

Reconsideration of Weighting and Updating Procedures in the US CPI

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BLS Indexes: CPI-U

- Aggregated from item-area indexes
 - ▶ 8,018 basic indexes weighted using Consumer Expenditure Survey data
 - ▶ Most basic indexes calculated using weighted geometric mean formula
- Uses Lowe index form
 - ▶ Biennial weight revisions since 2002
 - ▶ 2-year weight reference periods
 - ▶ Base period has been 2005-2006 since January 2008

BLS Indexes: C-CPI-U

- Uses same basic indexes as CPI-U
- Series introduced in July 2002
 - ▶ Published series go back to January 2000
- Monthly-chained Törnqvist index
 - ▶ Subject to two revisions
 - ▶ Preliminary indexes use geometric mean
 - ▶ Data are final through December 2007
 - ▶ 2009 data become final in February 2011

Issues

■ CPI-U

- ▶ More evidence on consumer substitution
- ▶ More frequent weight revisions
- ▶ Shorter weight reference periods
- ▶ Modified price-updating of weights

■ C-CPI-U

- ▶ Comparison to annual superlative indexes
- ▶ Modified preliminary index formula

Organization of Paper

- Analysis of annual and biennial weights
 - ▶ Superlative indexes
 - ▶ Summary (CES) substitution elasticities
- Simulations of alternative Lowe weight revision regimes
 - ▶ Compared to CPI-U
 - ▶ Compared to chain C-CPI-U
 - ▶ Compared to Young index

Television Price-Updating

Base Period	Expenditure Share (%)	Updated CPI Rel. Imp. (%)
1999-2000	.19	.15
2001-2002	.21	.16
2003-2004	.23	.16
2005-2006	.28	.17

CES Index Model

- Provides summary measure of substitution
- Consistent with Sato-Vartia index I_X^{SV}
- Can estimate σ using Feenstra-Reinsdorf weighted regression:

$$\begin{aligned} \text{dlog } s &= (\sigma - 1) \text{dlog } I_X^{SV} \\ &\quad + (1 - \sigma) \text{dlog } p \\ &\quad + \varepsilon \end{aligned}$$

Estimated Indexes (Table 1)

- Average percent difference 1999-2007, Annual Törnqvist change minus:
 - ▶ CPI-U (Lowe) -.31
 - ▶ Annual Laspeyres -.12
 - ▶ Annual Sato-Vartia -.01
 - ▶ Annual Fisher .06
 - ▶ C-CPI-U (Monthly Törnqvist) .05 (7 yrs)
 - ▶ Annual Paasche .23

Annual σ estimates (Table 2)

Period		Parameter	
Base	Current	Estimate	Std. Err.
1999	2000	0.727	0.043
2000	2001	0.521	0.051
2001	2002	0.631	0.053
2002	2003	0.583	0.052
2003	2004	0.655	0.054
2004	2005	0.553	0.059
2005	2006	0.650	0.060
2006	2007	0.935	0.062

Conclusions, Part I

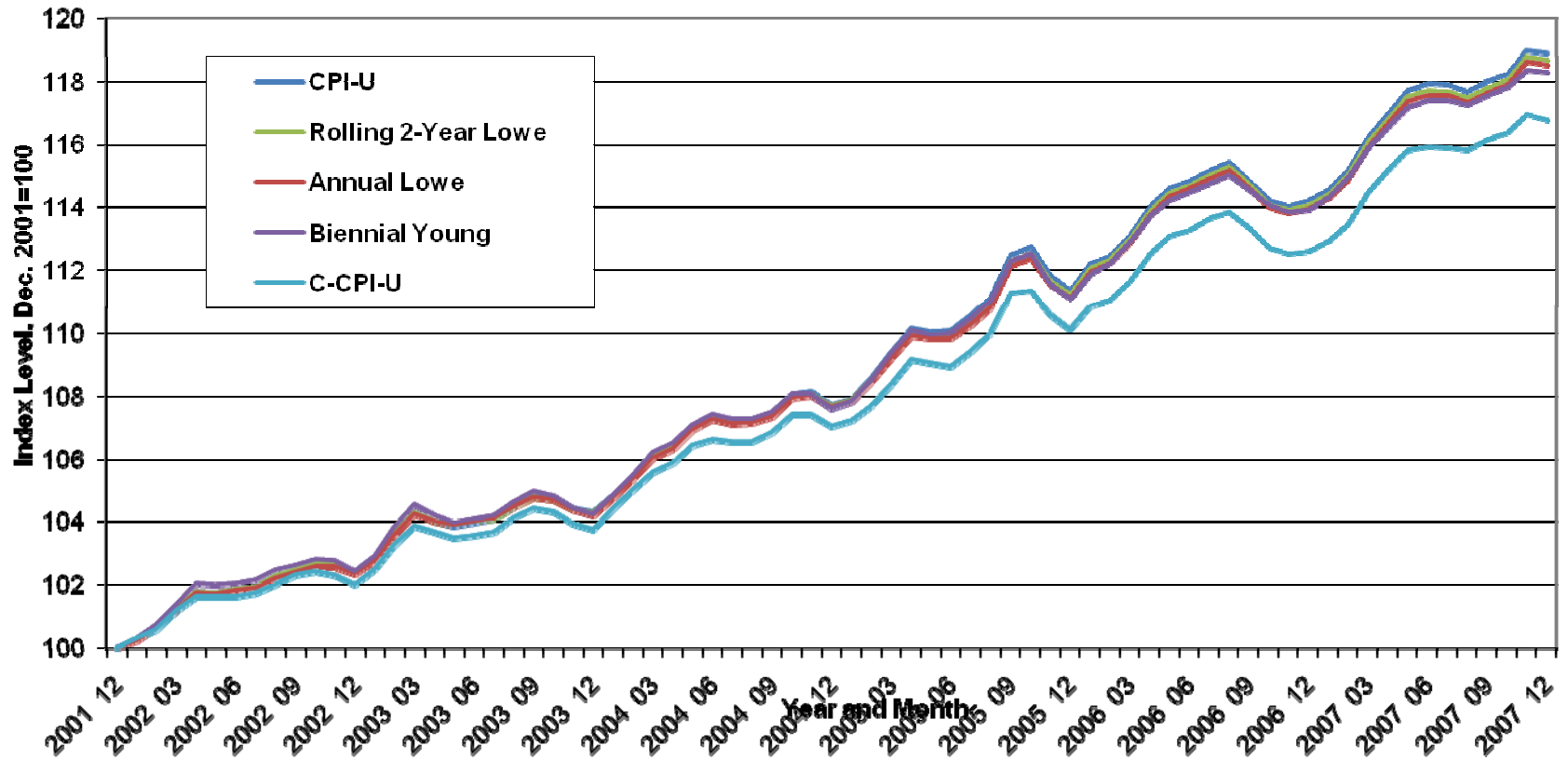
- Further evidence of consumer substitution in US expenditure behavior
 - ▶ Sato-Vartia indexes very close to Törnqvist
 - ▶ Results consistent with σ between 0 and 1
 - ▶ Do not confirm either Laspeyres/Lowe or Geometric/Young assumptions
- Annual and biennial Törnqvist indexes have risen slightly faster than C-CPI-U
 - ▶ Difference may be worth studying further

Index Correlations (Table 3)

Index Year	Regression Coefficient of Current Year Relative:	
	On Prior Year Index Relative	On Biennial Update Period Relative
2002	-0.246	-0.035
2003	0.111	0.124
2004	0.054	0.057
2005	0.187	0.167
2006	-0.005	0.004
2007	0.163	0.271

Notes: Coefficients in bold are not statistically significant.
Last line of Table 3 in paper is incorrect.

Simulated Indexes (Figure 1)



Conclusions, Part II

- Index changes are not reliably correlated from period to period
- More timely weight revisions reduce the growth rate of Lowe indexes
 - ▶ We find a monotonic relationship
 - ▶ No evidence of chain drift
 - ▶ Young index is lower than Lowe indexes
 - ▶ More timely revisions would not eliminate the gap between the CPI-U and C-CPI-U

Next Steps

- Continue to study more timely weight revisions
 - ▶ Annual revisions are feasible and appear well-behaved
 - ▶ New processing systems would permit quarterly updates
- Examine alternatives to geometric mean formula for preliminary C-CPI-U
 - ▶ Several alternatives being studied at BLS

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