

Constructing a PCE-Weighted Consumer Price Index

Caitlin Blair

Economist

Consumer Price Index

**NBER-CRIW Conference on Improving the
Measurement of Consumer Expenditures**

12/2/2011

(Updated 12/30/2011)



Outline of Presentation

- Introduction and motivation
- Methodology
 - ▶ Concordance
 - ▶ Scope
 - ▶ Adjustments
- Results
- Caveats
- What's next?

Why?

- Build on previous work and continue to examine the impact of measurement error
 - ▶ Lebow and Rudd (2003)
 - Examine weighting bias and find that the CPI overstates true cost of living by 0.87% per year, with weighting contributing 0.1%
 - ▶ Garner, Janini, Passero, Paszkiewicz, and Vendemia (2006)
 - Construct comparable CE/PCE ratios; find that overall ratio of expenditures is decreasing over time
 - ▶ McCully, Moyer, Stewart (2007)
 - Examine magnitude of effects in difference between CPI and PCE deflator; combination of weight and scope effects: $\sim 0.29\%$ overstatement per year

- Investigate the accuracy and reliability of CE data

PCE-CPI Concordance

ELI to PCE Series Code Basic Mapping			
ELI	ELI Description	PCE Series Code	PCE Description
AA011	MEN'S SUITS	DMBCRC	Men's and boys' clothing
AA012	MEN'S SPORT COATS AND TAILORED JACKETS	DMBCRC	Men's and boys' clothing
AA013	MEN'S OUTERWEAR	DMBCRC	Men's and boys' clothing
AA021	MEN'S UNDERWEAR, HOSIERY AND NIGHTWEAR	DMBCRC	Men's and boys' clothing
AA022	MEN'S ACCESSORIES	DLUGRC	Luggage and similar personal items
AA022	MEN'S ACCESSORIES	DMBCRC	Men's and boys' clothing
AA023	MEN'S ACTIVE SPORTSWEAR	DMBCRC	Men's and boys' clothing

PCE-CPI Concordance

ELI	ELI Description	PCE Series Code	PCE Description	Allocation Ratio
TF011	STATE VEHICLE REGISTRATION AND DRIVER'S LICENSE	N/A	N/A	0.00

ELI	ELI Description	PCE Series Code	PCE Description	Allocation Ratio
AA021	MEN'S UNDERWEAR, HOSIERY AND NIGHTWEAR	DMBCRC	Men's and boys' clothing	1.00
AA022	MEN'S ACCESSORIES	DMBCRC	Men's and boys' clothing	0.93
AA022	MEN'S ACCESSORIES	DLUGRC	Luggage and similar personal items	0.07

Outside of PCE Scope

■ Housing

- ▶ HP021 – Gardening and Lawncare Services
- ▶ HP043 – Inside Home Maintenance and Repair Services

■ Transportation

- ▶ TF011 – State Vehicle Registration and Driver's License
- ▶ TF012 – Local Vehicle Registration and License

PCE-Calibrated Indexes

Both calibrated to PCE expenditure levels using allocation ratios:

- PCE1

- ▶ PCE expenditure definitions

- PCE2

- ▶ CPI expenditure definitions (adjustment factors)

Methodology – PCE1

1. Apply allocation ratios
2. Produce PCE/CPI factors
3. Construct PCE-calibrated CPI weights for 2003-2008
4. Annualize to make '03-04, '05-06, '07-08 aggregation weights
5. Create indexes

Methodology – PCE2

1. Apply allocation ratios
2. Produce PCE/CPI factors
3. **Implement PCE2 adjustments**
4. Construct PCE-calibrated CPI weights for 2003-2008
5. Annualize to make '03-04, '05-06, '07-08 aggregation weights
6. Create indexes

PCE2 Adjustments

ELI	PCE Series Code	Adjustment Factor	Data Source
All "EB" ELIs	All	0.59375	NCES
FV051	DMSLRC	0.59375	NCES
GD051	DFEERC	0.08	GJPPV
HA011	All	0.98	GJPPV
HD011	All	8.00	GJPPV
HF011	All	1.02	GJPPV
HF021	All	0.86	GJPPV
HG011	All	0.69	GJPPV
MA011, MF011	All	0.167	AHRQ
MA090, MG090	DOMORC	0.167	AHRQ
All "MC" ELIs	All	0.167	AHRQ
All "MD" ELIs except MD031	All	0.167	AHRQ
All "ME" ELIs	All	0.167	AHRQ
MB023, MG013	All	0.167	AHRQ
All "TD" ELIs	All	0.67	GJPPV
TE011	All	2.11	GJPPV

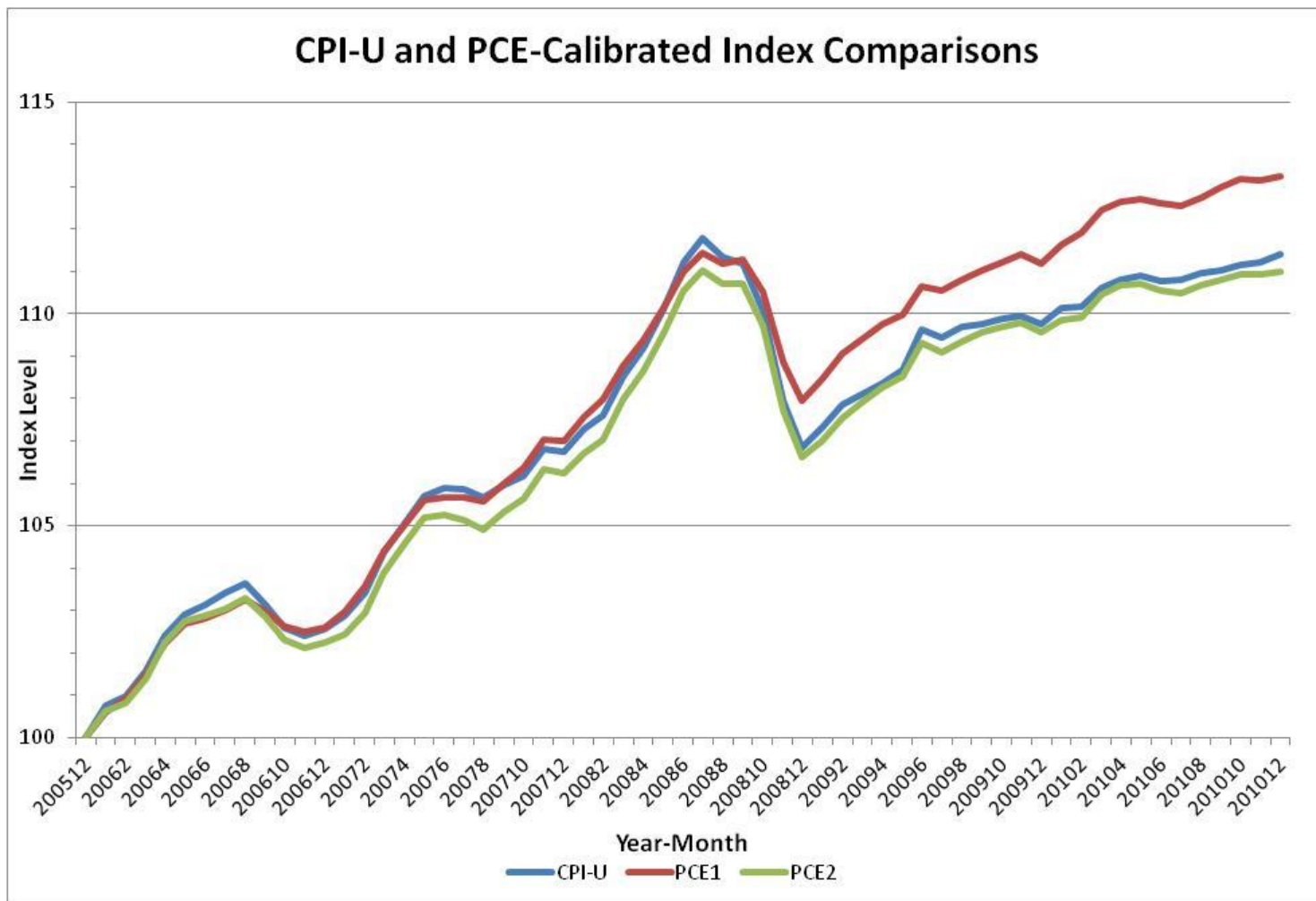
Caveats

- PCE2 adjustment factors
- Scope and excluded ELIS
- Diary-level disaggregation
- Item mapping

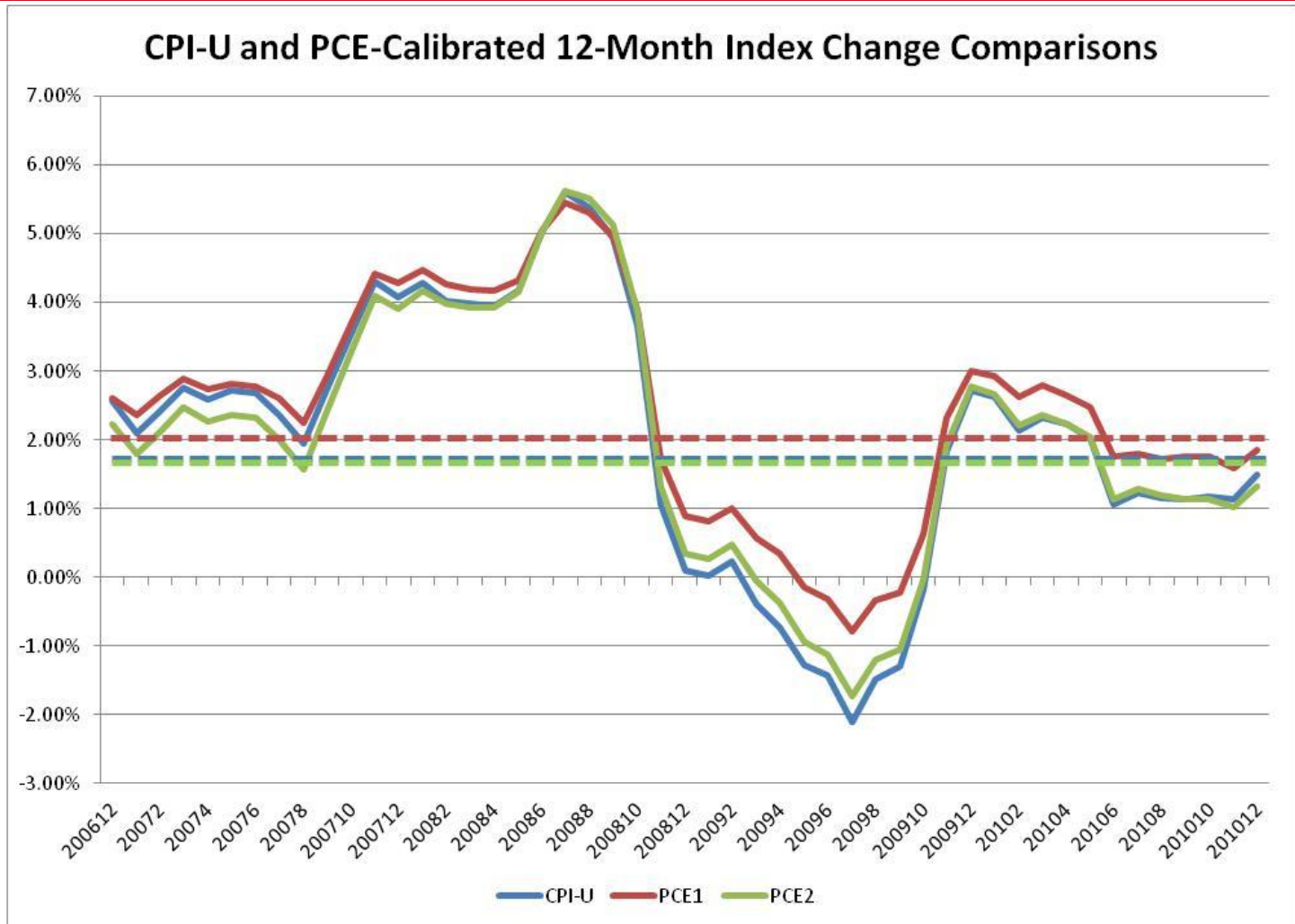
Relative Importances

CONSUMPTION CATEGORY	CPI-U	PCE1	PCE2
FOOD AND BEVERAGES	15.1%	13.8%	17.0%
Food at home	8.0%	7.1%	8.7%
Food away from home	6.0%	4.9%	6.0%
Alcoholic beverages	1.1%	1.8%	2.3%
HOUSING	42.4%	26.5%	32.9%
Rent	5.8%	3.4%	4.1%
Owner's equivalent rent	23.4%	12.9%	15.9%
Other housing	13.1%	10.2%	12.9%
APPAREL	3.8%	4.5%	5.5%
MEDICAL CARE	6.2%	22.3%	5.0%
TRANSPORTATION	17.4%	13.9%	17.3%
Motor vehicles	7.9%	5.3%	6.5%
Gasoline	4.2%	3.4%	4.3%
Other transportation	5.4%	5.2%	6.5%
EDUCATION AND COMMUNICATION	6.0%	5.4%	6.7%
RECREATION	5.6%	6.8%	8.4%
TOBACCO	0.7%	1.0%	1.2%
OTHER GOODS AND SERVICES	2.8%	5.8%	6.0%

Index Results



Index Results



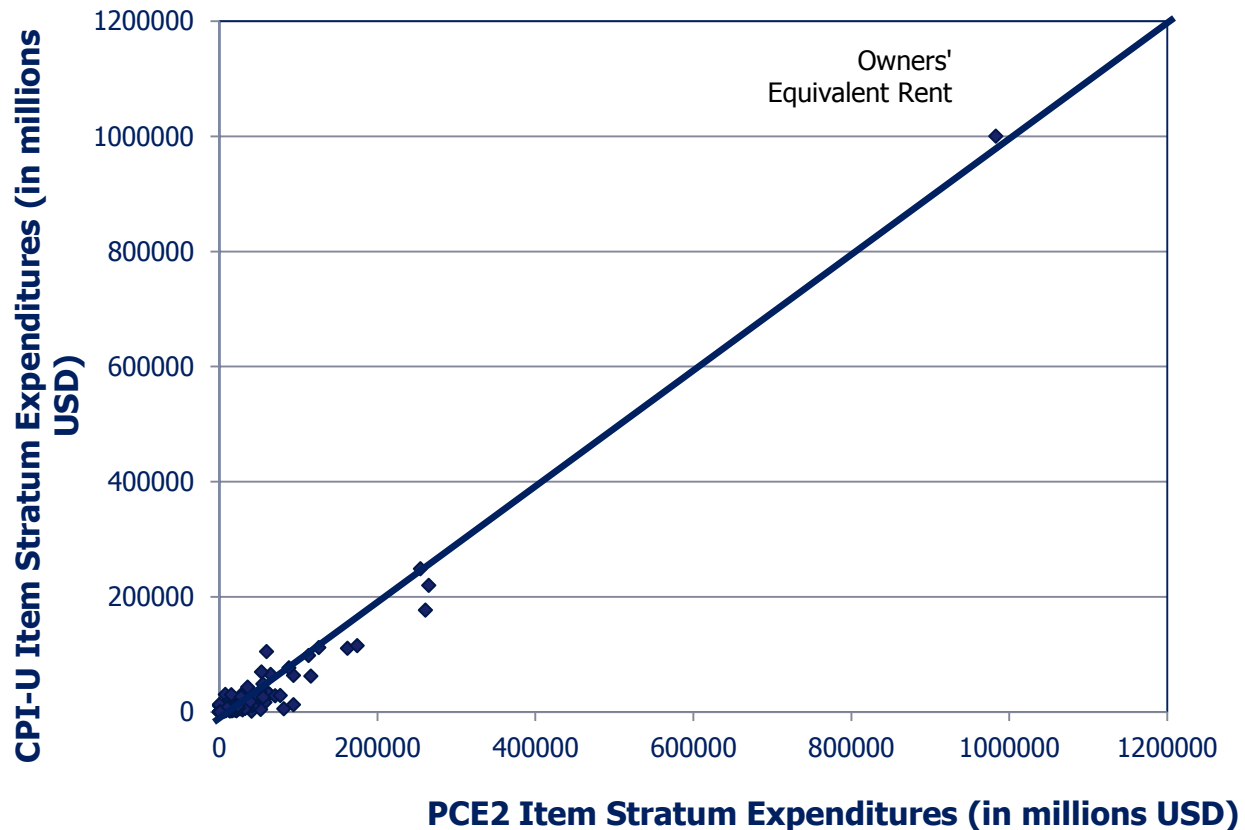
Index Results

- **PCE2 5-year annualized growth rate is 0.071% lower than the CPI-U 5-year annualized growth rate.**
- PCE1 5-year annualized growth rate is 0.338% higher than the CPI-U 5-year annualized growth rate.

Index	5-Year Annualized Growth Rate	5-Year Annualized Growth Rate Difference from CPI-U	2006-2010 Average 12-Month Index Change	2006-2010 Average 12-Month Index Change Difference from CPI-U
CPI-U	2.182%		2.013%	
PCE1	2.520%	-0.338%	2.454%	-0.441%
PCE2	2.111%	0.071%	2.009%	0.003%

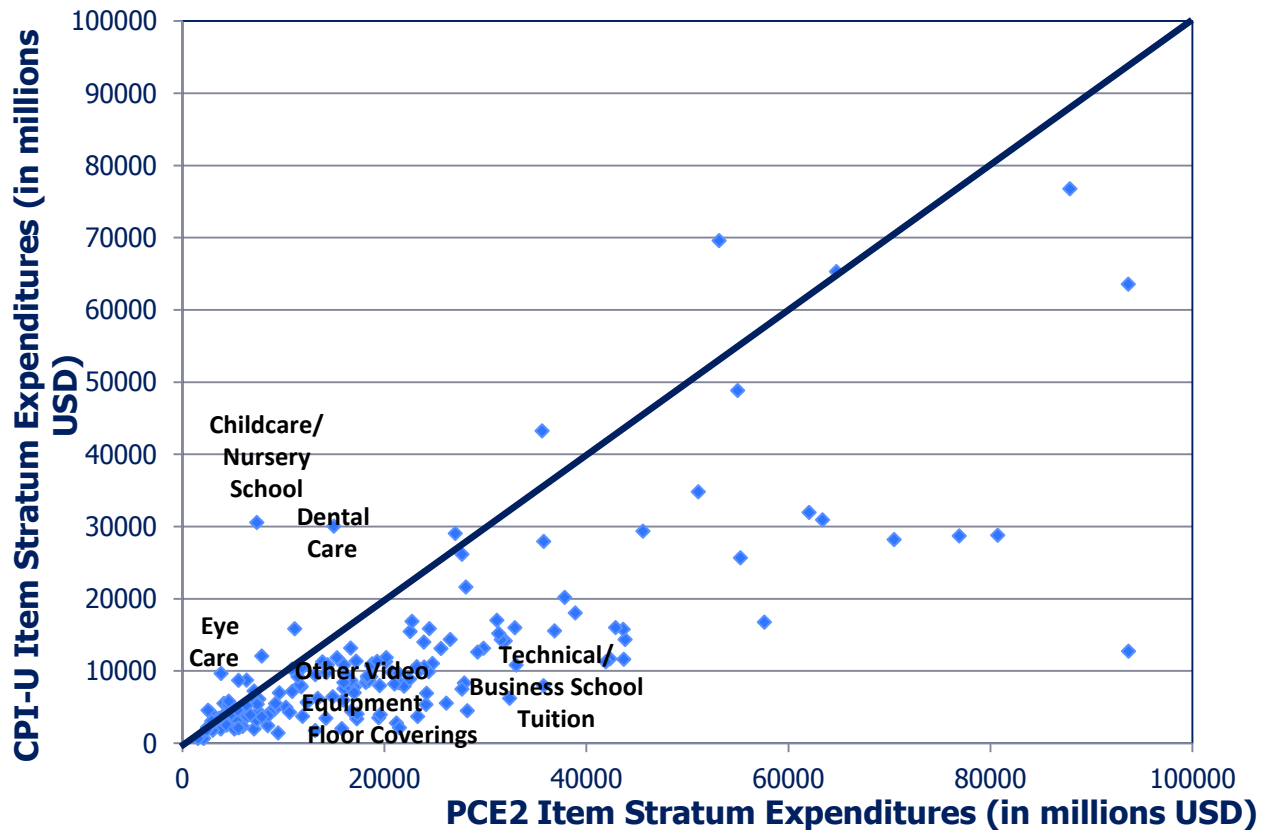
CPI-U/PCE2 Scatter Plots

**Scatterplot of CPI-U and PCE2
Elementary Item Stratum Expenditure
Estimates, 2005.12**



CPI-U/PCE2 Scatter Plots

**Scatterplot of CPI-U and PCE2
Elementary Item Stratum Expenditure
Estimates, 2005.12 (With Exclusions)**



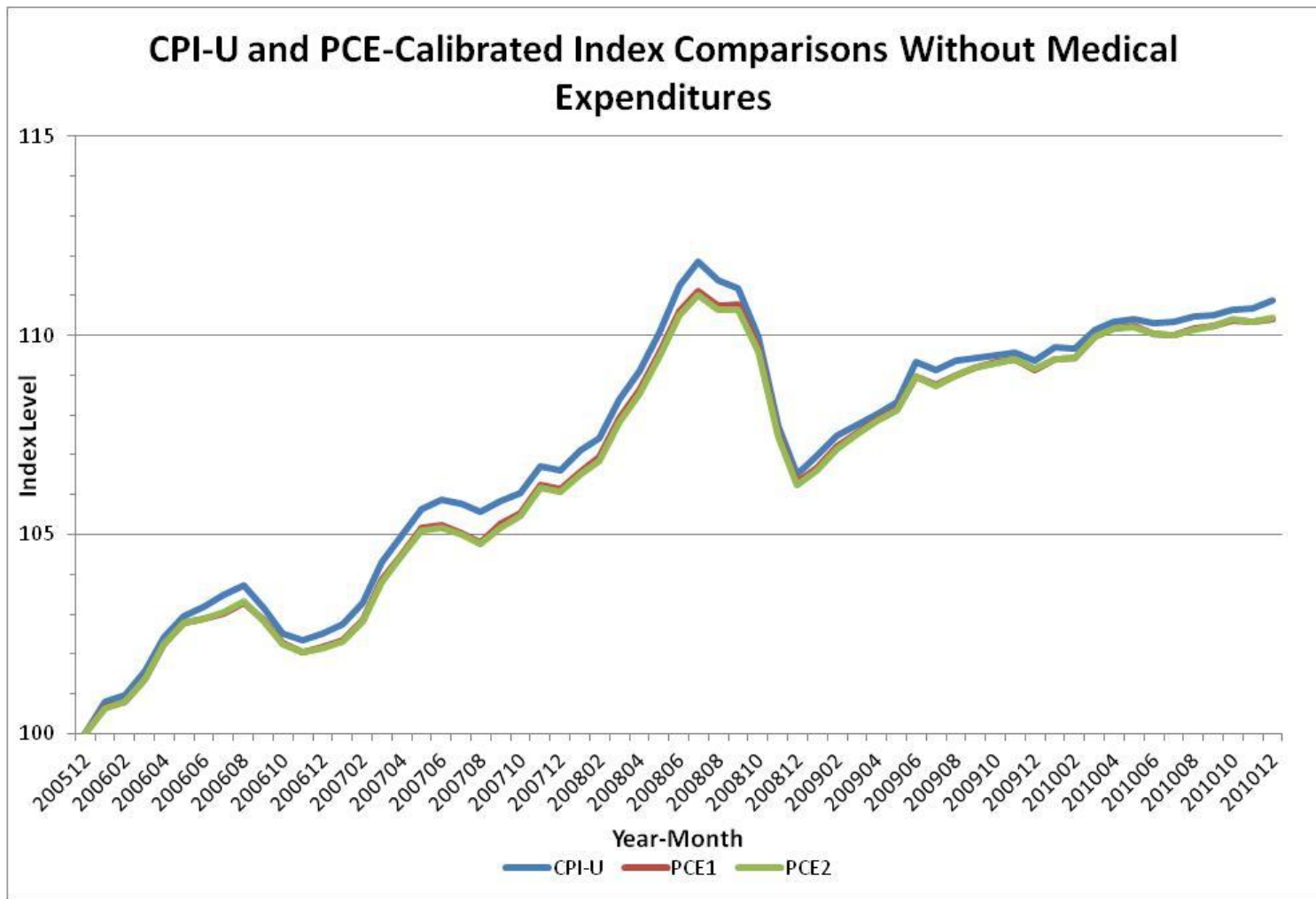
CPI-U/PCE2 Item Expenditure Ratios

CPI-U/PCE2 Expenditure Ratio Maximums								
ITEM	ITEM DESCRIPTION	2005 RATIO	ITEM	ITEM DESCRIPTION	2007 RATIO	ITEM	ITEM DESCRIPTION	2009 RATIO
SEEB03	Child care and nursery school	4.155	SEEB03	Child care and nursery school	4.556	SEEB03	Child care and nursery school	4.182
SEMC03	Eyeglasses and eye care	2.529	SEMC03	Eyeglasses and eye care	2.820	SEMC03	Eyeglasses and eye care	2.708
SEMC02	Dental services	2.006	SEHE02	Other household fuels	2.450	SEHE02	Other household fuels	2.640
SEHE02	Other household fuels	1.806	SEMC02	Dental services	2.112	SEMC02	Dental services	1.986
SEHB02	Other lodging away from home including hotels and motels	1.763	SEHB02	Other lodging away from home including hotels and motels	1.623	SEME03	Health Maintenance Plans	1.509

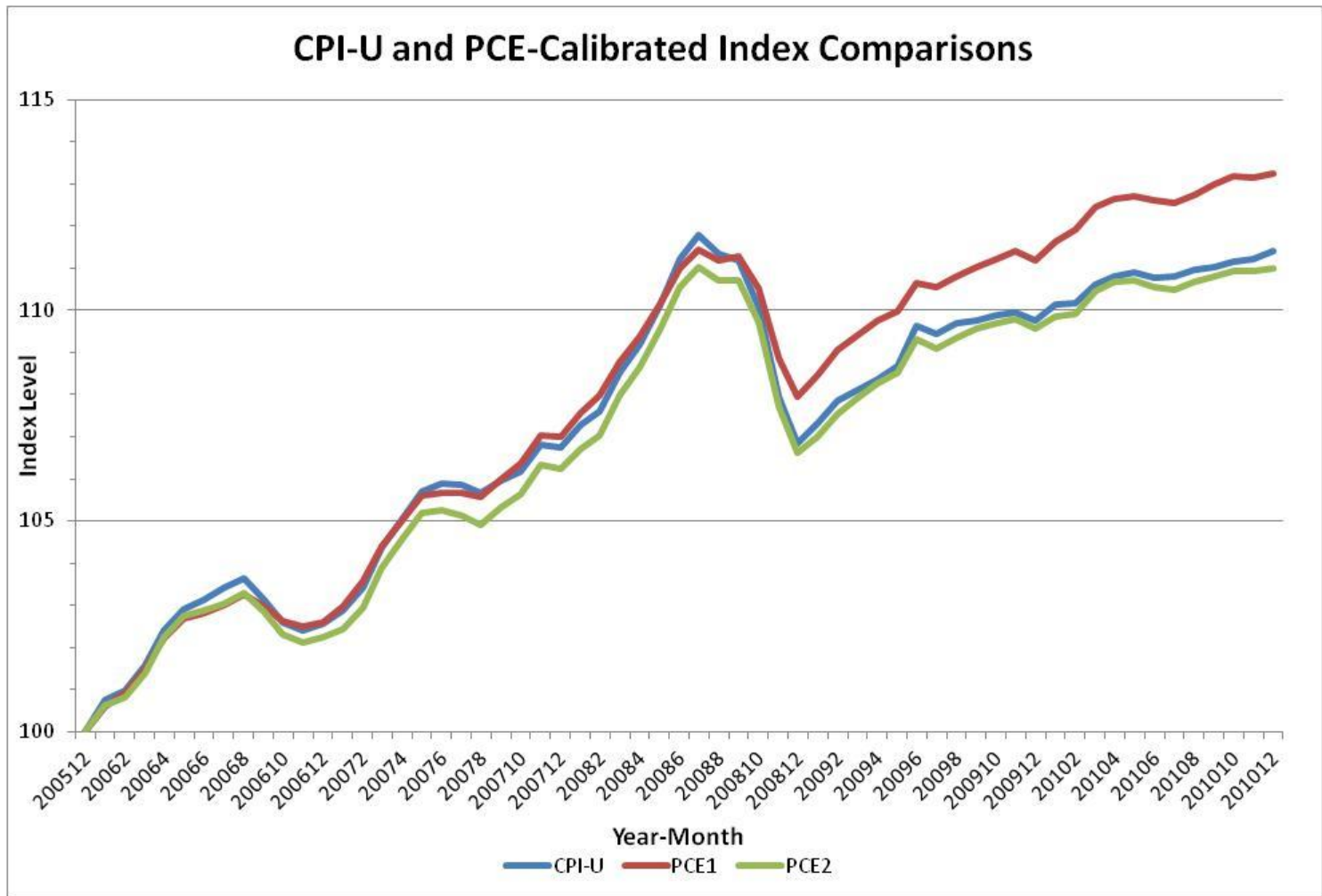
CPI-U/PCE2 Item Expenditure Ratios

CPI-U/PCE2 Expenditure Ratio Minimums								
ITEM	ITEM DESCRIPTION	2005 RATIO	ITEM	ITEM DESCRIPTION	2007 RATIO	ITEM	ITEM DESCRIPTION	2009 RATIO
SEGD01	Legal services	0.136	SEFW02	Distilled spirits at home	0.136	SEEE02	Computer software and accessories	0.131
SEEE02	Computer software and accessories	0.133	SEEE02	Computer software and accessories	0.117	SEFW02	Distilled spirits at home	0.131
SEEB04	Technical and business school tuition and fees	0.132	SEMD03	Care of invalids and elderly at home	0.112	SEHH01	Floor coverings	0.117
SERA03	Other video equipment	0.128	SERA03	Other video equipment	0.099	SEEB04	Technical and business school tuition and fees	0.087
SEHH01	Floor coverings	0.100	SEHH01	Floor coverings	0.090	SERA03	Other video equipment	0.087

Exclusion of Medical Items



Conclusions



Conclusions

- **PCE2 5-year annualized growth rate is 0.071% lower than the CPI-U 5-year annualized growth rate.**
- PCE1 5-year annualized growth rate is 0.338% higher than the CPI-U 5-year annualized growth rate.

Index	5-Year Annualized Growth Rate	5-Year Annualized Growth Rate Difference from CPI-U	2006-2010 Average 12-Month Index Change	2006-2010 Average 12-Month Index Change Difference from CPI-U
CPI-U	2.182%		2.013%	
PCE1	2.520%	-0.338%	2.454%	-0.441%
PCE2	2.111%	0.071%	2.009%	0.003%

Caitlin Blair

Economist

Consumer Price Index

www.bls.gov/cpi

202-691-5415

blair.caitlin@bls.gov