# Case Study of Subnational PPPs: United States

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## Introduction and Scope

The subnational PPPs in the United States are called Regional Price Parities (RPPs) and are estimated by the Regional Prices Branch of the Bureau of Economic Analysis (BEA). Annual results are published in the Survey of Current Business.[1] Experimental estimates began in 2003 (Aten 2005, 2006) and expanded in 2007 (Aten 2008, Aten and D'Souza 2008). The current methodology is described in Aten (2017).

The RPPs are published annually at the state level (50 states plus the District of Columbia) and at the Metropolitan Statistical Area level (383 MSAs), as well as for the metropolitan and non-metropolitan portions of states. They reflect household consumption only. The RPPs are estimated independently of the national price averages provided by the Bureau of Labor Statistics for Eurostat-OECD PPP computations and are thus not currently part of the ICP.

## Methodology and Source Data

The RPP methodology is based on those developed in Kravis, Heston & Summers (1982) and from the ICP. It includes the CPD approach below the basic heading, and Geary multilateral aggregations above the basic heading.[2]

*Major data sources*

The source data are the Consumer Price Index (CPI) microdata collected by the Bureau of Labor Statistics (BLS) which are *not* publicly available, and rent data from the Census that *are* accessible to users.[3] In addition, bi-annual expenditure data from the Consumer Expenditure survey are converted to annual cost weights by the CPI branch and are the relative weights used in aggregating prices at the item-strata level. These item-strata correspond roughly to basic headings in the ICP.

The CPI microdata consist of approximately one million product quotes per year, for about 200 basic headings. Tenant rents, imputed owner-occupied rents and total expenditures on rents are estimated from the Census Bureau's housing survey, called the American Community Survey (ACS). The ACS microdata has over 2 million housing observations annually, weighted to represent about 44 million tenant-occupied and 76 million owner-occupied homes in the U.S.

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[1] Eric Figueroa is the Chief of the Regional Prices Branch and can be reached at eric.figueroa@bea.gov. Last year's results, for reference year 2016, are in Survey of Current Business (SCB) volume 98, 6, June.
[2] Work has been done comparing Geary results to other multilateral spatial indexes (Aten & Reinsdorf, 2010).
[3] The CPI microdata are available to us through an interagency agreement, between the Bureau of Labor Statistics (BLS) and BEA, while the rent data are also microdata but closely match those from the PUMS (Public Use Microdata Sample) of the Census Bureau.

*Survey Framework*

The CPI uses a probability sampling framework to price products that covers all urban areas in the U.S., representing about 87% of the population.[4] The subnational geographies are the four Census regions, nine Census divisions, two sizes of city classes, eight cross-classifications of regions and size-classes, and for 23 local areas. Indexes are available for major groups of consumer expenditures (food and beverages, housing, apparel, transportation, medical care, recreation, education and communications, and other goods and services), for items within each group, and for special categories, such as services (https://www.bls.gov/cpi/overview.htm).

The ACS housing data represent all housing units in the U.S. but the subnational geographic identifiers on individual observations depend on whether the data are public or restricted. The public-use data, or PUMS, has state level and a sub-state level identifier called a PUMA (Public Use Microdata Areas), comprised of about 2870 areas with a population greater than 100,000. The restricted data are accessed on site at Census headquarters, and they contain identifiers of the housing units down to the tract and block group level, as well as rural/urban and metropolitan area identifiers. In addition to restricted access, all estimates and data that leave the Census must undergo a lengthy disclosure review process, and no result must contain more than four significant digits. [5]

*Estimating relative price levels using CPI data*

The products priced below the basic heading level in the CPI are not identical, although they have sample weights associated with each observation. This is one of the main issues in using the U.S. CPI: the survey is not designed for place-to-place surveys and requires additional work to obtain matching product specifications. To make the products as comparable as possible, we estimate a hedonic regression, below the basic heading, that is an extension of a CPD regression: the log of the price is regressed against the geographic areas and with class variables that include the product's characteristics, such as type, size, packaging and brand.[6]

The estimation of detailed hedonic regressions is feasible because the price quotes are collected in a way that allows the product's specification to be easily transformed into class variables. For example, observations on Milk may have two checklist variables: A for type and B for size, where A1 is Whole Milk, A2 is Skim Milk, B1 is a quart container, B2 is a gallon container. Thus, even if the same exact product is not priced in all areas, it is possible to estimate the relative price of milk

[4] See also https://www.bls.gov/cpi/questions-and-answers.htm,

[5] Research is underway to match PUMAs to CPI areas and/or MSAs, which would enable the RPPs to use public instead of restricted Census ACS microdata.

[6] We estimate detailed hedonic regressions for about 80 individual item-strata (basic headings), those corresponding to roughly 85% of expenditure weights. In practice, the regressions are at a more detailed level, called the Entry Level Item Cluster or ELIC level. For the remaining strata, we run simple weighted CPDs at either the Item Strata or the ELIC level.

holding constant the type and container size.[7] The disadvantage is that hedonic regressions can be time-consuming and labor intensive, requiring analyst judgment to determine which variables should be part of the regression. One way to maintain consistency is to create decision protocols that favor simplicity, and to document each regression specification so that prior years can be referenced. We also run a comprehensive outlier checking procedure based on the EU's Quaranta tables. Details of these stages of estimation, including the Quaranta analysis, are described in Aten, Figueroa and Martin (2011). [8]

The relative price levels of rents are also estimated using a hedonic regression. We regress the log of the observed contract rents on individual units against the housing characteristics, such as the structure type (apartment, attached or detached single-family house), number of bedrooms and total number of rooms, for example, as well as the geographic areas. The antilog of the coefficients on the areas are the relative price levels. Total expenditures are the sum of the rents on all the units. For owner-occupied housing, we use the same relative price levels as the tenant-occupied housing, adjusted by the number of units.[9]

The areas in the CPI are not directly comparable to those in the Census ACS, nor to administrative areas used by the BEA. This means that the CPI price levels must first be allocated to a smaller geographic unit, such as a county, then re-aggregated to states and metropolitan areas. We assume that all counties within a sampled area-size CPI combination have the same price level. The expenditure-based cost weights are also allocated to counties, a process described in detail in Figueroa, Aten and Martin (2014).

Once the CPI-derived price levels for consumption goods and services at the basic heading level have been allocated to counties, they are aggregated using a weighted Country-Product-Dummy (CPD-W) procedure, yielding relative prices for states and metropolitan areas for the sixteen major expenditure groups of the CPI (Food and Beverages, Apparel, Transportation, for example). These sixteen groups are then re-aggregated with the ACS rent price levels and to a single overall RPP using the Geary method.

## Empirical Results

*Table 1* shows subnational RPPs for 3 major private consumption expenditure groups: rents, goods and services, and the overall RPP for each state in 2016. One main result is the much wider range

[7] Of course, there must be some overlap of characteristics across the areas, or the regressions will not be estimable.

[8] The process is modeled after the Quaranta method used by the Organisation for Economic Co-operations and Development and Eurostat (OECD 2012), and the International Comparison Program of the World Bank (World Bank 2015)

[9] Research is underway to modify the owner-occupied estimates to include a premium for owners based on the relative value of their homes.

for rents (from 0.632 in Alabama to 1.574 in Hawaii) than for goods, and to a slightly lesser extent, to services. These are also published for 383 Metropolitan Areas and for the metropolitan and non-metropolitan portions of states.[10] All tables are indexed so that the U.S. overall RPP is equal to one.

*Table 2* shows the overall RPPs for states metro and nonmetropolitan portions for 2014-2016. Subnational data on RPPs are available from 2008 to 2017.[11] The range is larger for the metropolitan areas in 2016 (from 0.877 in Alabama to 1.217 in Hawaii) than for nonmetropolitan areas (0.816 Alabama to 1.031 in Connecticut) and remains consistent in earlier years. As expected, the RPPs for the metropolitan portions of states is much higher than for the nonmetropolitan portions (1.02 versus 0.88 respectively). This is driven primarily by rent price level differences.

In *Table 3* we repeat an exercise first shown in Aten & Reinsdorf (2010), where the CPI is compared to the implicit price growth of the RPPs for major metropolitan areas. The ratio of the 2016 to 2015 RPP is multiplied by the U.S. CPI (column 5) to provide an implicit price growth for each of the areas. Column (7) shows that there are substantial differences between the published CPI and the implicit price growth derived from the RPPs.[12]

## Summary

The U.S. CPI microdata lends itself to subnational comparisons because of the way prices are collected and recorded, through a set of checklists that describe the product characteristics. This facilitates the use of hedonic regressions to control for differences in the outlet, type, packaging, size and other product characteristics. It is not an ideal method as some products and characteristics are thinly dispersed across areas. Ideally one would have dedicated surveys with products specified more narrowly, together with corresponding surveys on the relative expenditures on these products. However, attempts at securing funding for such surveys have not succeeded in the past. We hope that in the future, other data sources or external surveys will augment and improve our current RPPs.[13]

The second major data source in the RPPs is the housing survey of the Census Bureau (ACS). This is a nationwide survey that has a wealth of information on rents and housing characteristics, and its sample size and coverage is comprehensive and well-suited to subnational comparisons. BEA is currently undergoing directorate-wide research on revising their imputed values or owner-occupied housing, an approach that would build up national totals from subnational geographies, for both tenant-occupied and owner-occupied units from the ACS (Aten 2018).

[10] The full tables are available on the web at www.bea.gov. See box titled "Data Availability" on how to access the data.
[11] The 2017 RPPs will be released on May 16th, 2019.
[12] Table 3 refers to RPPs from the CPI only, without the ACS data. Analysis in earlier years also show very little consistency between the CPI and the implicit price growth of the RPPs.
[13] Research is underway using J.D. Power marketing data on new automobile and truck prices, for example, and BEA is also searching for a new comprehensive medical prices survey. A revision of the medical services group in the CPI unfortunately resulted in price quotes that no longer lend themselves to robust hedonic specifications.

## Data Availability

Real personal income data, regional price parities, and implicit regional price deflators are available through the BEA website. Data are available for 2008 to 2013 for states, state metropolitan and nonmetropolitan portions, and metropolitan areas at www.bea.gov

To access the data, select the "Interactive Data" tab at the top of the homepage. At the next screen, select "GDP & Personal Income" under Regional Data. Data are available in two formats through these links:

- *Begin using the data*: interactive tables where users specify data type, region and time period.
- *Download complete data sets*: flat files accessed through Real Personal Income and Regional Price Parities menus.

For further information about these data, email the Regional Prices Branch at rpp@bea.gov

## Disclaimer

The BEA Regional Price Parity statistics are based in part on restricted access Consumer Price Index data from the Bureau of Labor Statistics. The BEA statistics expressed herein are products of BEA and not BLS.

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***Table 1. State RPPs for 2016 for Rents, Goods, Services and Overall***

| | State | Rent | Goods | Services | Overall |
|---|---|---|---|---|---|
| | **United States** | **1.0122** | **0.9936** | **0.9996** | **1** |
| **1** | Alabama | 0.632 | 0.962 | 0.933 | 0.866 |
| **2** | Alaska | 1.375 | 1.011 | 0.966 | 1.054 |
| **3** | Arizona | 0.918 | 0.974 | 0.972 | 0.959 |
| **4** | Arkansas | 0.638 | 0.947 | 0.933 | 0.869 |
| **5** | California | 1.484 | 1.036 | 1.068 | 1.144 |
| **6** | Colorado | 1.176 | 0.998 | 0.985 | 1.030 |
| **7** | Connecticut | 1.153 | 1.045 | 1.091 | 1.087 |
| **8** | Delaware | 0.971 | 0.991 | 1.032 | 1.002 |
| **9** | District of Columbia | 1.453 | 1.054 | 1.106 | 1.159 |
| **10** | Florida | 1.061 | 0.983 | 0.970 | 0.997 |
| **11** | Georgia | 0.812 | 0.967 | 0.947 | 0.921 |
| **12** | Hawaii | 1.574 | 1.105 | 1.035 | 1.184 |
| **13** | Idaho | 0.776 | 0.981 | 0.975 | 0.930 |
| **14** | Illinois | 0.984 | 0.989 | 0.992 | 0.989 |
| **15** | Indiana | 0.739 | 0.968 | 0.935 | 0.903 |
| **16** | Iowa | 0.751 | 0.952 | 0.918 | 0.902 |
| **17** | Kansas | 0.746 | 0.958 | 0.937 | 0.905 |
| **18** | Kentucky | 0.671 | 0.943 | 0.931 | 0.878 |
| **19** | Louisiana | 0.762 | 0.965 | 0.933 | 0.904 |
| **20** | Maine | 0.944 | 0.985 | 1.005 | 0.984 |
| **21** | Maryland | 1.220 | 1.034 | 1.070 | 1.095 |
| **22** | Massachusetts | 1.229 | 1.011 | 1.058 | 1.078 |
| **23** | Michigan | 0.810 | 0.973 | 0.963 | 0.933 |
| **24** | Minnesota | 0.954 | 1.009 | 0.949 | 0.975 |
| **25** | Mississippi | 0.650 | 0.938 | 0.933 | 0.864 |
| **26** | Missouri | 0.731 | 0.953 | 0.926 | 0.895 |
| **27** | Montana | 0.809 | 0.989 | 0.956 | 0.941 |
| **28** | Nebraska | 0.762 | 0.956 | 0.920 | 0.905 |
| **29** | Nevada | 0.947 | 0.961 | 1.011 | 0.974 |
| **30** | New Hampshire | 1.183 | 1.004 | 1.044 | 1.059 |
| **31** | New Jersey | 1.325 | 1.027 | 1.134 | 1.132 |
| **32** | New Mexico | 0.802 | 0.970 | 0.998 | 0.936 |
| **33** | New York | 1.332 | 1.090 | 1.116 | 1.156 |
| **34** | North Carolina | 0.786 | 0.963 | 0.933 | 0.909 |
| **35** | North Dakota | 0.828 | 0.950 | 0.916 | 0.915 |
| **36** | Ohio | 0.728 | 0.961 | 0.919 | 0.893 |
| **37** | Oklahoma | 0.701 | 0.955 | 0.933 | 0.890 |

| | State | Rent | Goods | Services | Overall |
|---|---|---|---|---|---|
| | **United States** | **1.0122** | **0.9936** | **0.9996** | **1** |
| **38** | Oregon | 1.060 | 0.989 | 0.972 | 0.998 |
| **39** | Pennsylvania | 0.888 | 0.994 | 1.027 | 0.984 |
| **40** | Rhode Island | 1.006 | 0.983 | 1.003 | 0.996 |
| **41** | South Carolina | 0.771 | 0.967 | 0.933 | 0.903 |
| **42** | South Dakota | 0.693 | 0.949 | 0.915 | 0.883 |
| **43** | Tennessee | 0.758 | 0.962 | 0.933 | 0.902 |
| **44** | Texas | 0.937 | 0.972 | 0.986 | 0.969 |
| **45** | Utah | 0.943 | 0.967 | 1.003 | 0.973 |
| **46** | Vermont | 1.132 | 0.984 | 1.003 | 1.016 |
| **47** | Virginia | 1.097 | 0.996 | 1.008 | 1.023 |
| **48** | Washington | 1.161 | 1.037 | 1.019 | 1.055 |
| **49** | West Virginia | 0.632 | 0.944 | 0.949 | 0.876 |
| **50** | Wisconsin | 0.848 | 0.959 | 0.934 | 0.928 |
| **51** | Wyoming | 0.929 | 0.987 | 0.961 | 0.967 |
| | *maximum* | *1.574* | *1.105* | *1.134* | *1.184* |
| | *minimum* | *0.632* | *0.938* | *0.915* | *0.864* |

*Source: Regional Prices Branch, Bureau of Economic Analysis*

***Table 2. Metro and Nonmetropolitan portions of States 2014-2016***

| Metropolitan | | 2014 | 2015 | 2016 | | Nonmetropolitan | | 2014 | 2015 | 2016 |
|---|---|---|---|---|---|---|---|---|---|---|
| | **United States** | **1.020** | **1.020** | **1.021** | | | **United States** | **0.882** | **0.883** | **0.879** |
| **1** | Alabama | 0.882 | 0.879 | 0.877 | | 1 | Alabama | 0.822 | 0.817 | 0.816 |
| **2** | Alaska | 1.095 | 1.086 | 1.085 | | 2 | Alaska | 1.001 | 0.999 | 0.992 |
| **3** | Arizona | 0.966 | 0.965 | 0.965 | | 3 | Arizona | 0.859 | 0.868 | 0.866 |
| **4** | Arkansas | 0.883 | 0.891 | 0.884 | | 4 | Arkansas | 0.838 | 0.835 | 0.835 |
| **5** | California | 1.142 | 1.142 | 1.151 | | 5 | California | 0.974 | 0.978 | 0.965 |
| **6** | Colorado | 1.030 | 1.038 | 1.042 | | 6 | Colorado | 0.963 | 0.965 | 0.964 |
| **7** | Connecticut | 1.090 | 1.091 | 1.092 | | 7 | Connecticut | 1.047 | 1.035 | 1.031 |
| **8** | Delaware | 1.012 | 1.002 | 1.003 | | - | - | - | - | - |
| **9** | District of Columbia | 1.186 | 1.177 | 1.164 | | - | - | - | - | - |
| **10** | Florida | 0.999 | 1.000 | 1.003 | | 8 | Florida | 0.896 | 0.902 | 0.898 |
| **11** | Georgia | 0.938 | 0.943 | 0.939 | | 9 | Georgia | 0.841 | 0.849 | 0.837 |
| **12** | Hawaii | 1.219 | 1.222 | 1.217 | | 10 | Hawaii | 0.996 | 1.006 | 1.017 |
| **13** | Idaho | 0.939 | 0.941 | 0.940 | | 11 | Idaho | 0.924 | 0.913 | 0.906 |
| **14** | Illinois | 1.011 | 1.010 | 1.007 | | 12 | Illinois | 0.850 | 0.856 | 0.846 |
| **15** | Indiana | 0.919 | 0.917 | 0.916 | | 13 | Indiana | 0.860 | 0.857 | 0.846 |
| **16** | Iowa | 0.926 | 0.927 | 0.925 | | 14 | Iowa | 0.872 | 0.871 | 0.867 |
| **17** | Kansas | 0.928 | 0.927 | 0.929 | | 15 | Kansas | 0.863 | 0.858 | 0.850 |
| **18** | Kentucky | 0.900 | 0.905 | 0.896 | | 16 | Kentucky | 0.852 | 0.850 | 0.844 |
| **19** | Louisiana | 0.923 | 0.920 | 0.915 | | 17 | Louisiana | 0.835 | 0.829 | 0.842 |
| **20** | Maine | 0.991 | 1.002 | 0.996 | | 18 | Maine | 0.955 | 0.954 | 0.956 |
| **21** | Maryland | 1.113 | 1.107 | 1.105 | | 19 | Maryland | 0.909 | 0.899 | 0.896 |
| **22** | Massachusetts | 1.076 | 1.076 | 1.081 | | 20 | Massachusetts | 1.012 | 1.022 | 1.017 |
| **23** | Michigan | 0.946 | 0.943 | 0.944 | | 21 | Michigan | 0.876 | 0.876 | 0.869 |
| **24** | Minnesota | 1.002 | 1.000 | 1.002 | | 22 | Minnesota | 0.880 | 0.881 | 0.873 |
| **25** | Mississippi | 0.896 | 0.888 | 0.894 | | 23 | Mississippi | 0.828 | 0.831 | 0.832 |
| **26** | Missouri | 0.912 | 0.909 | 0.910 | | 24 | Missouri | 0.849 | 0.848 | 0.837 |
| **27** | Montana | 0.957 | 0.970 | 0.956 | | 25 | Montana | 0.934 | 0.933 | 0.926 |
| **28** | Nebraska | 0.927 | 0.927 | 0.927 | | 26 | Nebraska | 0.866 | 0.868 | 0.864 |
| **29** | Nevada | 0.979 | 0.980 | 0.980 | | 27 | Nevada | 0.945 | 0.941 | 0.928 |
| **30** | New Hampshire | 1.083 | 1.079 | 1.083 | | 28 | New Hampshire | 1.007 | 1.007 | 1.011 |
| **31** | New Jersey | 1.141 | 1.135 | 1.135 | | - | - | - | - | - |
| **32** | New Mexico | 0.966 | 0.955 | 0.949 | | 29 | New Mexico | 0.888 | 0.896 | 0.897 |
| **33** | New York | 1.175 | 1.171 | 1.175 | | 30 | New York | 0.953 | 0.952 | 0.954 |
| **34** | North Carolina | 0.926 | 0.922 | 0.923 | | 31 | North Carolina | 0.851 | 0.854 | 0.842 |
| **35** | North Dakota | 0.929 | 0.933 | 0.929 | | 32 | North Dakota | 0.900 | 0.915 | 0.900 |
| **36** | Ohio | 0.903 | 0.902 | 0.902 | | 33 | Ohio | 0.850 | 0.853 | 0.846 |
| **37** | Oklahoma | 0.913 | 0.913 | 0.905 | | 34 | Oklahoma | 0.857 | 0.864 | 0.854 |
| **38** | Oregon | 0.999 | 0.999 | 1.009 | | 35 | Oregon | 0.920 | 0.927 | 0.929 |

| Metropolitan | | 2014 | 2015 | 2016 | | Nonmetropolitan | | 2014 | 2015 | 2016 |
|---|---|---|---|---|---|---|---|---|---|---|
| | **United States** | **1.020** | **1.020** | **1.021** | | | **United States** | **0.882** | **0.883** | **0.879** |
| **39** | Pennsylvania | 0.990 | 0.990 | 0.993 | | 36 | Pennsylvania | 0.916 | 0.915 | 0.911 |
| **40** | Rhode Island | 1.000 | 0.996 | 0.998 | | - | - | - | - | - |
| **41** | South Carolina | 0.910 | 0.914 | 0.914 | | 37 | South Carolina | 0.826 | 0.819 | 0.824 |
| **42** | South Dakota | 0.916 | 0.921 | 0.913 | | 38 | South Dakota | 0.847 | 0.851 | 0.854 |
| **43** | Tennessee | 0.910 | 0.910 | 0.916 | | 39 | Tennessee | 0.845 | 0.842 | 0.842 |
| **44** | Texas | 0.978 | 0.981 | 0.983 | | 40 | Texas | 0.877 | 0.878 | 0.873 |
| **45** | Utah | 0.973 | 0.970 | 0.979 | | 41 | Utah | 0.933 | 0.949 | 0.938 |
| **46** | Vermont | 1.053 | 1.038 | 1.049 | | 42 | Vermont | 1.002 | 1.006 | 0.991 |
| **47** | Virginia | 1.055 | 1.053 | 1.051 | | 43 | Virginia | 0.881 | 0.884 | 0.878 |
| **48** | Washington | 1.059 | 1.059 | 1.066 | | 44 | Washington | 0.959 | 0.959 | 0.954 |
| **49** | West Virginia | 0.885 | 0.892 | 0.889 | | 45 | West Virginia | 0.864 | 0.868 | 0.848 |
| **50** | Wisconsin | 0.948 | 0.947 | 0.942 | | 46 | Wisconsin | 0.885 | 0.882 | 0.879 |
| **51** | Wyoming | 0.980 | 0.974 | 0.973 | | 47 | Wyoming | 0.957 | 0.955 | 0.958 |
| | *maximum* | *1.219* | *1.222* | *1.217* | | | *maximum* | *1.047* | *1.035* | *1.031* |
| | *minimum* | *0.882* | *0.879* | *0.877* | | | *minimum* | *0.822* | *0.817* | *0.816* |

*Source: Regional Prices Branch, Bureau of Economic Analysis*

***Table 3. CPI compared to Implicit Price Growth of RPPs***

| Large Metropolitan Statistical Areas | CPI 2016/2015 | | RPP 2015 | RPP 2016 | Implicit Price Growth (RPP 2016/2015 *US CPI) | | CPI/Implicit Price Growth | |
|---|---|---|---|---|---|---|---|---|
| | (1) ratio | (2) % | (3) | (4) | (5) ratio | (6) % | (7) ratio | (8) % |
| **United States** | ***1.0126*** | **1.262%** | **1** | **1** | ***1.0126*** | ***1.262%*** | **1** | **0%** |
| Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD CMSA | *1.006* | 0.6% | 1.061 | 1.064 | *1.016* | 1.6% | 0.990 | -1.0% |
| Boston-Brockton-Nashua, MA-NH-ME-CT CMSA | *1.015* | 1.5% | 1.123 | 1.193 | *1.076* | 7.6% | 0.943 | -5.7% |
| Pittsburgh, PA MSA | *1.016* | 1.6% | 0.890 | 0.890 | *1.013* | 1.3% | 1.004 | 0.4% |
| New York-Northern New Jersey-Long Island, NY-NJ-CT-PA CMSA | *1.011* | 1.1% | 1.375 | 1.392 | *1.025* | 2.5% | 0.986 | -1.4% |
| NY suburbs | *1.011* | 1.1% | 1.265 | 1.240 | *0.993* | -0.7% | 1.018 | 1.8% |
| NJ suburbs | *1.011* | 1.1% | 1.183 | 1.210 | *1.036* | 3.6% | 0.975 | -2.5% |
| Chicago-Gary-Kenosha, IL-IN-WI CMSA | *1.007* | 0.7% | 1.009 | 1.041 | *1.044* | 4.4% | 0.964 | -3.6% |
| Detroit-Ann Arbor-Flint, MI CMSA | *1.016* | 1.6% | 0.936 | 0.951 | *1.029* | 2.9% | 0.987 | -1.3% |
| St. Louis, MO-IL MSA | *1.008* | 0.8% | 0.880 | 0.916 | *1.053* | 5.3% | 0.957 | -4.3% |
| Cleveland-Akron, OH CMSA | *1.014* | 1.4% | 0.871 | 0.875 | *1.017* | 1.7% | 0.997 | -0.3% |
| Minneapolis-St. Paul, MN-WI MSA | *1.002* | 0.2% | 0.992 | 0.977 | *0.998* | -0.2% | 1.004 | 0.4% |
| Milwaukee-Racine, WI CMSA | *1.016* | 1.6% | 0.899 | 0.920 | *1.036* | 3.6% | 0.980 | -2.0% |
| Cincinnati-Hamilton, OH-KY-IN CMSA | *1.006* | 0.6% | 0.849 | 0.890 | *1.061* | 6.1% | 0.948 | -5.2% |
| Kansas City, MO-KS MSA | *1.008* | 0.8% | 0.897 | 0.919 | *1.038* | 3.8% | 0.971 | -2.9% |
| Washington-Baltimore, DC-MDVA-WV CMSA | *1.012* | 1.2% | 1.195 | 1.158 | *0.982* | -1.8% | 1.030 | 3.0% |
| Baltimore-Columbia-Towson, MD | *1.012* | 1.2% | 1.077 | 1.099 | *1.033* | 3.3% | 0.979 | -2.1% |
| Dallas-Fort Worth, TX CMSA | *1.015* | 1.5% | 0.971 | 0.966 | *1.007* | 0.7% | 1.007 | 0.7% |
| Houston-Galveston-Brazoria, TX CMSA | *1.016* | 1.6% | 1.023 | 0.994 | *0.984* | -1.6% | 1.032 | 3.2% |
| Atlanta, GA MSA | *1.017* | 1.7% | 0.925 | 0.922 | *1.010* | 1.0% | 1.008 | 0.8% |
| Miami-Fort Lauderdale, FL CMSA | *1.013* | 1.3% | 1.099 | 1.128 | *1.039* | 3.9% | 0.975 | -2.5% |

| Large Metropolitan Statistical Areas | CPI 2016/2015 | | RPP 2015 | RPP 2016 | Implicit Price Growth (RPP 2016/2015 *US CPI) | | CPI/Implicit Price Growth | |
|---|---|---|---|---|---|---|---|---|
| | (1) ratio | (2) % | (3) | (4) | (5) ratio | (6) % | (7) ratio | (8) % |
| Tampa-St. Petersburg-Clearwater, FL MSA | *1.012* | 1.2% | 0.990 | 0.936 | *0.957* | -4.3% | 1.057 | 5.7% |
| Los Angeles-Riverside-Orange County, CA CMSA | *1.019* | 1.9% | 1.209 | 1.208 | *1.012* | 1.2% | 1.007 | 0.7% |
| Greater LA | *1.019* | 1.9% | 1.158 | 1.175 | *1.028* | 2.8% | 0.991 | -0.9% |
| San Francisco-Oakland-San Jose, CA CMSA | *1.030* | 3.0% | 1.313 | 1.376 | *1.061* | 6.1% | 0.971 | -2.9% |
| Seattle-Tacoma-Bremerton, WA CMSA | *1.022* | 2.2% | 1.095 | 1.102 | *1.019* | 1.9% | 1.003 | 0.3% |
| San Diego, CA MSA | *1.020* | 2.0% | 1.190 | 1.196 | *1.018* | 1.8% | 1.002 | 0.2% |
| Portland-Salem, OR-WA CMSA | *1.021* | 2.1% | 1.008 | 0.980 | *0.985* | -1.5% | 1.037 | 3.7% |
| Honolulu, HI MSA | *1.020* | 2.0% | 1.279 | 1.231 | *0.974* | -2.6% | 1.047 | 4.7% |
| Anchorage, AK MSA | *1.004* | 0.4% | 1.082 | 1.080 | *1.011* | 1.1% | 0.993 | -0.7% |
| Phoenix-Mesa, AZ MSA | *1.016* | 1.6% | 0.936 | 0.933 | *1.010* | 1.0% | 1.007 | 0.7% |
| Denver-Boulder-Greeley, CO CMSA | *1.028* | 2.8% | 1.056 | 1.059 | *1.016* | 1.6% | 1.011 | 1.1% |
| *maximum* | | 3.0% | | | | 7.6% | | 5.7% |
| *minimum* | | 0.2% | | | | -4.3% | | -5.7% |

*Source: Regional Price Branch, Bureau of Economic Analysis*