PRODUCTIVITY RESEARCH NOTES 2611

Quality Adjustment and PPP

A Fundamental Caveat in Productivity Comparisons

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KEY MESSAGE

Cross-country productivity comparisons are fundamentally shaped by how national price indices treat quality change—a difference that affects real output before any PPP conversion, and one that neither constant nor current PPPs can correct.

WHY THIS MATTERS

International comparisons of GDP and productivity levels rely on converting output values into real volumes expressed in a common currency using purchasing power parities (PPPs). In practice, the "constant PPP" for GDP uses a fixed benchmark-year PPP extrapolated with national deflators, while the "current PPP" for GDP uses successive international price comparisons to update PPPs over time. Recent discussions (see Ackerman's blog, February 19, 2026) point to a widening gap between US and European productivity levels in constant PPP-based comparisons, raising concerns that such differences may partly reflect approaches to price measurement rather than underlying economic performance. This note focuses on a more fundamental issue: real output itself is not measured consistently across countries due to differences in approaches to quality adjustment.

MECHANISM: QUALITY CHANGE AND DIVERGENCE

Quality change affects real output measurement via price indices. When quality improvements are fully captured, measured price growth is lower and real output growth higher, reflecting gains in both quantity and quality; when only partially incorporated, price growth is overstated and real output growth understated. Because statistical agencies apply different methods, measured inflation can diverge across countries even for similar products.

These differences accumulate over time, and small discrepancies in quality adjustment can generate substantial gaps in real output and productivity, especially in rapidly innovating sectors. Evidence from computers illustrates the scale of this problem: in Japan–US comparisons, Nomura and Samuels (2004) document substantial price-trend divergences in periods and product categories where hedonic adjustment had not yet been fully applied—gaps that disappear once comparable methods are used. This suggests that measured productivity differences may partly reflect methodological differences rather than underlying performance.

PPP CHOICE AND INTERPRETATION

Measurement differences become particularly consequential when real output levels are compared across countries using PPPs, as they are not resolved by the choice of PPP. For a graphical illustration of PPP-based level comparisons in Asian countries, see PRN2601.

Constant PPP series rely on domestic real growth rates to extrapolate from a benchmark year, implicitly assuming that national price indices measure real growth in a comparable way across

countries. When quality adjustments differ across countries, these differences accumulate over time and may distort long-term comparisons.

Current PPPs incorporate updated international price information and can mitigate inconsistencies arising from benchmark extrapolation, particularly when comparisons are made at a given point in time, and comparable goods of similar quality are priced across countries. This assumption may hold for narrowly defined tradable goods, including some high-technology products with standardized specifications.

However, PPP comparisons are typically based on purchaser prices rather than producer prices, and imported goods may embody substantial differences in transport, insurance, and distribution margins across countries. In practice, even within the same product category, product composition also differs across countries in terms of quality, specifications, and branding. These differences imply that PPP price gaps may reflect not only price levels but also margins and unobserved quality variation. For non-tradable services such as education, healthcare, and public services, quality differences are often substantial and difficult to measure.

At the same time, measured quality changes within national price indices tend to be more gradual and internally consistent, which may provide some stability for intertemporal comparisons when constant PPPs are used. As a result, neither constant nor current PPPs can fully eliminate cross-country inconsistencies in real output measurement.

DISCUSSION

Taken together, these considerations suggest that cross-country productivity comparisons face two important sources of uncertainty: the treatment of quality change within national price indices, and the choice of PPP methodology. Constant PPPs, as used in international productivity databases such as those of the OECD and APO, provide a consistent basis for long-term comparisons but may amplify cumulative differences in national price indices. Current PPPs can improve cross-sectional comparability and help assess such divergences, but they do not eliminate underlying inconsistencies in quality adjustment across countries. In both cases, the reliability of comparisons ultimately depends on the consistency and cross-country comparability of price measurement, particularly in the treatment of quality change.

IMPLICATIONS

01
Cross-country productivity comparisons are fundamentally shaped by differences in quality adjustment embedded in national price indices.

02
PPP methodology cannot correct inconsistencies arising from these measurement differences.

03
Interpreting productivity level comparisons requires attention to cross-country differences in price measurement methods.

REFERENCES

Nomura, K. and J.D. Samuels (2004). “Can We Go Back to Data? Reconsideration of U.S.-Harmonized Computer Prices in Japan,” Program on Technology and Economic Policy, John F. Kennedy School of Government, Harvard University.

This note is part of the Productivity Research Notes series, examining key issues in productivity and economic performance in Asia. The views expressed in this paper are those of the authors and do not necessarily represent the U.S. Bureau of Economic Analysis or the U.S. Department of Commerce. Inquiries may be directed to sankenoffice@info.keio.ac.jp.

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