

Mismeasuring Productivity in Resource-Rich Economies

Evidence from Saudi Arabia

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KEY MESSAGE

Standard productivity measures systematically misattribute resource depletion to TFP in resource-dominant economies, leading to a structural bias in cross-country productivity comparisons when mineral and energy resources (MER) are omitted as capital inputs.

WHY THIS MATTERS

TFP is commonly interpreted as a measure of efficiency or technological progress. However, standard growth accounting frameworks do not always capture the full range of capital inputs—in particular, MER—natural resource capital derived from subsoil assets such as oil, gas, coal, and minerals. In economies where MER plays a dominant role, changes in resource availability are often substantial. If not properly accounted for, measured TFP may reflect resource depletion rather than true productivity dynamics.

EVIDENCE FROM SAUDI ARABIA

Saudi Arabia provides a clear illustration of this issue and is newly incorporated as the 28th economy in the 2026 editions of the Augmented Productivity Database (APDB) and the Asia Natural Resources Database (ANRD), developed at the Keio Economic Observatory, Keio University. Figure 1 illustrates how the inclusion of MER alters measured capital and TFP.

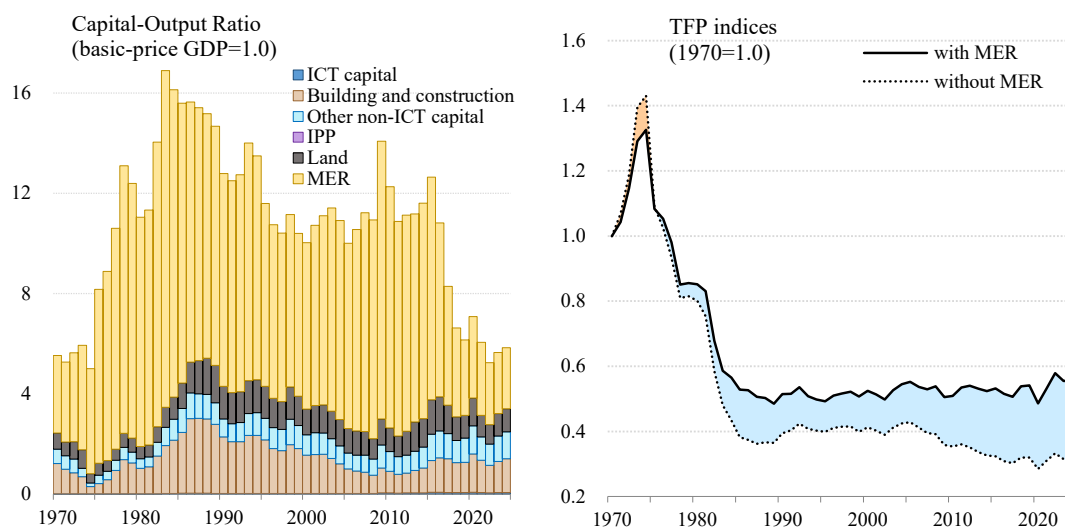


Figure 1. Capital Composition and TFP Measurement in Saudi Arabia, 1970–2024. Sources: APDB and ANRD 2026. Note: GDP series incorporate GASTAT's 2023-benchmark comprehensive revision (released May 2025); see Jeyhun (2026) for an independent verification of the revision.

The left panel shows the composition of nominal capital stock, highlighting the dominant role of natural resource capital—particularly oil. Consistent with this composition, incorporating MER substantially alters measured capital services. While the divergence in real capital service growth becomes pronounced after 2008, the average growth rate over 2008–24 declines from 4.7% when MER is excluded (but land and inventories are included) to 2.5% when MER is incorporated.

The right panel compares TFP indices with and without accounting for MER. When MER is excluded (but land and inventories are included), TFP estimates exhibit a pronounced downward trend from the late 2000s onward. When MER is included, the TFP path is revised upward and becomes more stable. Over the period 2008–24, this corresponds to a shift in average TFP growth from –1.6% to 0.2%. This suggests that recent policy narratives emphasizing productivity improvements under [Saudi Vision 2030](#) may be sensitive to how natural resource capital is treated in measurement.

INTERPRETATION

In a standard growth accounting framework, TFP is measured as the residual after accounting for capital and labor inputs. In resource-rich economies, however, natural resource extraction simultaneously generates output while reducing the underlying stock of subsoil assets. When these assets are not treated as capital inputs, the associated depletion is not recorded as a decline in capital services but is instead absorbed into the residual, thereby confounding measured productivity with asset depletion.

MEASUREMENT CONSIDERATIONS

The MER estimates are constructed using production-based measures linked to actual extraction flows and involve assumptions regarding valuation and depletion. While subject to uncertainty, they provide a consistent framework for incorporating natural resource capital into growth accounting. In particular, MER capital stock estimates are sensitive to assumptions about the years of production used to value remaining reserves; alternative assumptions would shift the stock levels in the left panel of Figure 1, while leaving the qualitative implications for TFP robust.

IMPLICATIONS

01

Cross-country productivity comparisons are biased unless natural resource dynamics are explicitly incorporated.

02

Observed TFP declines in resource-rich economies may largely reflect resource depletion rather than efficiency losses.

03

Integrating MER capital is essential for consistent growth accounting across heterogeneous economies.

REFERENCE

Jeyhun, M. (2026). “Understanding Saudi Arabia’s GDP Methodology Revision: Critical Verification of Measurement Change,” KS-2026-CO01, King Abdullah Petroleum Studies and Research Center (KAPSARC), March.

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.

