walton	170	23196	-0.0192	0.0054	-0.0046	0.0075	-0.0142	-0.0142	98.47
Washington	52	2638	-0.0766	0.0105	-0.0904	0.0054	-0.0875	-0.0876	91.50