

An Evaluation of Alternative Hypotheses for Explaining the Near-Linearity of Price–Profit rate Curves Using the U.S. Annual Input–Output Accounts, 1997–2024.

Topic: Development Programme - Discussants: Francesca Severini and Geoffrey J.D. Hewings

Author: Bruno Sánchez Solís

Since the late 1970s, the use of linear production models has served as a framework to study the effects of changes in the profit rate on the prices of production and the wage rate. These studies have recurrently found that these effects can be well represented by nearly linear curves. The results are intriguing in light of the underlying mathematical properties of the model, as we would expect to see a more complex behavior of prices under changes in income distribution.

In the most recent literature, we find efforts in the identification of the constraints on the production structure governing the price–rate-of-profit curves. Two competing explanations have been proposed. The first attributes near-linearity to the exponential decay of subdominant eigenvalues of the input-coefficient matrix: if sufficiently few eigenvalues carry explanatory weight, a rank-one approximation to the price system is adequate, and near-linearity follows. The second agrees that subdominant eigenvalues tend toward zero but argues that eigenvalue behavior alone is insufficient, identifying an additional structural condition: a sufficient tendency toward proportionality between the labor-coefficient vector and the left Perron–Frobenius eigenvector of the input matrix as a constraint behind empirical near-linearity.

Ferrer-Hernández & Torres-González (2022) showed that theoretical price curves depend on the joint action of eigenvalues and the projection of the labour-coefficient vector onto the eigenvectors of the input matrix coefficients, and Torres-González (2022) derived the spectral conditions for linearity and provided the first empirical evaluation using U.S. Benchmark Input–Output Accounts for selected years in 1977–2012 at a high level of disaggregation. This paper extends that evaluation to the same data source that proponents of the first hypothesis mentioned have used to support their claims. It uses the U.S. Annual Input–Output Accounts for 1997–2024 to construct industry-by-industry input-coefficient matrices and labor-coefficient vectors from supply-use tables at the 71-industry level. The use of annual accounts allows us to assess whether the structural conditions identified by Torres-González hold continuously across time, including periods of significant economic disruption, and whether the results are robust to a substantially lower level of sectoral disaggregation. By evaluating both hypotheses on the empirical ground chosen by the first hypothesis, the test is not biased toward either explanation by data selection.

The results confirm and strengthen the earlier findings. Across all 28 years examined, eigenvalue behavior alone is insufficient to account for near-linear price–rate of profit curves: subdominant eigenvalues of non-negligible magnitude are present in every year, making spectral compression an incomplete explanation. The evidence consistently points to the joint effect of the eigenvalue pattern and the alignment between the labor-coefficient vector and the spectral structure of the input matrix as the structural basis for the observed regularity. That these results hold on the same data source used to motivate the eigenvalue-only hypothesis, at a different level of aggregation, and across a period that includes major structural shocks, suggests that the insufficiency of eigenvalue decay is not an artifact of dataset or methodology but a robust feature of the U.S. productive structure.