

Income Concepts and Productivity

Separating Production from Asset Revaluation and Its Implications for TFP

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KEY MESSAGE

Measured productivity depends on how income and production are defined, not only on underlying efficiency. Alternative accounting treatments of asset revaluation can materially change its interpretation.

WHY THIS MATTERS

Productivity indicators are widely used as measures of economic performance and technological progress. In practice, however, they are constructed within a system of national accounts (SNA) that reflects specific accounting conventions. Standard GDP includes depreciation (consumption of fixed capital) but excludes capital gains and losses on productive assets. While these conventions serve important statistical purposes, they do not necessarily correspond to a broader economic concept of income. This matters because productivity is defined as a residual between output and input, so changing the boundary between income and production changes what it measures. The distinction is particularly relevant for assets such as land, where changes in value are large and not directly tied to current production. This issue is quantitatively significant in Asia: according to the Augmented Productivity Database (APDB), land can account for more than 70% of total assets in economies such as Hong Kong and Singapore, and 20% in many ASEAN countries.

CONCEPTUAL FRAMEWORK

The key distinction is between alternative concepts of income. The SNA adopts a production-based definition that excludes asset revaluation, whereas the Hicksian tradition considers capital gains and losses as part of income. These are not alternative measurements of the same object; they are different objects, reflecting distinct conceptual definitions of income, a point systematically developed in the broader accounting framework of Diewert and Fox (2024), which explores alternative definitions of output, input, and income in the national accounts.

This distinction maps directly into total factor productivity (TFP). As a residual between output and input, TFP inherits the scope of the output concept. When asset revaluation is excluded from income, as in the SNA, productivity measures efficiency within a production-based concept of income, with capital input valued using the Jorgensonian user costs that reflect asset price changes. When it is included in income, consistency requires that revaluation effects be separated from production and excluded from the price of capital services. In this formulation, production is defined net of asset revaluation, and productivity is measured relative to a broader income concept but a more narrowly defined notion of production.

Whether unrealized capital gains should be included in the Hicksian income remains debated. Including them may better reflect changes in economic wealth, but introduces volatility and valuation uncertainty. Excluding them avoids these issues but narrows the concept of income,

shifting the effects of asset revaluation implicitly into the production side of the accounts. The key point is that either treatment reflects a conceptual choice, not a neutral adjustment.

INTERPRETATION

Changes in the treatment of asset revaluation do not simply adjust TFP; they alter the economic content of the residual. When revaluation effects are excluded from production and from capital service prices, TFP is less exposed to fluctuations driven by asset price movements and provides a cleaner signal of production efficiency. This distinction becomes particularly relevant during periods of large asset price swings, such as asset booms or busts. In such cases, separating revaluation effects can stabilize measured capital (waiting) service costs and, in turn, the income shares used in aggregation. The resulting TFP series may therefore provide a more consistent signal of underlying production performance, although this depends on the accuracy of asset valuation and user cost measurement.

For empirical analysis, the implication is direct. Comparisons of productivity across time or countries require alignment not only in data but in accounting concepts. Without such alignment, differences in TFP may reflect alternative treatments of asset revaluation rather than differences in technology or efficiency.

MEASUREMENT CONSIDERATIONS

Extending the income concept requires explicit valuation of assets—especially land—where prices may be sparse, heterogeneous, or infrequently observed, and asset revaluation can be highly volatile. These are empirical constraints, not conceptual objections. The treatment of asset revaluation can change the variability of measured nominal output (and related factor income aggregates), but it does not remove the dependence of productivity measures on the underlying accounting framework.

IMPLICATIONS

01

Productivity measures depend on the accounting framework: changing the definitions of income and production alters what TFP represents.

02

Separating asset revaluation from production reduces the influence of asset price fluctuations on capital input prices and can yield a more stable, interpretable measure of production efficiency.

03

Alternative income concepts do not replace standard measures but provide complementary perspectives, particularly for economies where asset values play a significant role.

REFERENCES

Diewert, W.E. and K.J. Fox (2024). “Alternative Output, Input and Income Concepts for the Production Accounts,” *Journal of Productivity Analysis*, 62, 379–393.

Diewert, W.E., K. Nomura, and C. Shimizu (2024). “Improving the SNA: Alternative Measures of Output, Input, Income, and Productivity,” *Review of Income and Wealth*, 70 (4).

Jorgenson, D. W. (1963). “Capital Theory and Investment Behaviour,” *American Economic Review*, 53(2), 247–259.

This note is part of the Productivity Research Notes series, examining key issues in productivity and economic performance in Asia. The views expressed are those of the author(s). Inquiries may be directed to sankenoffice@info.keio.ac.jp.

