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Estimates of State and Metropolitan Price Parities for Consumption Goods and Services in the United States, 2005

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Abstract

Price indexes are commonly used in time-to-time economic series to adjust for changes in price levels across years. This paper estimates price *parities* within the U.S., defined as an adjustment for differences in price levels across geographic areas at one point in time. The term *parity* is more frequently used in international comparisons, where *purchasing power parities (PPPs)* are divided by the exchange rate to denote differences in price levels across countries. The method described here for calculating regional *PPPs* is based on micro-level price data from the Consumer Price Index of the Bureau of Labor Statistics and on the American Community Survey of the Census Bureau. It uses a Bayesian spatial smoothing approach to obtain individual county price levels that are aggregated to *regional price parities (RPPs)* for 363 metropolitan areas and 51 states in the United States. An example of their relevance is given by comparing the Personal Income and Gross Domestic Product estimates produced by the Bureau of Economic Analysis for the year 2005 at national prices and at regional price parities.

Introduction

This paper develops exploratory estimates of the spatial price differences for consumption goods and services at the U.S. state and metropolitan area level for 2005. Spatial (place-to-place) price differences are important to regional and other sub-national accounting frameworks as they make possible comparisons of economic data that are adjusted for geographic differences in price levels. In international comparisons, these adjustments are termed *purchasing power parities (PPP)*; when divided by exchange rates they are called national price levels. In areas with a common currency like the Euro, the exchange rates are the same and the PPP becomes the price level.

Just as there are differences in price levels between European Union member countries, there are significant differences in the purchasing power of a currency across diverse areas of the United States, for example between metropolitan New York compared to rural South Dakota. We use the term *Regional Price Parity (RPPs)* to label these sub-national estimates of *PPPs*. The *RPPs* can be used to adjust consumption-related

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statistics, such as per capita incomes, expenditures and output, providing users with a more accurate picture of regional economic differences at one point in time. See for example Bernstein *et al* [2000], Johnson *et al* [2001], and Jollife [2006].

The *RPPs* are built up in this paper from two main data sets. The first is the principal source of consumer price information in the United States, the Bureau of Labor Statistics Consumer Price Index (CPI) for 38 metropolitan and urban areas, which is of course used for time-to-time indexes. Aten (2006) presented regional price parity estimates for 2003 and 2004 for these 38 areas, which cover 87% of the population but only about 15% of U.S. counties. In addition, some states are not covered at all by the CPI.

The second source of information is the county level monthly median costs for owners and renters from the 2005 American Community Survey (ACS) of the U.S. Census Bureau, adjusted for quality differences. This adjustment is described in the next section. Henceforth, the *housing costs* denote the average of these costs – that is, the geometric mean[1] of the median selected monthly owner costs (with and without mortgages) and median gross rents[2].

The sub-national price level estimates presented here are generated using Bayesian inference and a two-stage approach that bridges the results in the areas sampled by the CPI price surveys to the remaining non-sampled areas covered by the Census.

Methodology and Data

BLS data: Price Parities

The background methodology and data on estimating place-to-place price parities for the 38 metropolitan and urban areas in the CPI for one year price levels is detailed in Aten [2005, 2006]. The estimation of these parities begins with over a million price quotes and detailed hedonic regressions for over two hundred consumption goods and services items. These items range from new automobiles to haircuts, and include consumption expenditures on shelter, or *rents*. The CPI *rents* estimated within the BLS framework are different from the ACS and Census *housing costs* in that the former uses *owner-equivalent* rents[3] rather than actual *owner-costs*.

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[1] The ACS tables (Tables B25088 and B25064) provide the number of owner-occupied versus rental housing units. *Housing costs* are calculated as the weighted geometric mean of the ownership costs and gross *rents*, where the weights equal the proportion of owned and rented housing units in each county.
[2] *"Selected **monthly owner costs** are the sum of payments for mortgages, deeds of trust, contracts to purchase, or similar debts on the property; real estate taxes: fire, hazard, and flood insurance on the property; utilities (electric, gas, water, and sewer); and fuels (oil, coal, kerosene, wood, and so on). It also includes, where appropriate, the monthly condominium fee for condominiums and mobile home costs",*
*" **Gross rent** is the contract rent plus the estimated average monthly cost of utilities and fuels if these are paid by the renter",* page 64:
http://www.census.gov/acs/www/SBasics/congress_toolkit/Housing%20Fact%20Sheets.pdf
[3] http://www.bls.gov/cpi/cpifact6.htm

The hedonic regressions take into account item characteristics, such as unit size and packaging, as well as the location and type of outlet where the item is sold, and uses probability sampling quotes as weights[4]. The resulting item price levels are then aggregated into major categories, such as Food and Beverages, Transportation, and Housing[5], and up to an overall *RPP* for consumption. The aggregation method follows the Rao-system of multilateral price comparisons (Rao [2005]) and uses the itemized expenditures of each area as weights (see *Appendix Table A1* in Aten [2006] for a list of all counties comprising these areas).

One shortcoming of this background work is its limited geographical coverage, albeit representing the great majority of the country's population. This is because the CPI survey is designed as a probability sample to estimate price changes over time, not price differences across locations[6]. More disaggregated item calculations or more extensive geographical coverage would require a redesign of the CPI survey, something that is not feasible in the short run.

Census data: *Housing Costs*

The data on *housing costs* are taken from the Census Bureau. A previous version of this paper (Aten, 2007) used Census 2000 data, moving back the estimated price levels from 2003 to 2000 by the urban and non-urban CPI changes[7]. This paper instead uses 2005 prices and the more recent 2005 American Community Survey (ACS). The 2005 ACS includes all counties with a population of 65,000 or more, a total of about 780 counties covering 82 percent of the nation's population. It also includes the proportion of owners and renters in each county, as well as median gross rents and selected monthly owner costs[8].

In addition, an adjustment is made for the 'quality' of the rental and owned housing stock. Quality-adjustment in this context means taking into account various characteristics of the housing observations, namely number of rooms, bathrooms, age, kitchen and plumbing facilities, and the type of unit – whether it is a detached or attached house, a small or a large apartment building for example, in addition to the mortgage status (for owners).

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[4] Since the author anticipates estimating the 38 interarea price levels annually, the results for 2005 onward will be available as tables rather than published papers. Effort is underway to make them available for downloading at the BLS website as well as from BEA.

[5] Housing items in the CPI also include *Rents.* Rents in the BLS are distinct from Rents in the Census, as the former imputes the owner-equivalent *rents* using utility costs and other adjustments (for a more detailed description, see Aten [2006]).

[6]The individual price quotes of the CPI are identified by location (zip code in most cases), but full coverage of all items exist only when aggregated to the 38 metro and urban areas. This is because the probability quote weights for the samples as well as the detailed expenditure weights by item are only available for the 38 areas.

[7] Aten (2006) compares an extrapolation of 2003 to 2004 versus a direct estimate for the year 2004 and finds that there are minor differences when an aggregate CPI rate is used as the deflator, but negligible differences with a detailed item-level CPI deflator.

[8] 2005, 2006 ACS FactFinder, subject tables B25088 and B25064 and an earlier footnote (Footnote 2) .

These detailed characteristics are only available at the *Public Use Microdata Sample* (*PUMS*) level, and not identifiable at the county level, so a quality adjustment factor can only be obtained at the next aggregate level, the state level[9]. The factor is the ratio of the average value of quality-adjusted housing to unadjusted housing using a separate hedonic regression for renters versus owners with the characteristics listed above. The median gross rent and the monthly owner cost in each county are multiplied by the corresponding quality adjustment factors, and the results averaged in proportion to the number of owners and renters. The result is termed *housing costs* for simplicity.

The 2005 *housing costs* for counties not in the ACS were computed in the following way. Their 2000 Census *housing costs* were moved to 2005 using the population weighted geometric mean of the ACS counties for each state. In other words, the change in median *housing costs* for these smaller (less than 65,000 population) counties was assumed to reflect the average change across the larger counties within each state, weighted by their populations. Henceforth Census *housing costs* will denote these quality adjusted weighted averages of renters and owners that include both ACS and smaller counties[10].

Method

The starting point of the estimation procedure is the set of 38 price levels obtained directly from price quotes and hedonic regressions using the BLS data. These price levels are strongly related to the *housing costs* as shown in *Figure 1*. The price level - rent relationship across these areas is assumed to hold within the areas, so that using the estimated coefficients from Equation (1), the price levels for the 425 counties that make up these 38 areas can be obtained[11]. They are then adjusted so that their population weighted means equal the 38 original area means.

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[9] The ACS PUMS housing records for 2005 consist of over 280,000 rent observations and 855,000 owner observations, and are described in http://www.census.gov/acs/www/Products/PUMS/

[10] Observations in the Census data follow several designations: county is the lowest aggregation for many states, but for others there are Places and MCDs within a county FIPS code. For example, there are five townships in Maine that are part of York County, which in turn is one of the ten counties in the A103 Boston metropolitan area. Connecticut, Massachusetts, Vermont and New Hampshire also have several towns or cities within a county code. Unless otherwise noted, the subdivisions are aggregated to the county level. In the case of *housing costs*, this is the weighted geometric mean of the Places or MCDs within each county.

[11] A few counties span more than one CPI area, primarily when the county is comprised of townships. In these cases, the FIPS code of the county was assigned to one area only, based on the size of the sample and/or the population that it covered. They are the following:

Litchfield, CT to area A110 (New York Suburbs)
Middlesex, CT to area X100 (Northeast B region)
Windham, CT to area X100 (Northeast B region)
Hampden, MA to area X100 (Northeast B region)

Eight towns within Litchfield are in the A110 area and five are in the X100 region but the ones in the A110 area account for two thirds of the population. Seven out of eight towns in Middlesex are in the X100 area, with 79% of the population. In Windham, only Thompson town with 11% of the population is in the A103 Boston with the rest in the X100 area, and similarly in Hampden, only Holland town with less than one percent of the population is in A103, with the remainder in the X100 Northeast B area.

A second set of parameters are then estimated using Equation (2). The 425 county *housing costs* and also their relative locations are modeled explicitly, resulting in a set of spatially smoothed estimates. Both equations use a Bayesian framework, allowing the variances of the error terms to be non-constant. In addition, Equation (2) is written as a spatial model with missing dependent variables (the price levels to be estimated for the remaining counties), and an adjustment is made to include the *housing costs* of the missing observations as well as their relative location. These will be discussed further below.

There are two main issues that arise from this methodology. The first is a change-of-scale problem - from the 38 BLS areas to the 425 counties that comprise them, and the second one a change-of-sample problem - from the 425 counties that belong the BLS sample to the remaining counties.

The change-of-scale problem arises partly because some of the 38 areas cross state lines and represent larger regions, while others refer to single counties. For example, the District of Columbia is only one of 26 counties in the Greater Washington metropolitan area as defined in the CPI, but it is also a *quasi* state, or at least, for many purposes, a separate entity from the states of Virginia or Maryland. Los Angeles is one county and one BLS area by itself, but only one of 58 counties in the state of California. The BLS area termed South B (medium and small urban areas in the South Region), is made up of 84 smaller units, scattered across states such as Georgia, Tennessee, and South Carolina.

Combining and using these disparate spatial units, as well as issues related to scale, classification inconsistencies and sampling coverage have been discussed in the spatial econometric (Anselin [2002]), and geostatistical literature by Goodchild, Anselin and Deichmann [1993], Gotway and Young [2002], Baneerje and Gelfand [2004], and Anselin and Gallo [2006]. Holt, Trammer, Stell and Wrigley [1996] and Huang and Cressie [1997] have proposed some adjustments to deal with the differences between aggregation levels.

The approach used here hopes to mitigate, rather than resolve some of the problems associated with changes of scale and spatial aggregation, but is by necessity data-driven and constrained by the sampling coverage.

The second main issue in making inferences for areas not sampled by the BLS CPI is by construction: the survey design systematically excludes the smaller, less densely populated counties which have lower volumes of expenditures. This means that direct inferences from the sampled areas of the CPI to the non-sampled areas would be misleading because the distribution of expenditures and prices are also likely to be systematically different[12].

[12] The unweighted average housing costs for the 425 counties is $1,003 while for all other counties it is $594. The two-sample equality of means t-test statistic is 25.99 (p<0.0001).

One approach that has proven successful in predicting sampled versus non-sampled observations is the use of a best linear unbiased predictor *(BLUP)* for missing dependent variables (Goldberger [1962], Cressie [1993], Kelejian and Prucha [2004]). The spatial econometric equivalent of the *BLUP* is termed an endogenous spatial smoothing approach given in LeSage and Pace [2004, 2007] and is adopted here.

In the final stage, the predicted county price level estimates are aggregated to the state and the metropolitan area level, weighted by the total value of wage and salary disbursements in each county. These weighted aggregate price levels are the *Regional Price Parities* or *RPP*s. Total wage and salary disbursements include supplements, such as employer contributions to social security and are termed Compensation of Employees. Compensation of Employees enters into the calculation of GDP and Personal Income by state and metropolitan areas at BEA[13].

Ideally, one would use the consumption expenditures of individuals rather than the compensation of employees to weight the consumption-based price levels, but expenditures are not available at a detailed geographic level, whereas compensation data are. Another argument for using compensation is that it is a major component of total product on the income side of GDP accounting, just as expenditures generally account for the largest proportion of GDP from the expenditure side.

To highlight the use of *RPP*s, estimates of income and product at national prices versus estimates adjusted for regional price differences are presented. They are calculated by adjusting the Compensation of Employees total in Personal Income and GDP by the RPP, then adding the unadjusted remainder. This unadjusted remainder includes such components as taxes, transfers, dividends and interest, and are explained in more detail in Lenze (2007) and Panek, Baumgardner and McCormick (2007).

Results

Figure 1 plots the relationships between the original price levels and the *housing costs* for 2005.

[13] County level Compensation of Employees are available from the BEA website, as are Personal Income and GDP totals by state and metropolitan areas. See http://bea.gov/regional/index.htm for the data and methodology.

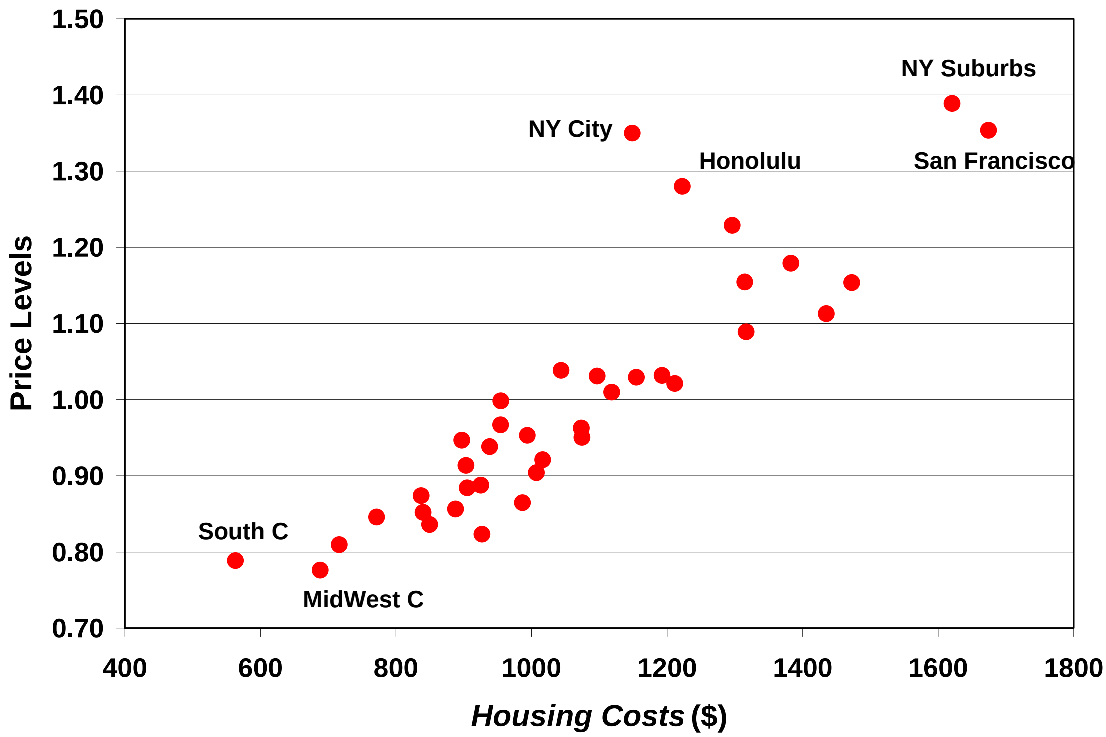


Table 1 shows the price levels and also the corresponding average *housing costs* in dollars for each area. The *housing cost* level is equal to the *housing cost* in dollars divided by the average dollar *rent* for the 38 areas.

Table 1. Observed Price Levels and Housing Costs by Area for 2005

Region	Area	Freq	Area Name	Price Level	Housing Cost ($)	Housing Cost Level
North East	A102	14	Philadelphia	1.04	1044	0.98
	A103	12	Boston	1.15	1315	1.24
	A104	6	Pittsburgh	0.81	716	0.67
	A109	5	NY city	1.35	1149	1.08
	A110	10	NY suburbs	**1.39	1620	1.52
	A111	15	NJ suburbs	1.18	1383	1.30
Mid West	A207	13	Chicago	1.03	1193	1.12
	A208	10	Detroit	0.92	1016	0.96
	A209	13	St. Louis	0.84	850	0.80
	A210	8	Cleveland	0.86	888	0.83
	A211	13	Minneapolis	1.01	1118	1.05
	A212	5	Milwaukee	0.86	987	0.93
	A213	13	Cincinnati	0.88	905	0.85
	A214	11	Kansas City	0.82	927	0.87
South	A312	26	DC	1.09	1317	1.24
	A313	7	Baltimore	1.00	955	0.90
	A316	12	Dallas	0.95	994	0.93
	A318	8	Houston	0.94	938	0.88
	A319	20	Atlanta	0.90	1007	0.95

Region	Area	Freq	Area Name	Price Level	Housing Cost ($)	Housing Cost Level
	A320	2	Miami	1.03	1097	1.03
	A321	4	Tampa	0.87	837	0.79
West	A419	1	Los Angeles	1.23	1296	1.22
	A420	4	Greater LA	1.11	1435	1.35
	A422	10	San Francisco	1.35	**1674	**1.57
	A423	6	Seattle	1.03	1155	1.09
	A424	1	San Diego	1.15	1473	1.38
	A425	8	Portland	0.95	1075	1.01
	A426	1	Honolulu	1.28	1222	1.15
	A427	1	Anchorage	1.02	1212	1.14
	A429	2	Phoenix	0.97	955	0.90
	A433	7	Denver	0.96	1073	1.01
Non-metro	D200	7	MW Cs	*0.78	688	0.65
	D300	9	South Cs	0.79	*563	*0.53
	D400	2	West Cs	0.95	897	0.84
	X100	21	NE Bs	0.91	904	0.85
	X200	25	MW Bs	0.85	840	0.79
	X300	84	South Bs	0.85	772	0.73
	X499	9	West Bs	0.89	925	0.87
	Sum	425	**Mean**	1.00	1064	1.00
			****Max**	1.39	1674	1.57
			***Min**	0.78	563	0.53
			Range	0.61	1111	1.04

The column labeled *Freq* denotes the number of counties that make up each area (four areas are made up of only one county: Los Angeles, San Diego, Honolulu and Anchorage). The mean of the price levels and the *housing cost* levels across the 38 areas is 1.00 by construction, while that of the unweighted *housing costs* is US$ 1,064. The range of the *housing costs* far exceeds that of the price levels: 1.04 versus 0.61.

The San Francisco area had the highest *housing costs*, with an average of US$ 1,674 and a *rent* level of 1.57, while the South C areas, comprised of the urban parts of Arcadia FL, Morristown TN, Picayune MS and Statesboro GA were the lowest, with *housing costs* averaging US$ 563 and a *rent* level of 0.53. New York City, and to some extent Honolulu, appear to have relatively low *housing costs* but high price levels. The New York Suburbs had the highest price levels among the metro areas, and includes Dutchess, Nassau, Orange, Putnam, Rockland, Suffolk and Westchester counties, as well as Fairfield, Middlesex and New Haven in Connecticut.

Equation (1): n = 38

$$P = X\beta + \varepsilon$$

$$\varepsilon \approx \mathrm{N}(0,\sigma^2\mathrm{V}),\ \mathrm{V}=\mathrm{diag}(v_i,\ldots,v_n)$$

A simple linear-in-logs relationship between price levels (P) and the exogenous variable*s,* weighted by the population in each area, is the starting point in Equation (1). X is a *n by 2* matrix containing the intercept and the *housing costs.*

Alternatives specifications were tested, such as a log-linear version and non-linear functions, fixed-effects for size and region, and models that included other explanatory variables, such as incomes (from the Internal Revenue Service), Census demographic variables and population densities.

Introducing incomes and demographic variables raises simultaneity issues, namely whether incomes determine prices or vice-versa. The effect of including Census variables, such as race, education and other neighborhood-specific indicators was analyzed in some detail in Aten (2005). Although not insignificant, it was unclear whether one wants to use differences in racial and ethnic make-up to control for geographic price differences[14]. Since the objective is not to explain price levels, but rather to obtain estimates based on their correlation to price indicators that have a more extensive geographical coverage, it was felt that these additional variables should not be included.

Table 2 shows the estimated parameters for Equation (1). The Simple OLS column assumes the variances are constant ($V=I$), while the non-constant variance version is under the Bayesian OLS column.

Table 2. First Stage Regression Results

Dependent: *Ln P*		**Simple OLS**	**Bayesian OLS**
n=38		**Parameter Estimates**	
Intercept	β_1	-4.40 (0.38)	-4.28 (0.33)
Ln Housing costs	β_2	0.63 (0.05)	0.61 (0.05)
Rbar^2		0.80	0.78
σ^2		23900	9371

Coefficients are followed by the standard errors in ( )s.

Rbar^2 is a 'pseudo' R^2 and equals the squared correlation between the predicted and observed price levels. The *Rbar^2* is lower in the heteroscedastic estimates as less weight is given to the outliers. The mean squared error (σ^2) in the Bayesian model is the mean of the 1000 draws in the Gibbs sampler. All coefficients are significant at the 1% level.

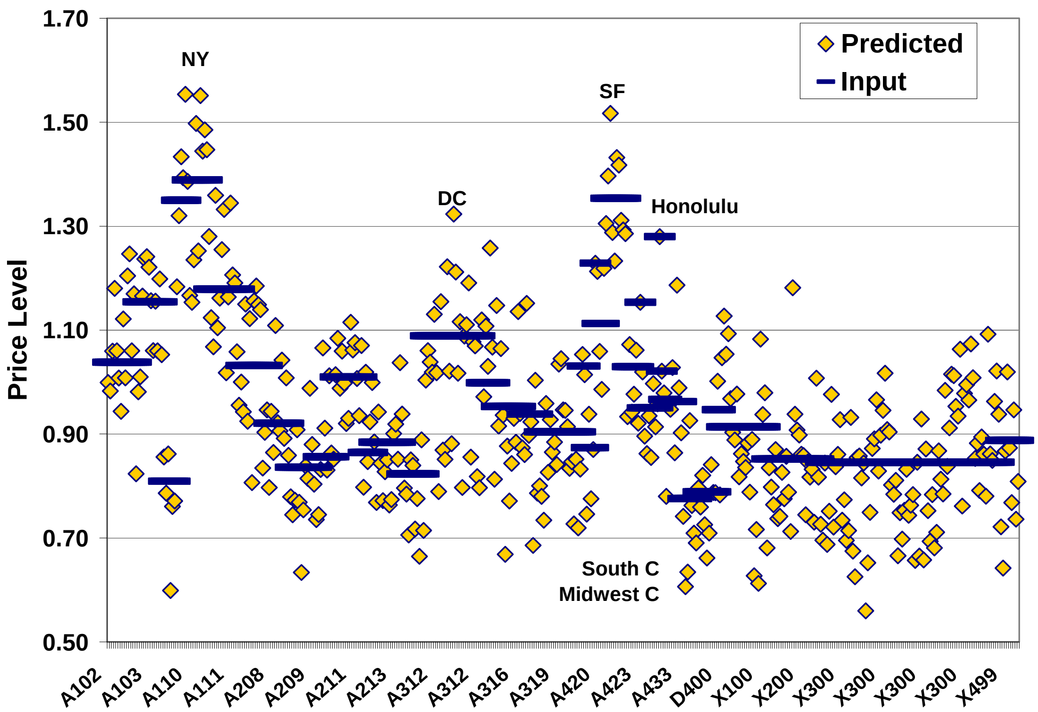
The variances (V) of the error term (ε) are estimated using a Bayesian framework, and visual inspection shows they are non-constant (with the New York and Los Angeles areas having the greatest variances) a result that is expected given the differences in scale and

[14] A principal component analysis (Aten [2005]) revealed that about a third of the standard variance among Census 2000 variables in the *rent* regressions was because of the first component that contrasts race (percent white, percent white occupancy) with income (percent under poverty, percent renters, percent ownership of two plus cars).

coverage discussed earlier. About half of the 38 areas have less than ten counties, while three of them consist of only one county. The prior distribution for the v_i terms is assumed to be an independent chi-square distribution $\chi^2(r)$. Large r values imply that variances approach unity, so smaller values ranging from two to ten were used, and 1000 samples were taken from 1100 draws, following Smith and LeSage [2004].

The Bayesian parameters from *Equation (1)* are applied to the *housing costs* of the within-area counties, and adjusted so that the weighted geometric means within areas equal the input price levels. The predicted price levels for the 425 counties are shown in *Figure 2*.

Figure 2. Predicted Price Levels n=425



The fourteen leftmost set of points on the horizontal axes of *Figure 3*, represent Philadelphia (A102) in the North East region while the rightmost nine points represent West B size areas (X499).

Philadelphia has an observed input price level of 1.04 with an average weighted *rent* of \$1,044 (*Table A1* in the *Appendix*). There are fourteen counties that make up the Philadelphia area. The lowest predicted price level is 0.82 for Philadelphia County, while the highest is 1.25 for Chester, PA, closely followed by Bucks County, PA. The corresponding *housing cost* variation is \$716 for Philadelphia County versus \$1,406 for Chester County. The highest estimated price level is Richmond County in New York, with 1.55, and an observed *housing cost* of \$1,444, while the lowest is St.Landry Parish, Louisiana, with a price level of 0.56 and *housing costs* averaging $397. The highest *housing cost* across all 425 counties was in Marin County, CA, at $2016 and its estimated price level was 1.52.

Equation (2): Spatial Bayesian Model (n=425)

$$P = \lambda WP + X\beta + \varepsilon$$

$$\varepsilon \approx \mathrm{N}(0,\sigma^2\mathrm{V}),\ \mathrm{V}=\mathrm{diag}(v_i,...,v_n)$$

Equation (2) is similar to Equation (1) but adds a *n by n* spatial weight matrix *W*. The *X* matrix also includes the spatial weight matrix and is analogous to a spatial Durbin variable[15]: X is an *n by 3* matrix with the 3 columns equal to an intercept, *housing costs*, and *W*housing costs*. As in Equation (1), the prior distribution for the v_i terms is assumed to be an independent chi-square distribution $\chi^2(r)$ and is obtained using a Gibbs sampler.

The matrix *W* is a non-negative spatial weight matrix with zeros on the diagonal and non-zero entries reflecting the spatial proximity of one county to another. A non-zero element W_{ik} defines *i* and *k* as geographical neighbors. The term neighbor in this context may range from nearest neighbors, to contiguity, to inverse distance matrix definitions of neighbors. For example, a first-order nearest neighbor matrix will have ones in the row and columns corresponding to observations that are closest to each other geographically, and zero otherwise[16]. Inverse distance matrices will have entries in all the elements (except the main diagonal) indicating the inverse of the distance between the observations. The contiguity matrix is defined using a Delaunay triangulation[17], with observations having from three to twelve neighbors. This is the matrix chosen for this paper. See Aten [2007] for an analysis of the sensitivity of different spatial weight matrices to the final estimated price levels.

Table 3. Second Stage Regression Results

Dependent: *Ln P*		**Spatial Bayesian**
n=425		**Parameter Estimates**
W*lnP	**λ**	0.20 (.02)
Intercept	β_1	-3.83 (.07)
Ln Housing costs	β_2	0.55 (.01)

15 For a review of the estimation of spatial econometric models, including their specification, see for example, Anselin [1988, 2002, 2004], Getis et al [2004], LeSage et al [2004].

16 Other metrics, such as trade or commuting flows may be used in the W matrix, but distance is an easy to compute variable that is clearly exogenous, and has been shown to be correlated to price levels in other studies (Aten [1996, 1997]).

17 Delaunay triangles (the dual of a Voronoi diagram, also know as Thiessen polygons) returns a set of triangles such that no data points are contained in any triangle's circumcircle. The contiguity matrix is the adjacency matrix derived from this triangulation.

Dependent: *Ln P*		Spatial Bayesian
W*Ln Housing costs	β_3	-0.002 (.0009)
Rbar^2		0.84
σ^2		289

Coefficients are followed by the standard errors in ( ).

Following the notation in Pace and LeSage [2007], the variables in Equation (2) are partitioned into the set of observations for the BLS counties (labeled with the subscript *1*) and the remaining counties (subscript *2*). The X matrix equals $[X_1\ X_2]$ and $P = [P_1\ P_2]$, with $n=n_1 + n_2$. Similarly the spatial weight matrix W is partitioned into W_{11}, W_{12}, W_{21} and W_{22}. This means that W_{11}, the weight matrix for the counties in the BLS, reflects their contiguity within the larger set of all U.S. counties, not as a separate set of spatial locations[18]. The partitions are shown in Equation (3).

Equation (3): Partitioned n (n_1 = 425, n_2 = 2713)

$$\begin{pmatrix} p_1 \\ p_2 \end{pmatrix} = \lambda \begin{pmatrix} W_{11} & W_{12} \\ W_{21} & W_{22} \end{pmatrix} \begin{pmatrix} p_1 \\ p_2 \end{pmatrix} + \beta \begin{pmatrix} X_1 \\ X_2 \end{pmatrix} + \begin{pmatrix} \varepsilon_1 \\ \varepsilon_2 \end{pmatrix}$$

P_2 are the unobserved, missing price levels for the counties not in the BLS sample, that is, the ones to be predicted, while X_2, the *housing costs* and spatially lagged (*W*housing costs*) housing costs for these counties are observed.

We use the estimated βs and λ from Table 3 to obtain an exogenous prediction E(p_2) , shown in *Equation (4)*.

Equation (4): Expected values of missing dependent variables E(p_2)

$$E(p) = \tilde{p} = Z^{-1} X \beta$$
$$\tilde{\varepsilon} = p - \tilde{p}$$
$$Z = \begin{pmatrix} I_{n_1} - \lambda W_{11} & -\lambda W_{12} \\ -\lambda W_{21} & I_{n_2} - \lambda W_{22} \end{pmatrix}$$
$$E(p_1) = \tilde{p}_1 = V_{11} X_1 \beta + V_{12} X_2 \beta$$
$$E(p_2) = \tilde{p}_2 = V_{21} X_1 \beta + V_{22} X_2 \beta$$

Where $Z = I - \lambda W$, and $V=Z^{-1}$.

[18] The use of such an <u>endogenous</u> spatial weight matrix is discussed in Smirnov [2007].

E (p_2) includes the observed X_1 and X_2 values, and the spatial structure within (W_{22}) and across (W_{21}) the two sets of counties. LeSage and Pace [2004] show that we can improve on this prediction by conditioning on the observed sampled information (p.236 ibid), shown in Equation (5).

Equation (5): Conditional expectation of missing dependent variables E(p_2|p_1)

$$E(p_2 \mid p_1) = \breve{p}_2 = \tilde{p}_2 - (\Psi_{22})^{-1}\Psi_{21}\tilde{\varepsilon}_1$$

Where $\Psi = Z'Z$ is the inverse of the variance-covariance matrix.

The resulting BLUP predictions, E ($p_2|p_1$), use the exogenous prediction of p_2 from Equation *(4)* modified by the variance-covariance structure of the two sets of counties and the observed residuals (ε_1) from the BLS counties. The final parameters in Equation (3) are re-estimated using the 'repaired' data set of dependent variables made up of the original p_1s and the conditional expectation of the p_2s (LeSage [1999]) [19]. The repaired parameters for the full set of n=3138 observations differ from those shown in Table 3 only in the third decimal place.

Final Stage

The final stage consists of aggregating the predicted county price level estimates to regional price parities or *RPP*s. The aggregations correspond to two geographical definitions used by the BEA, the 51 states and 363 metropolitan areas[20]. Ideally, an aggregate *consumption RPP* would use county-level *consumption expenditure weights* at the county level, but these are not available below the metro-area level. Instead, we use total *Compensation of Employees* by county, which includes wages and salaries plus supplements to wages and salaries. Compensation of employees is a large component of both the Personal Income and Gross Domestic Product data estimated by the BEA (see Lenze [2007] and Panek, Baumgardner & McCormick [2007])[21].

One purpose of estimating RPPs is to convert expenditure-related data, such as incomes and output, from national prices to regional prices which better reflect volume[22] measures. However, we have very little, if any, information on price differences for government services, transfers, investment income and other components on the income-

[19] All estimation was done in Matlab using the Spatial Econometrics package written by James LeSage (http://www.spatial-econometrics.com/)

[20] See Metropolitan area definitions and BEA Economic Area definitions under http://www.bea.gov/regional/index.htm. The micropolitan areas and the metro/non-metro portions of each state may also be made available upon request.

[21] Personal Incomes are published at the county level, but GDP only at the metropolitan area level http://www.bea.gov/regional/gsp/help/. The latter are estimated, but not published at the county level.

[22] Dividing GDP by the expenditure based *PPP* for GDP provides a comparison of real volumes across areas, following common practice in international comparisons of real income and product. See for example, the OECD – Eurostat Methodological Manual of Purchasing Power Parities Box 1.1, Chapter 1 in www.oecd.org/std/ppp/manual

related side of the personal income and gross output measures at BEA. We therefore use the RPP to convert only the wages and salaries component, and assume national prices for the other components.

Tables 4 and 5 show the Compensation of Employees totals, at national prices and at RPPs, and the corresponding per capita Personal Income[23] and per capita Gross Domestic Output[24] values as well as the actual RPPs for each state and metropolitan area, respectively. The RPPs are normalized so that the sum of unadjusted and adjusted totals for the U.S. as a whole are equal, and the RPPs are multiplied by one hundred for presentation purposes.

The range for the values adjusted by their RPPs is smaller. In *Table 4* the mean per capita income for the country as a whole is $34,757. At national prices the range is from $24,901 (LA) to $54,371 (DC), while at regional price parities the range is from $29,570 (LA) to $47,825 (DC). This is expected as the higher income (and GDP) states tend to have a high RPP, so that their adjusted values will be lower, and conversely, the lower income (and GDP) states will be adjusted upward as their price levels tend to be lower. The lowest RPP is West Virginia (66.4) and the highest New York (131.0).

In *Table 5*, the lowest RPP is for Cumberland MD-WV (60.7) and the highest for the San Jose-Sunnyvale-Santa Clara CA (150.5) metropolitan statistical area. The lowest per capita income metropolitan area is McAllen-Edinburg-Mission, TX and the highest is Bridgeport-Stamford-Norwalk, CT, at both national prices and RPPs. The range decreases from $52,102 at national prices to $33,908 at regional price parities.

Conclusions

Regional price parities or RPPs are constructed from a set of 38 metropolitan and urban area price levels for consumption goods and services, plus housing costs for all U.S. counties from the 2005 American Community Survey of the Census Bureau.

The 38 area price levels are computed from individual price observations on hundreds of consumption items that make up the Consumer Price Index of the Bureau of Labor Statistics, covering the expenditures of approximately 87% of the U.S. population, but accounting for only 15% of the counties in the United States.

The strong relationship between the area price levels and quality-adjusted housing costs makes it feasible to estimate the unobserved price levels of the remaining counties not covered by the Consumer Price Index. This relationship is calculated using a Bayesian spatial smoothing approach that takes into account the spatial autocorrelation and non-

[23] The definition of Personal Income and the geographical aggregations are from BEA: http://bea.gov/regional/reis/default.cfm?catable=CA1-3&section=2

[24] Source: BEA http://bea.gov/regional/index.htm

constant variances of the observations, as well as the relationship between the variables observed in the BLS counties and those observed in all U.S. counties.

The results demonstrate the feasibility of estimating state price levels from the Consumer Price Index survey of the Bureau of Labor Statistics and from housing cost data in the American Community Survey of the Census Bureau. Just as we deflate incomes and output over time to adjust for changes in prices across years using the CPI, the RPPs enable us to adjust national totals to take into account regional price level differences.

An important extension of this work is to explore the development of RPPs that reflect more than consumption goods and services, such as investment and government price differences, and to explore geographic price differences in production prices. In international comparisons, the price level of consumption is often a good approximation for GDP from the expenditure side. This is because the relative prices of investment and government change systematically in opposite directions when measured across per capita incomes. It is not clear whether this pattern would be found across states or smaller geographies within one country, but it seems worth examining. One approach to this would be to see if there is a pattern across states in salaries and prices of inputs and outputs related to construction, producers' durable equipment and government compensation.

A second outgrowth of this work is to look at differences in price levels within expenditure categories, such as Food and Beverages, and within income groups, in order to make adjustments to federal and state aid programs that aim to target particular populations. Most of the non-urban counties in the United States had lower *housing costs* than their urban counterparts within a state, but the price levels of goods, such as fresh vegetables, and of medical and educational services were sometimes higher. Using both the time-to-time CPI index and the regional price parities (RPPs) may broaden the analysis of patterns of consumption price levels while enabling a more focused approach to targeting areas of interest.

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Table 4. Regional Price Parities for the United States, 2005

Area	Compensation of Employees (Millions of dollars)		RPP	Per capita Personal Income (Dollars)		Per capita GDP (Dollars)	
	National Prices	At RPPs		National Prices	At RPPs	National Prices	At RPPs
United States	7,009,477	7,009,477	100	34,757	34,757	41,815	41,815
Alabama	87,392	112,596	77.6	29,306	34,858	33,338	38,890
Alaska	17,943	17,432	102.9	36,261	35,497	58,849	58,086
Arizona	121,606	126,539	96.1	30,386	31,215	35,670	36,499
Arkansas	48,083	62,179	77.3	26,989	32,074	31,385	36,470
California	917,796	721,713	127.2	37,462	32,013	44,911	39,463
Colorado	119,624	122,236	97.9	37,600	38,159	45,860	46,419
Connecticut	111,109	89,307	124.4	47,943	41,689	55,499	49,246
Delaware	24,188	24,171	100.1	37,083	37,062	67,492	67,472
District of Columbia	61,399	57,589	106.6	54,371	47,825	141,960	135,414
Florida	369,760	378,764	97.6	34,798	35,306	37,587	38,094
Georgia	203,353	228,709	88.9	31,193	33,977	39,347	42,131
Hawaii	32,501	25,338	128.3	34,935	29,285	43,210	37,560
Idaho	25,284	30,574	82.7	28,301	32,012	32,184	35,894
Illinois	325,423	318,071	102.3	36,489	35,911	43,681	43,103
Indiana	133,518	153,109	87.2	30,900	34,032	37,774	40,905
Iowa	62,642	74,663	83.9	31,535	35,602	39,801	43,868
Kansas	59,880	71,553	83.7	32,709	36,966	38,381	42,639
Kentucky	81,634	100,434	81.3	28,387	32,894	33,233	37,741
Louisiana	82,844	103,833	79.8	24,901	29,570	40,113	44,782
Maine	25,716	27,719	92.8	30,952	32,479	34,221	35,748
Maryland	148,152	140,126	105.7	41,657	40,217	43,862	42,421
Massachusetts	200,901	165,562	121.3	43,612	38,115	49,781	44,284
Michigan	229,755	242,671	94.7	32,694	33,972	36,817	38,095
Minnesota	138,440	141,997	97.5	37,256	37,952	45,257	45,953
Mississippi	45,358	59,142	76.7	25,490	30,242	27,508	32,260
Missouri	126,615	153,281	82.6	31,426	36,033	37,159	41,767
Montana	16,600	20,162	82.3	29,183	32,990	31,968	35,775
Nebraska	39,330	44,797	87.8	32,882	35,999	41,186	44,303
Nevada	61,051	61,165	99.8	37,450	37,497	45,729	45,776
New Hampshire	31,896	27,839	114.6	37,557	34,443	41,530	38,417
New Jersey	244,815	196,452	124.6	43,598	38,012	49,397	43,811
New Mexico	35,077	42,484	82.6	28,175	32,040	36,367	40,233
New York	551,577	421,181	131.0	41,016	34,247	49,910	43,140
North Carolina	185,853	209,871	88.6	30,713	33,480	40,407	43,175
North Dakota	13,692	18,304	74.8	31,871	39,124	39,210	46,464
Ohio	256,020	289,224	88.5	31,939	34,837	38,591	41,488
Oklahoma	63,610	79,435	80.1	30,107	34,583	34,378	38,853
Oregon	78,860	81,718	96.5	31,599	32,386	39,072	39,860
Pennsylvania	285,348	305,700	93.3	34,927	36,573	39,308	40,954

Table 4. 1 of 2

Table 4. Regional Price Parities for the United States, 2005

Area	Compensation of Employees (Millions of dollars)		RPP	Per capita Personal Income (Dollars)		Per capita GDP (Dollars)	
	National Prices	At RPPs		National Prices	At RPPs	National Prices	At RPPs
Rhode Island	24,257	21,204	114.4	35,987	33,124	40,895	38,032
South Carolina	80,766	97,202	83.1	28,460	32,323	32,923	36,786
South Dakota	14,823	18,694	79.3	31,557	36,520	39,153	44,116
Tennessee	125,557	151,113	83.1	30,827	35,094	37,566	41,833
Texas	501,893	550,705	91.1	33,253	35,389	43,308	45,445
Utah	50,248	57,028	88.1	27,992	30,699	35,275	37,981
Vermont	13,454	13,218	101.8	32,833	32,453	37,202	36,821
Virginia	208,313	203,914	102.2	37,968	37,386	46,403	45,820
Washington	157,176	151,713	103.6	35,838	34,967	43,277	42,406
West Virginia	30,098	45,323	66.4	26,523	34,954	29,403	37,835
Wisconsin	126,818	138,460	91.6	32,829	34,930	39,164	41,265
Wyoming	11,431	13,263	86.2	37,316	40,931	53,789	57,405
Max	917,796	721,713	131.0	54,371	47,825	141,960	135,414
Min	11,431	13,218	66.4	24,901	29,285	27,508	32,260
Range	906,365	708,495	64.6	29,470	18,540	114,452	103,153

Table 4. 2 of 2

TABLE 5. Regional Price Parities for Metropolitan Areas of the U.S. 2005

Area	Compensation of Employees (Millions of dollars)		RPP	Per capita Personal Income (Dollars)		Per capita GDP (Dollars)	
	National Prices	At RPPs		National Prices	At RPPs	National Prices	At RPPs
United States	7,009,477	7,009,477	100	34,757	34,757	41,815	41,815
Metropolitan portion	6,291,544	6,039,181	104.2	36,483	35,459	44,993	43,970
Nonmetropolitan portion	717,933	970,296	74.0	26,115	31,238	25,901	31,025
Metropolitan Statistical Areas							
Abilene, TX	2,680	3,531	75.9	27,790	33,144	28,549	33,904
Akron, OH	15,654	17,266	90.7	33,739	36,038	36,657	38,956
Albany, GA	2,755	3,641	75.7	24,811	30,282	28,300	33,771
Albany-Schenectady-Troy, NY	22,224	22,365	99.4	36,107	36,274	40,675	40,842
Albuquerque, NM	17,461	18,047	96.8	31,061	31,795	40,069	40,803
Alexandria, LA	2,491	3,248	76.7	29,908	35,063	28,418	33,574
Allentown-Bethlehem-Easton, PA-NJ	16,232	16,168	100.4	33,677	33,595	33,352	33,270
Altoona, PA	2,412	3,433	70.2	27,693	35,802	29,247	37,356
Amarillo, TX	4,462	5,789	77.1	28,750	34,325	33,598	39,173
Ames, IA	1,926	2,149	89.6	31,158	33,879	38,080	40,802
Anchorage, AK	9,809	9,087	107.9	39,525	37,473	63,475	61,423
Anderson, IN	1,797	2,107	85.3	27,871	30,244	24,247	26,620
Anderson, SC	2,383	2,997	79.5	26,975	30,495	24,489	28,009
Ann Arbor, MI	11,451	10,692	107.1	38,682	36,484	50,109	47,911
Anniston-Oxford, AL	2,136	3,051	70.0	27,445	35,616	29,312	37,484
Appleton, WI	5,221	5,467	95.5	33,455	34,606	40,019	41,170
Asheville, NC	6,729	8,363	80.5	29,022	33,199	30,266	34,443
Athens-Clarke County, GA	3,389	4,045	83.8	26,223	29,881	30,264	33,921
Atlanta-Sandy Springs-Marietta, GA	131,539	135,290	97.2	35,262	36,019	48,859	49,615
Atlantic City, NJ	7,069	6,282	112.5	33,589	30,664	46,871	43,946
Auburn-Opelika, AL	1,879	2,422	77.6	24,181	28,514	24,208	28,541
Augusta-Richmond County, GA-SC	10,373	13,080	79.3	28,356	33,586	31,315	36,545
Austin-Round Rock, TX	38,239	36,015	106.2	34,701	33,188	45,085	43,572
Bakersfield, CA	12,730	12,981	98.1	25,050	25,385	30,402	30,737
Baltimore-Towson, MD	74,635	71,793	104.0	40,933	39,861	44,525	43,453
Bangor, ME	2,909	3,489	83.4	28,537	32,483	32,957	36,904
Barnstable Town, MA	4,270	3,841	111.2	42,618	40,711	35,775	33,868
Baton Rouge, LA	15,630	17,847	87.6	30,154	33,190	44,898	47,934
Battle Creek, MI	3,082	3,672	83.9	28,588	32,857	32,957	37,226
Bay City, MI	1,727	2,193	78.8	28,000	32,287	24,169	28,457
Beaumont-Port Arthur, TX	7,413	10,041	73.8	28,519	35,421	31,922	38,825
Bellingham, WA	3,431	3,517	97.6	29,214	29,677	35,420	35,883
Bend, OR	2,598	2,442	106.4	31,909	30,806	40,149	39,046
Billings, MT	3,277	3,697	88.6	33,142	36,013	38,719	41,590
Binghamton, NY	4,756	5,731	83.0	27,856	31,800	26,741	30,684
Birmingham-Hoover, AL	25,918	29,164	88.9	35,448	38,431	45,082	48,065
Bismarck, ND	2,298	2,723	84.4	33,172	37,441	38,672	42,940
Blacksburg-Christiansburg-Radford, VA	2,867	3,770	76.1	24,136	29,969	28,029	33,863
Bloomington, IN	3,038	3,635	83.6	26,153	29,449	29,031	32,328

TABLE 5. Regional Price Parities for Metropolitan Areas of the U.S. 2005

Area	Compensation of Employees (Millions of dollars)		RPP	Per capita Personal Income (Dollars)		Per capita GDP (Dollars)	
	National Prices	At RPPs		National Prices	At RPPs	National Prices	At RPPs
Bloomington-Normal, IL	4,434	4,641	95.6	32,195	33,487	44,379	45,671
Boise City-Nampa, ID	11,541	12,795	90.2	31,925	34,227	40,621	42,923
Boston-Cambridge-Quincy, MA-NH	161,803	126,993	127.4	47,491	39,677	58,550	50,736
Boulder, CO	9,757	8,936	109.2	47,032	44,129	54,573	51,670
Bowling Green, KY	2,340	2,817	83.1	27,838	32,110	34,141	38,413
Bremerton-Silverdale, WA	5,171	5,168	100.1	36,308	36,294	31,123	31,109
Bridgeport-Stamford-Norwalk, CT	37,764	25,646	147.3	68,840	55,302	81,168	67,630
Brownsville-Harlingen, TX	3,890	5,507	70.6	17,760	22,099	16,427	20,766
Brunswick, GA	1,772	2,230	79.5	31,234	35,925	30,107	34,798
Buffalo-Niagara Falls, NY	24,790	27,190	91.2	31,825	33,928	34,126	36,228
Burlington, NC	2,395	2,868	83.5	26,913	30,298	28,952	32,337
Burlington-South Burlington, VT	5,671	5,029	112.8	35,211	32,089	45,225	42,103
Canton-Massillon, OH	7,189	8,290	86.7	28,895	31,595	30,609	33,309
Cape Coral-Fort Myers, FL	10,096	10,246	98.5	38,598	38,873	37,574	37,850
Carson City, NV	1,594	1,615	98.7	38,938	39,325	48,572	48,959
Casper, WY	1,655	2,055	80.5	39,865	45,619	78,046	83,799
Cedar Rapids, IA	6,340	6,858	92.4	33,269	35,364	45,348	47,442
Champaign-Urbana, IL	4,599	5,269	87.3	28,800	31,884	32,148	35,232
Charleston, WV	6,886	9,709	70.9	30,959	40,225	40,973	50,238
Charleston-North Charleston, SC	13,091	13,696	95.6	31,026	32,031	37,380	38,385
Charlotte-Gastonia-Concord, NC-SC	44,242	44,673	99.0	36,580	36,864	62,252	62,536
Charlottesville, VA	4,571	4,737	96.5	36,546	37,430	40,746	41,630
Chattanooga, TN-GA	10,505	12,852	81.7	30,316	34,983	37,007	41,674
Cheyenne, WY	2,057	2,184	94.2	36,922	38,403	41,287	42,769
Chicago-Naperville-Joliet, IL-IN-WI	264,844	241,298	109.8	39,454	36,951	49,010	46,507
Chico, CA	3,027	3,285	92.1	26,691	27,893	24,916	26,117
Cincinnati-Middletown, OH-KY-IN	52,630	56,599	93.0	35,326	37,213	43,221	45,108
Clarksville, TN-KY	5,685	7,192	79.0	29,618	35,602	31,671	37,655
Cleveland, TN	1,739	2,357	73.8	27,357	33,079	31,151	36,874
Cleveland-Elyria-Mentor, OH	54,338	60,155	90.3	35,555	38,300	46,829	49,574
Coeur d'Alene, ID	1,919	2,149	89.3	27,449	29,262	27,115	28,928
College Station-Bryan, TX	3,338	3,974	84.0	23,963	27,194	27,208	30,438
Colorado Springs, CO	14,393	14,317	100.5	33,131	33,002	36,230	36,101
Columbia, MO	3,517	4,042	87.0	30,257	33,614	34,190	37,547
Columbia, SC	15,871	18,025	88.0	31,001	34,116	38,031	41,146
Columbus, GA-AL	6,376	8,305	76.8	30,771	37,564	33,725	40,517
Columbus, IN	2,132	2,449	87.1	33,156	37,476	46,951	51,271
Columbus, OH	46,102	47,168	97.7	34,777	35,398	48,189	48,811
Corpus Christi, TX	7,859	9,154	85.9	29,353	32,503	32,113	35,264
Corvallis, OR	1,942	1,972	98.5	33,814	34,191	43,589	43,967
Cumberland, MD-WV	1,487	2,449	60.7	24,775	34,428	21,911	31,563
Dallas-Fort Worth-Arlington, TX	159,113	158,830	100.2	38,089	38,041	54,296	54,248
Dalton, GA	3,208	4,349	73.7	26,984	35,721	42,662	51,399

Area	Compensation of Employees (Millions of dollars)		RPP	Per capita Personal Income (Dollars)		Per capita GDP (Dollars)	
	National Prices	At RPPs		National Prices	At RPPs	National Prices	At RPPs
Danville, IL	1,354	1,962	69.0	24,719	32,148	25,080	32,509
Danville, VA	1,577	2,247	70.2	25,492	31,775	26,346	32,628
Davenport-Moline-Rock Island, IA-IL	8,662	10,264	84.4	32,405	36,696	39,490	43,780
Dayton, OH	20,291	22,942	88.4	31,739	34,893	38,551	41,704
Decatur, AL	2,481	3,417	72.6	29,401	35,762	32,235	38,596
Decatur, IL	2,716	3,755	72.3	32,649	42,136	43,408	52,895
Deltona-Daytona Beach-Ormond Beach, FL	6,486	7,395	87.7	28,329	30,197	22,821	24,688
Denver-Aurora, CO	70,028	71,206	98.3	42,476	42,974	55,592	56,090
Des Moines-West Des Moines, IA	15,384	15,465	99.5	37,650	37,805	59,476	59,630
Detroit-Warren-Livonia, MI	121,881	122,378	99.6	37,204	37,314	44,068	44,178
Dothan, AL	2,417	3,443	70.2	28,701	36,256	31,219	38,775
Dover, DE	2,980	3,346	89.1	27,881	30,424	36,913	39,456
Dubuque, IA	2,176	2,618	83.1	30,462	35,320	41,953	46,811
Duluth, MN-WI	5,394	7,055	76.5	29,515	35,571	31,314	37,369
Durham, NC	15,642	15,551	100.6	34,775	34,577	56,613	56,415
Eau Claire, WI	3,056	3,590	85.1	28,519	31,972	33,947	37,401
El Centro, CA	2,232	2,397	93.1	22,074	23,146	22,351	23,423
Elizabethtown, KY	2,564	3,062	83.7	29,500	34,011	36,111	40,622
Elkhart-Goshen, IN	6,017	6,784	88.7	31,826	35,790	48,482	52,446
Elmira, NY	1,651	2,003	82.4	27,567	31,546	27,906	31,885
El Paso, TX	10,821	14,071	76.9	24,081	28,644	30,851	35,413
Erie, PA	5,465	6,699	81.6	27,520	31,941	29,590	34,011
Eugene-Springfield, OR	6,288	6,702	93.8	29,209	30,440	31,016	32,248
Evansville, IN-KY	8,128	10,078	80.7	32,612	38,222	42,174	47,784
Fairbanks, AK	2,546	2,434	104.6	32,001	30,817	42,339	41,155
Fargo, ND-MN	4,587	5,237	87.6	33,108	36,600	45,436	48,928
Farmington, NM	2,166	3,045	71.1	24,675	31,878	51,939	59,142
Fayetteville, NC	9,242	10,540	87.7	31,110	34,869	36,931	40,691
Fayetteville-Springdale-Rogers, AR-MO	8,740	10,108	86.5	28,694	32,042	37,640	40,988
Flagstaff, AZ	2,303	2,684	85.8	28,008	31,068	29,930	32,989
Flint, MI	7,690	9,080	84.7	27,602	30,765	27,037	30,200
Florence, SC	3,740	4,917	76.1	27,641	33,622	32,137	38,118
Florence-Muscle Shoals, AL	2,060	2,804	73.5	25,741	30,983	24,159	29,401
Fond du Lac, WI	1,989	2,233	89.1	31,745	34,224	34,831	37,310
Fort Collins-Loveland, CO	5,999	5,789	103.6	33,886	33,128	35,187	34,429
Fort Smith, AR-OK	4,659	6,397	72.8	26,376	32,522	32,837	38,983
Fort Walton Beach-Crestview-Destin, FL	5,007	5,731	87.4	35,023	38,970	49,121	53,067
Fort Wayne, IN	9,378	10,989	85.3	30,813	34,809	38,474	42,470
Fresno, CA	14,820	14,852	99.8	26,052	26,088	28,693	28,729
Gadsden, AL	1,412	2,144	65.9	26,071	33,210	23,248	30,387
Gainesville, FL	5,569	6,295	88.5	29,663	32,592	33,175	36,104
Gainesville, GA	2,999	3,252	92.2	27,458	28,990	34,148	35,680
Glens Falls, NY	2,215	2,434	91.0	28,282	29,993	26,325	28,036

TABLE 5. Regional Price Parities for Metropolitan Areas of the U.S. 2005

Area	Compensation of Employees (Millions of dollars) National Prices	At RPPs	RPP	Per capita Personal Income (Dollars) National Prices	At RPPs	Per capita GDP (Dollars) National Prices	At RPPs
Goldsboro, NC	1,968	2,493	78.9	25,797	30,427	29,341	33,971
Grand Forks, ND-MN	2,114	2,575	82.1	28,992	33,727	32,997	37,733
Grand Junction, CO	2,303	2,686	85.7	28,917	31,873	29,211	32,168
Grand Rapids-Wyoming, MI	18,520	19,403	95.4	31,966	33,114	40,871	42,019
Great Falls, MT	1,564	1,845	84.8	29,647	33,079	29,457	32,889
Greeley, CO	3,434	3,582	95.9	25,183	25,838	27,607	28,262
Green Bay, WI	7,690	8,008	96.0	32,503	33,575	44,610	45,682
Greensboro-High Point, NC	16,010	17,963	89.1	31,138	34,032	44,403	47,297
Greenville, NC	2,933	3,528	83.1	27,030	30,652	29,904	33,527
Greenville-Mauldin-Easley, SC	13,165	15,333	85.9	29,715	33,389	37,701	41,375
Gulfport-Biloxi, MS	5,264	6,327	83.2	25,101	29,237	33,543	37,680
Hagerstown-Martinsburg, MD-WV	4,392	5,213	84.2	29,071	32,361	28,375	31,664
Hanford-Corcoran, CA	2,203	2,393	92.1	21,609	22,929	22,580	23,899
Harrisburg-Carlisle, PA	16,170	17,465	92.6	34,992	37,480	47,369	49,857
Harrisonburg, VA	2,333	2,957	78.9	26,329	31,786	40,492	45,948
Hartford-West Hartford-East Hartford, CT	39,732	35,376	112.3	42,782	39,094	56,722	53,034
Hattiesburg, MS	2,130	2,849	74.8	24,800	30,251	28,997	34,447
Hickory-Lenoir-Morganton, NC	6,295	8,348	75.4	27,034	32,832	32,112	37,910
Hinesville-Fort Stewart, GA	2,064	2,510	82.2	21,844	27,884	33,270	39,309
Holland-Grand Haven, MI	5,483	5,486	100.0	30,995	31,005	36,358	36,368
Honolulu, HI	25,486	18,746	136.0	37,343	29,871	45,553	38,082
Hot Springs, AR	1,301	1,851	70.3	28,592	34,485	24,832	30,725
Houma-Bayou Cane-Thibodaux, LA	3,647	5,173	70.5	26,764	34,483	33,726	41,445
Houston-Sugar Land-Baytown, TX	140,636	142,574	98.6	40,734	41,098	59,407	59,771
Huntington-Ashland, WV-KY-OH	4,820	7,068	68.2	25,652	33,552	27,571	35,470
Huntsville, AL	10,982	12,962	84.7	32,949	38,308	43,442	48,802
Idaho Falls, ID	2,039	2,559	79.7	28,879	33,522	30,972	35,614
Indianapolis-Carmel, IN	44,701	46,447	96.2	36,160	37,221	53,256	54,317
Iowa City, IA	3,701	3,935	94.1	32,706	34,344	41,847	43,485
Ithaca, NY	2,386	2,539	94.0	28,088	29,613	32,616	34,141
Jackson, MI	2,819	3,063	92.0	27,370	28,871	28,756	30,257
Jackson, MS	10,993	12,299	89.4	30,977	33,479	38,345	40,847
Jackson, TN	2,552	3,116	81.9	28,260	33,351	38,171	43,262
Jacksonville, FL	31,071	32,301	96.2	35,439	36,423	42,081	43,066
Jacksonville, NC	4,117	4,906	83.9	30,619	35,558	32,968	37,906
Janesville, WI	3,077	3,302	93.2	28,467	29,905	29,149	30,587
Jefferson City, MO	3,169	3,994	79.4	29,363	35,109	35,689	41,434
Johnson City, TN	3,079	4,349	70.8	25,709	32,430	27,846	34,566
Johnstown, PA	2,260	3,392	66.6	26,347	34,053	23,613	31,318
Jonesboro, AR	1,818	2,433	74.7	24,640	30,101	29,794	35,256
Joplin, MO	2,938	4,033	72.8	25,647	32,244	29,719	36,315
Kalamazoo-Portage, MI	6,781	7,488	90.6	30,581	32,783	33,179	35,381
Kankakee-Bradley, IL	1,741	2,032	85.7	26,840	29,541	24,920	27,621

TABLE 5. Regional Price Parities for Metropolitan Areas of the U.S. 2005

Area	Compensation of Employees (Millions of dollars)		RPP	Per capita Personal Income (Dollars)		Per capita GDP (Dollars)	
	National Prices	At RPPs		National Prices	At RPPs	National Prices	At RPPs
Kansas City, MO-KS	50,810	58,028	87.6	35,839	39,559	46,894	50,614
Kennewick-Richland-Pasco, WA	4,789	5,171	92.6	28,387	30,135	33,555	35,303
Killeen-Temple-Fort Hood, TX	8,191	9,441	86.8	29,734	33,259	30,928	34,454
Kingsport-Bristol-Bristol, TN-VA	5,304	7,845	67.6	26,830	35,288	28,188	36,647
Kingston, NY	2,516	2,356	106.8	30,367	29,486	22,565	21,684
Knoxville, TN	14,847	18,631	79.7	30,713	36,464	39,994	45,745
Kokomo, IN	2,812	3,333	84.4	30,545	35,727	36,179	41,361
La Crosse, WI-MN	2,866	3,237	88.5	30,050	32,919	37,133	40,003
Lafayette, IN	3,980	4,472	89.0	27,084	29,725	37,193	39,834
Lafayette, LA	5,903	6,911	85.4	31,408	35,480	50,741	54,813
Lake Charles, LA	3,951	5,443	72.6	23,363	31,050	60,581	68,268
Lake Havasu City-Kingman, AZ	1,907	2,489	76.6	22,345	25,486	17,648	20,789
Lakeland, FL	8,787	10,568	83.1	29,625	32,930	26,826	30,131
Lancaster, PA	10,494	10,938	95.9	32,422	33,330	35,701	36,609
Lansing-East Lansing, MI	10,642	11,100	95.9	30,123	31,125	36,736	37,738
Laredo, TX	2,986	3,635	82.2	19,342	22,264	23,081	26,003
Las Cruces, NM	2,546	3,529	72.1	23,216	28,396	22,371	27,551
Las Vegas-Paradise, NV	44,166	43,936	100.5	36,893	36,758	47,312	47,177
Lawrence, KS	1,859	1,965	94.6	27,659	28,615	29,147	30,103
Lawton, OK	2,453	3,055	80.3	28,055	33,430	30,122	35,497
Lebanon, PA	1,932	2,407	80.3	31,311	35,113	25,040	28,842
Lewiston, ID-WA	1,023	1,305	78.4	27,781	32,563	27,044	31,826
Lewiston-Auburn, ME	1,953	2,187	89.3	29,483	31,682	30,380	32,579
Lexington-Fayette, KY	11,557	12,794	90.3	33,922	36,777	46,190	49,045
Lima, OH	2,413	3,109	77.6	27,719	34,313	37,811	44,406
Lincoln, NE	6,955	7,668	90.7	32,526	35,028	42,714	45,216
Little Rock-North Little Rock-Conway, AR	15,227	17,379	87.6	33,289	36,622	40,994	44,327
Logan, UT-ID	1,698	2,126	79.9	21,906	25,573	21,595	25,261
Longview, TX	3,717	5,219	71.2	29,862	37,381	37,336	44,855
Longview, WA	1,708	1,926	88.7	25,914	28,175	27,426	29,687
Los Angeles-Long Beach-Santa Ana, CA	342,803	263,570	130.1	37,441	31,287	49,186	43,032
Louisville-Jefferson County, KY-IN	28,531	31,308	91.1	34,162	36,459	41,418	43,715
Lubbock, TX	4,725	5,799	81.5	27,529	31,629	31,102	35,202
Lynchburg, VA	4,214	5,819	72.4	28,556	35,346	31,454	38,244
Macon, GA	4,345	5,433	80.0	29,522	34,296	32,043	36,817
Madera, CA	1,735	1,782	97.4	22,429	22,763	21,904	22,239
Madison, WI	16,283	15,412	105.6	38,281	36,672	53,887	52,278
Manchester-Nashua, NH	11,578	9,431	122.8	39,287	33,906	46,651	41,270
Mansfield, OH	2,514	3,277	76.7	26,749	32,748	30,203	36,203
McAllen-Edinburg-Mission, TX	6,644	9,762	68.1	16,738	21,394	16,502	21,158
Medford, OR	3,307	3,641	90.8	30,133	31,852	30,772	32,491
Memphis, TN-MS-AR	31,531	33,592	93.9	34,052	35,695	45,171	46,814
Merced, CA	2,821	2,738	103.0	22,995	22,648	22,016	21,668

TABLE 5. Regional Price Parities for Metropolitan Areas of the U.S. 2005

Area	Compensation of Employees (Millions of dollars)		RPP	Per capita Personal Income (Dollars)		Per capita GDP (Dollars)	
	National Prices	At RPPs		National Prices	At RPPs	National Prices	At RPPs
Miami-Fort Lauderdale-Pompano Beach, FL	122,333	112,244	109.0	38,342	36,469	43,006	41,133
Michigan City-La Porte, IN	1,877	2,218	84.6	27,005	30,132	28,722	31,848
Midland, TX	2,895	3,478	83.2	42,615	47,451	63,813	68,649
Milwaukee-Waukesha-West Allis, WI	42,900	46,859	91.6	37,361	39,940	47,743	50,322
Minneapolis-St. Paul-Bloomington, MN-WI	101,909	96,224	105.9	42,457	40,645	54,565	52,753
Missoula, MT	2,165	2,402	90.1	30,101	32,420	38,732	41,052
Mobile, AL	7,673	9,371	81.9	25,211	29,475	32,093	36,356
Modesto, CA	8,003	7,392	108.3	26,995	25,775	27,700	26,480
Monroe, LA	2,915	3,759	77.6	27,405	32,337	32,960	37,892
Monroe, MI	2,291	2,380	96.3	31,029	31,615	24,792	25,378
Montgomery, AL	7,967	9,790	81.4	31,356	36,472	36,772	41,889
Morgantown, WV	2,398	3,393	70.7	28,203	36,768	36,845	45,411
Morristown, TN	2,045	2,507	81.6	24,312	27,869	26,275	29,832
Mount Vernon-Anacortes, WA	2,057	2,058	100.0	31,962	31,968	40,981	40,988
Muncie, IN	2,032	2,599	78.2	26,535	31,393	27,485	32,343
Muskegon-Norton Shores, MI	2,839	3,250	87.4	25,626	27,986	25,996	28,356
Myrtle Beach-Conway-North Myrtle Beach, SC	4,013	4,890	82.1	26,745	30,584	37,244	41,083
Napa, CA	3,619	2,646	136.8	45,223	37,765	49,184	41,725
Naples-Marco Island, FL	6,524	6,021	108.4	54,166	52,526	44,706	43,066
Nashville-Davidson-Murfreesboro-Franklin, TN	36,480	38,916	93.7	36,056	37,736	47,298	48,977
New Haven-Milford, CT	20,979	17,122	122.5	39,354	34,772	40,717	36,135
New Orleans-Metairie-Kenner, LA	26,915	30,293	88.8	19,926	22,505	47,254	49,833
New York-Northern New Jersey-Long Island, NY-NJ-PA	597,444	417,241	143.2	46,221	36,614	57,117	47,510
Niles-Benton Harbor, MI	2,975	3,613	82.3	29,361	33,344	30,518	34,501
Norwich-New London, CT	7,803	6,972	111.9	39,181	36,049	43,441	40,309
Ocala, FL	3,940	5,051	78.0	27,720	31,402	22,137	25,819
Ocean City, NJ	1,778	1,661	107.0	39,059	37,874	40,764	39,579
Odessa, TX	2,296	3,287	69.9	26,115	34,074	33,305	41,264
Ogden-Clearfield, UT	8,434	9,435	89.4	28,148	30,183	27,899	29,934
Oklahoma City, OK	24,806	28,565	86.8	33,243	36,494	40,316	43,567
Olympia, WA	4,533	4,636	97.8	34,204	34,656	31,164	31,615
Omaha-Council Bluffs, NE-IA	21,472	22,051	97.4	37,869	38,582	48,739	49,452
Orlando-Kissimmee, FL	47,381	47,181	100.4	31,828	31,725	46,051	45,948
Oshkosh-Neenah, WI	4,478	4,860	92.1	32,572	34,962	42,152	44,541
Owensboro, KY	2,009	2,621	76.6	28,046	33,569	33,269	38,791
Oxnard-Thousand Oaks-Ventura, CA	19,139	14,783	129.5	40,845	35,337	40,636	35,128
Palm Bay-Melbourne-Titusville, FL	10,694	11,692	91.5	32,314	34,208	30,286	32,180
Palm Coast, FL	699	769	90.9	28,474	29,400	30,025	30,950
Panama City-Lynn Haven, FL	3,384	4,082	82.9	30,378	34,698	34,880	39,200
Parkersburg-Marietta-Vienna, WV-OH	2,964	4,059	73.0	26,643	33,411	30,368	37,136
Pascagoula, MS	2,710	3,298	82.2	25,248	29,035	25,036	28,824
Pensacola-Ferry Pass-Brent, FL	7,818	9,234	84.7	28,267	31,447	26,886	30,066
Peoria, IL	9,214	10,782	85.5	33,540	37,808	39,243	43,511

TABLE 5. Regional Price Parities for Metropolitan Areas of the U.S. 2005

Area	Compensation of Employees (Millions of dollars)		RPP	Per capita Personal Income (Dollars)		Per capita GDP (Dollars)	
	National Prices	At RPPs		National Prices	At RPPs	National Prices	At RPPs
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	162,937	148,402	109.8	40,948	38,438	50,900	48,391
Phoenix-Mesa-Scottsdale, AZ	89,825	86,846	103.4	32,660	31,893	41,388	40,620
Pine Bluff, AR	1,687	2,253	74.9	23,456	28,912	26,292	31,748
Pittsburgh, PA	55,648	63,666	87.4	36,159	39,535	42,945	46,321
Pittsfield, MA	2,873	3,171	90.6	36,614	38,891	40,872	43,149
Pocatello, ID	1,440	1,834	78.5	24,358	28,937	27,504	32,082
Portland-South Portland-Biddeford, ME	12,393	11,590	106.9	35,425	33,855	43,332	41,762
Portland-Vancouver-Beaverton, OR-WA	52,423	51,218	102.4	34,921	34,345	45,617	45,041
Port St. Lucie, FL	5,602	6,023	93.0	36,086	37,206	27,144	28,263
Poughkeepsie-Newburgh-Middletown, NY	12,694	9,608	132.1	34,164	29,509	28,847	24,192
Prescott, AZ	2,224	2,683	82.9	25,460	27,781	19,875	22,196
Providence-New Bedford-Fall River, RI-MA	34,689	30,925	112.2	35,412	33,075	36,855	34,517
Provo-Orem, UT	6,525	7,640	85.4	21,127	23,531	24,217	26,621
Pueblo, CO	2,175	2,660	81.8	25,438	28,672	22,610	25,845
Punta Gorda, FL	1,711	2,011	85.1	30,886	32,844	21,301	23,259
Racine, WI	3,854	4,283	90.0	33,404	35,621	33,043	35,260
Raleigh-Cary, NC	23,589	22,135	106.6	35,585	34,064	45,385	43,863
Rapid City, SD	2,476	2,927	84.6	32,287	36,104	35,643	39,460
Reading, PA	7,874	8,331	94.5	31,617	32,778	32,859	34,020
Redding, CA	2,840	2,877	98.7	29,010	29,219	28,518	28,728
Reno-Sparks, NV	10,598	10,163	104.3	42,219	41,118	46,465	45,364
Richmond, VA	32,386	33,396	97.0	37,082	37,942	47,286	48,145
Riverside-San Bernardino-Ontario, CA	59,846	55,279	108.3	26,818	25,642	26,160	24,984
Roanoke, VA	6,937	8,824	78.6	32,308	38,768	39,061	45,522
Rochester, MN	5,308	5,570	95.3	36,886	38,373	45,315	46,802
Rochester, NY	24,753	25,069	98.7	34,294	34,600	40,545	40,851
Rockford, IL	7,055	7,410	95.2	28,311	29,355	32,028	33,071
Rocky Mount, NC	2,593	3,341	77.6	27,004	32,201	38,346	43,543
Rome, GA	1,867	2,637	70.8	28,705	36,879	32,683	40,857
Sacramento-Arden-Arcade-Roseville, CA	51,426	42,498	121.0	35,318	30,937	41,599	37,219
Saginaw-Saginaw Township North, MI	4,357	5,289	82.4	27,246	31,757	31,258	35,769
St. Cloud, MN	3,944	4,393	89.8	28,741	31,214	37,540	40,013
St. George, UT	1,620	2,070	78.3	23,353	27,129	24,110	27,885
St. Joseph, MO-KS	2,116	2,902	72.9	26,345	32,806	28,864	35,325
St. Louis, MO-IL	69,876	79,210	88.2	35,991	39,354	41,853	45,216
Salem, OR	6,487	7,088	91.5	27,699	29,311	29,884	31,495
Salinas, CA	8,749	6,815	128.4	36,137	31,405	40,175	35,444
Salisbury, MD	2,227	2,665	83.6	28,016	31,791	29,827	33,601
Salt Lake City, UT	27,847	29,628	94.0	33,469	35,167	48,244	49,942
San Angelo, TX	1,914	2,486	77.0	28,519	33,872	29,491	34,843
San Antonio, TX	37,877	42,218	89.7	31,189	33,494	35,567	37,872
San Diego-Carlsbad-San Marcos, CA	82,957	67,702	122.5	40,383	35,197	49,719	44,533
Sandusky, OH	1,680	2,001	83.9	33,171	37,298	37,385	41,511

TABLE 5. Regional Price Parities for Metropolitan Areas of the U.S. 2005

Area	Compensation of Employees (Millions of dollars) National Prices	Compensation of Employees (Millions of dollars) At RPPs	RPP	Per capita Personal Income (Dollars) National Prices	Per capita Personal Income (Dollars) At RPPs	Per capita GDP (Dollars) National Prices	Per capita GDP (Dollars) At RPPs
San Francisco-Oakland-Fremont, CA	152,574	108,322	140.9	54,191	43,518	64,663	53,991
San Jose-Sunnyvale-Santa Clara, CA	80,509	53,492	150.5	51,277	35,871	70,276	54,870
San Luis Obispo-Paso Robles, CA	4,667	3,841	121.5	33,959	30,762	36,483	33,285
Santa Barbara-Santa Maria-Goleta, CA	9,907	7,786	127.2	40,968	35,703	43,058	37,792
Santa Cruz-Watsonville, CA	4,804	3,449	139.3	42,017	36,605	36,537	31,125
Santa Fe, NM	2,751	2,760	99.7	39,522	39,585	42,599	42,663
Santa Rosa-Petaluma, CA	10,176	7,453	136.5	40,821	34,948	39,865	33,992
Sarasota-Bradenton-Venice, FL	12,655	13,358	94.7	43,700	44,751	34,512	35,563
Savannah, GA	6,946	7,652	90.8	32,730	34,974	34,727	36,971
Scranton-Wilkes-Barre, PA	10,658	13,271	80.3	30,476	35,238	31,056	35,818
Seattle-Tacoma-Bellevue, WA	103,191	91,996	112.2	42,356	38,864	56,800	53,308
Sebastian-Vero Beach, FL	2,101	2,383	88.2	50,369	52,593	30,852	33,076
Sheboygan, WI	2,821	2,981	94.6	33,861	35,264	43,125	44,528
Sherman-Denison, TX	1,805	2,244	80.4	26,046	29,835	24,635	28,425
Shreveport-Bossier City, LA	7,655	9,921	77.2	30,543	36,478	46,958	52,893
Sioux City, IA-NE-SD	2,916	3,586	81.3	29,444	34,190	36,402	41,148
Sioux Falls, SD	5,307	5,697	93.2	35,276	37,088	56,689	58,501
South Bend-Mishawaka, IN-MI	6,140	7,054	87.0	31,741	34,634	35,357	38,250
Spartanburg, SC	5,572	6,877	81.0	27,179	32,089	33,857	38,767
Spokane, WA	9,230	10,370	89.0	28,544	31,132	33,898	36,485
Springfield, IL	5,174	6,073	85.2	33,083	37,465	37,703	42,085
Springfield, MA	13,561	14,091	96.2	32,475	33,250	29,314	30,089
Springfield, MO	7,336	9,200	79.7	27,860	32,510	32,184	36,833
Springfield, OH	2,074	2,478	83.7	28,157	31,006	23,246	26,095
State College, PA	3,246	3,863	84.0	28,696	33,052	34,058	38,414
Stockton, CA	10,281	8,360	123.0	26,239	23,319	26,222	23,302
Sumter, SC	1,876	2,543	73.8	24,831	31,193	26,156	32,518
Syracuse, NY	14,818	16,044	92.4	31,445	33,338	36,697	38,590
Tallahassee, FL	7,538	8,224	91.7	29,834	31,839	33,606	35,611
Tampa-St. Petersburg-Clearwater, FL	58,591	61,570	95.2	33,678	34,804	38,161	39,287
Terre Haute, IN	2,872	3,835	74.9	25,518	31,204	28,762	34,447
Texarkana, TX-Texarkana, AR	2,238	3,305	67.7	27,202	35,262	28,310	36,369
Toledo, OH	15,101	16,678	90.5	30,811	33,218	38,071	40,478
Topeka, KS	4,816	5,818	82.8	30,375	34,782	35,220	39,627
Trenton-Ewing, NJ	13,911	11,855	117.3	45,740	40,087	59,140	53,487
Tucson, AZ	16,867	18,838	89.5	29,658	31,784	29,189	31,315
Tulsa, OK	18,596	21,120	88.0	35,180	38,041	43,523	46,384
Tuscaloosa, AL	4,067	5,337	76.2	29,143	35,543	35,280	41,680
Tyler, TX	3,988	4,907	81.3	31,892	36,720	38,227	43,055
Utica-Rome, NY	5,230	6,294	83.1	27,363	30,965	26,350	29,952
Valdosta, GA	2,160	2,846	75.9	24,581	30,010	26,848	32,277
Vallejo-Fairfield, CA	7,274	5,296	137.4	33,445	28,599	28,568	23,723
Victoria, TX	2,189	3,062	71.5	29,323	37,092	38,395	46,164

TABLE 5. Regional Price Parities for Metropolitan Areas of the U.S. 2005

Area	Compensation of Employees (Millions of dollars)		RPP	Per capita Personal Income (Dollars)		Per capita GDP (Dollars)	
	National Prices	At RPPs		National Prices	At RPPs	National Prices	At RPPs
Vineland-Millville-Bridgeton, NJ	2,937	2,930	100.2	27,378	27,331	29,603	29,557
Virginia Beach-Norfolk-Newport News, VA-NC	42,244	42,967	98.3	33,259	33,698	40,426	40,864
Visalia-Porterville, CA	5,445	6,015	90.5	23,654	25,055	23,786	25,188
Waco, TX	4,263	5,296	80.5	27,091	31,694	30,560	35,163
Warner Robins, GA	3,143	3,752	83.8	28,507	33,342	34,794	39,629
Washington-Arlington-Alexandria, DC-VA-MD-WV	214,825	184,220	116.6	49,442	43,582	66,510	60,650
Waterloo-Cedar Falls, IA	3,644	4,531	80.4	30,514	35,971	41,142	46,599
Wausau, WI	3,087	3,558	86.8	32,148	35,831	40,289	43,972
Weirton-Steubenville, WV-OH	1,946	3,119	62.4	25,982	35,337	26,599	35,955
Wenatchee, WA	1,841	2,176	84.6	27,671	30,915	31,325	34,569
Wheeling, WV-OH	2,611	4,167	62.7	27,764	38,310	29,913	40,460
Wichita, KS	13,726	15,739	87.2	34,491	37,933	37,942	41,384
Wichita Falls, TX	2,705	3,514	77.0	29,760	35,156	32,971	38,368
Williamsport, PA	2,106	2,619	80.4	27,285	31,642	28,793	33,150
Wilmington, NC	5,526	6,242	88.5	29,620	31,878	36,916	39,174
Winchester, VA-WV	2,399	2,686	89.3	29,847	32,322	38,017	40,492
Winston-Salem, NC	10,060	11,427	88.0	32,680	35,741	46,851	49,912
Worcester, MA	16,865	14,970	112.7	36,666	34,229	32,857	30,420
Yakima, WA	3,649	4,500	81.1	25,141	28,860	27,016	30,735
York-Hanover, PA	8,526	9,044	94.3	32,377	33,650	33,095	34,369
Youngstown-Warren-Boardman, OH-PA	10,089	12,951	77.9	27,927	32,850	28,689	33,612
Yuba City, CA	2,169	2,228	97.4	25,827	26,206	24,482	24,861
Yuma, AZ	2,573	3,772	68.2	21,081	27,721	22,744	29,384
Max	597,444	417,241	150.5	68,840	55,302	81,168	83,799
Min	699	769	60.7	16,738	21,394	16,427	20,766
Range	596,745	416,472	89.8	52,102	33,908	64,741	63,034