

# Intangible Expansion and Capital Quality

## *Implications of the 2020 Benchmark Revision in Japan*

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### KEY MESSAGE

*Japan's 2020 benchmark revision primarily reflects a systematic expansion of intangible-related investment, concentrated in the post-2015 period. This revision raises the growth of capital services more than that of capital stock, widening the divergence between the two—often interpreted as “capital quality”—and implying that a larger share of measured output growth is attributable to intangible capital inputs rather than residual TFP growth.*

### WHY THIS MATTERS

Japan's prolonged low-growth narrative has often been associated with weak capital deepening and stagnant productivity. However, such interpretations depend critically on how capital formation, particularly intangible investment, is measured. Improvements in the coverage of intangible assets can materially reshape how Japan's growth performance is attributed between capital input and productivity.

### EVIDENCE FROM THE 2020 BENCHMARK REVISION

The 2020 benchmark revision was released in two stages, with revised flow accounts published in December 2025 and the corresponding stock accounts in January 2026 by the Economic and Social Research Institute (ESRI), Cabinet Office, Government of Japan. The revision raises nominal GDP by approximately 2.7% for 2020, with the increase driven primarily by investment components rather than consumption. Notably, software investment alone accounts for about 1.5 percentage points of the upward revision, reflecting expanded coverage based on updated economic census data and the 2020 benchmark input–output table.

This revision to investment flows translates into a substantial revaluation of the capital stock. In particular, the net capital stock of software increases from 35.2 trillion yen to 61.6 trillion yen by the end of 2023—an approximately 75% expansion in the revised series. This large adjustment reflects the cumulative effect of improved coverage and measurement of intangible investment in the updated accounts. The revision is not entirely neutral over time. While the capital stock at the beginning of the period is also revised upward—by about 8.2% for software in 2015—the magnitude of the adjustment becomes substantially larger in the later years. Although the revision extends back beyond the 2011 benchmark period, its effects are more strongly reflected in the latter half of the decade.

### INTERPRETATION

Activities previously under-recorded or incompletely captured—particularly those related to software and other intangible services—are now more fully incorporated into measured capital formation. As a result, the revised series suggests that Japan's economy has been more intensive in intangible investment than previously indicated.

## MEASUREMENT CONSIDERATIONS

The revision is not uniform over time. The upward adjustment to investment is concentrated primarily in the latter half of the 2010s, altering not only the level but also the trajectory of capital accumulation. The underlying source of this temporal pattern remains an open question: it may reflect actual investment dynamics, or it may stem from the concentration of measurement improvements in more recent periods, given the limitations inherent in backcasting. This distinction is critical for growth accounting, where the decomposition of output growth depends on the dynamics of input growth rather than their levels.

The revision has direct implications for the measurement of capital input. Higher investment in intangible assets raises both the capital stock and the consumption of fixed capital (CFC). However, the effect on capital services is stronger. Intangible assets typically carry higher depreciation rates and user costs, and thus receive larger weights in the aggregation of capital services. As a result, the growth of capital services is revised upward more than that of capital stock, increasing the divergence between the two measures.

Table 1 illustrates the contribution of the software revision to capital services, capital quality, and measured TFP growth. The revised series shows a substantially larger divergence between capital services growth and capital stock growth, reflecting the increased weight of intangible assets in capital input. In the Jorgensonian framework, this divergence—often referred to as “capital quality”—captures compositional shifts toward higher-cost assets. This pattern therefore reflects not only greater capital accumulation, but also a compositional shift toward assets with higher measured contributions to production.

Table 1. Contribution of Software Investment Revision to Capital Input and TFP Growth (Japan, 2011–24)

Unit: Percentage (average annual growth rates). The Difference column reports

percentage-point differences between the revised and counterfactual series. Notes: Software investment in the counterfactual series is based on the previous series through 2023 and extrapolated to 2024 using revised-series growth rates. Productivity and capital input measures are author estimates based on the APO Productivity Database 2026 (forthcoming) and do not represent official ESRI estimates. Values may not sum exactly due to rounding.

	Revised series	Counterfactual Series	Difference
Capital Services	0.65%	0.33%	0.31pt
Capital Stock	0.09%	0.04%	0.05pt
Capital Quality	0.56%	0.29%	0.27pt
TFP Growth	0.21%	0.35%	-0.14pt

## IMPLICATIONS

### 01

Japan’s recent growth is more capital-driven than previously suggested, reflecting both higher intangible investment and a stronger contribution of capital services to output growth.

### 02

The widening divergence between capital services and capital stock growth highlights the importance of measuring capital quality, especially in economies undergoing structural shifts toward intangible assets.

### 03

Growth accounting results can be materially affected by the treatment of intangible assets, with important implications for both domestic analysis and cross-country comparisons.

## REFERENCES

ESRI (2025) “Toward the 2020 (Reiwa 2) Revision of the National Accounts,” Economic and Social Research Institute, Cabinet Office, Government of Japan, November 19. (in Japanese)

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