

**Productivity and Misallocation in
General Equilibrium
by
David Baqaee and Emmanuel Farhi**

**Discussion by
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at the**

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- **VERY GOOD PAPER!**
- **it makes a real contribution to the literature on empirical growth**
- **it operationalizes the dichotomy between *productive* efficiency and *allocative* efficiency in the measurement of aggregate TFP.**
- **I will focus on its historical and intuitive context**

Historical Notes

- The idea of *output per unit total input* – or TFP – predates Solow (1957)
- Solow introduced the aggregate neoclassical production function, with input growth as a movement along the function and TFP as a shift in the function measured by “the residual
- He assumed competitive markets, CRTS, neutral shift in the production function
- These are sufficient conditions. Hulten (1973) shows that they are also necessary

The Role of Prices

- **prices are used to “estimate” marginal products, cost, and utilities**
- **this is important because it means that the underlying output elasticities, which are not directly observable, and be proxied by observable factor shares.**
- **prices and quantities obtained from national income and wealth accounts can be used without the need of econometric modeling and estimation**
- **the Solow approach is thus nonparametric**

Multiple Industries and Outputs

- attention shifted to industries, and thus to multiple outputs and intermediate inputs**
- growth accountants computed residuals for each industry, based on gross output**
- Hulten (1978) paralleled Solow's approach by basing aggregate TFP on the shift in the PPF, and showed that this implied the aggregation weights suggested by Domar (1961)**
- showed that the messy problem of intermediate goods took care of itself**

Baqae and Farhi

- **Extended of the distortion-free “neoclassical” world of perfect competition used in Hulten (1978)**
- **They show that the presence of economic distortions leads to an additional term in the conventional TFP formula**
- **Add another tool to growth analysis tool kit**

Baqae and Farhi Equation (6)

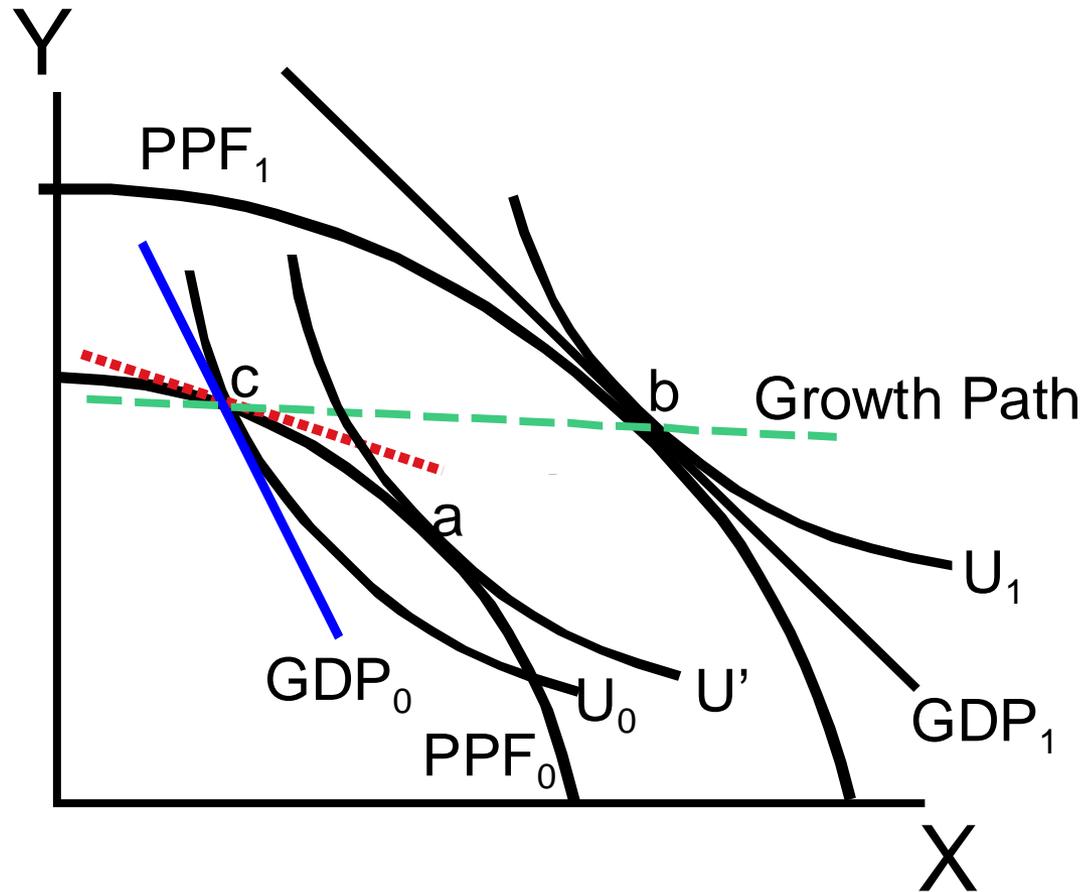
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Proposition 1 (TFP Decomposition)

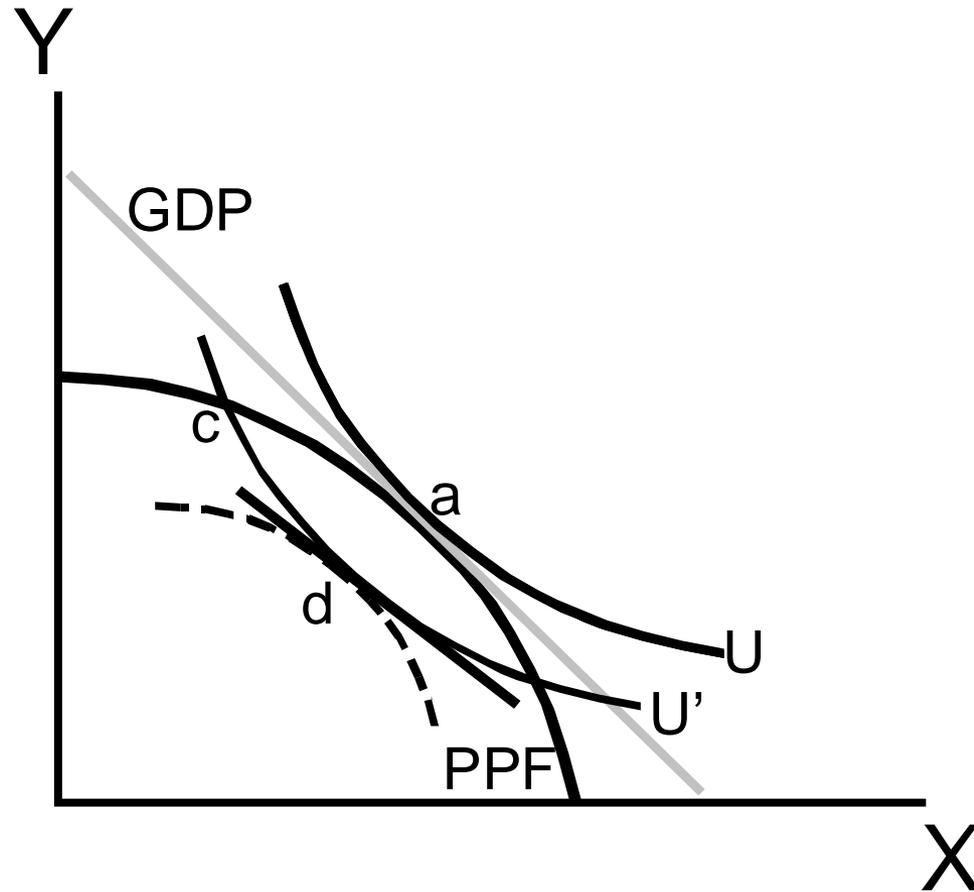
To the first order, we can decompose aggregate TFP as

$$\underbrace{\Delta \log Y_t - \tilde{\Lambda}'_{t-1} \Delta \log L_t}_{\Delta \text{ Aggregate TFP}} \approx \underbrace{\tilde{\lambda}'_{t-1} \Delta \log A_t}_{\Delta \text{ Technology}} - \underbrace{\tilde{\lambda}'_{t-1} \Delta \log \mu_t - \tilde{\Lambda}'_{t-1} \Delta \log \Lambda_t}_{\Delta \text{ Allocative Efficiency}}.$$

Conceptually, economy moves from c to a by removing distortion and from a to b increasing productive efficiency



Another form of distortion



Why is the inefficiency correction important?

Distortions due to taxes, regulations, market power, and other rigidities feature prominently in discussions of slow economic growth and low productivity in many nations (recently in parts of the European Union). Major economic reforms are also a source of growth in countries like Germany, China, and India.

Bringing the allocational dimension into the picture, while preserving much of the existing analytical framework, is a valuable addition to growth analysis.

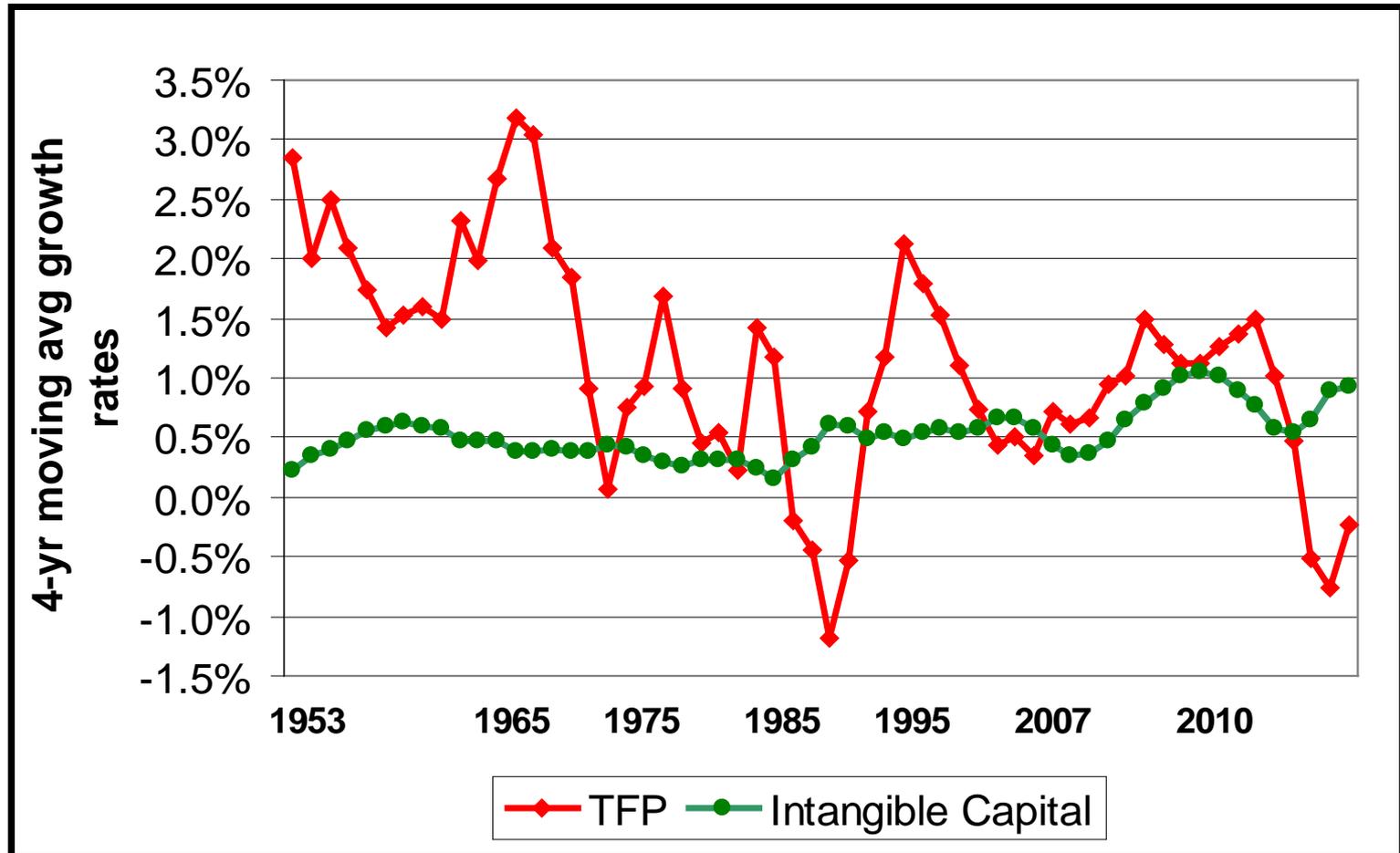
Six Comments and Quibbles

- The distortions and inefficiencies are not readily observable. Requires estimation, imputations, or simulations beyond the non-parametric procedures usually employed in growth accounting.
- Are there forms of inefficiency and distortion that can't be handled within the framework?
- The distortions captured by the allocative efficiency term refer to a departure from the Pareto efficient point of the PPF. *Distortions that affect the growth path are not included* (distortions in the rate of capital formation or adoption of new technologies). These dynamic distortions may have a larger cumulative impact over time.

Six Comments and Quibbles

- The allocative efficiency effect is bounded by the Pareto efficient point on the PPF. Dynamic distortions exact a cumulative gap that is bounded by the maximal potential *increase* in productive efficiency.
- The outward shift in the PPF (undistorted) is *not* the same as technical innovation in best-practice technology. TFP measures, at most, costless component of technical change (spillovers).
- Abramovitz (1956) called the residual the “measure of our ignorance”. Baqaee and Farhi have reduced this ignorance, a very welcome contribution, but there are still other factors like measurement error

Growth Rates of TFP and Intangible Capital per Worker, U.S. NFB, 1953-2010



Source: Data underlying Corrado and Hulten (2010, 2014)