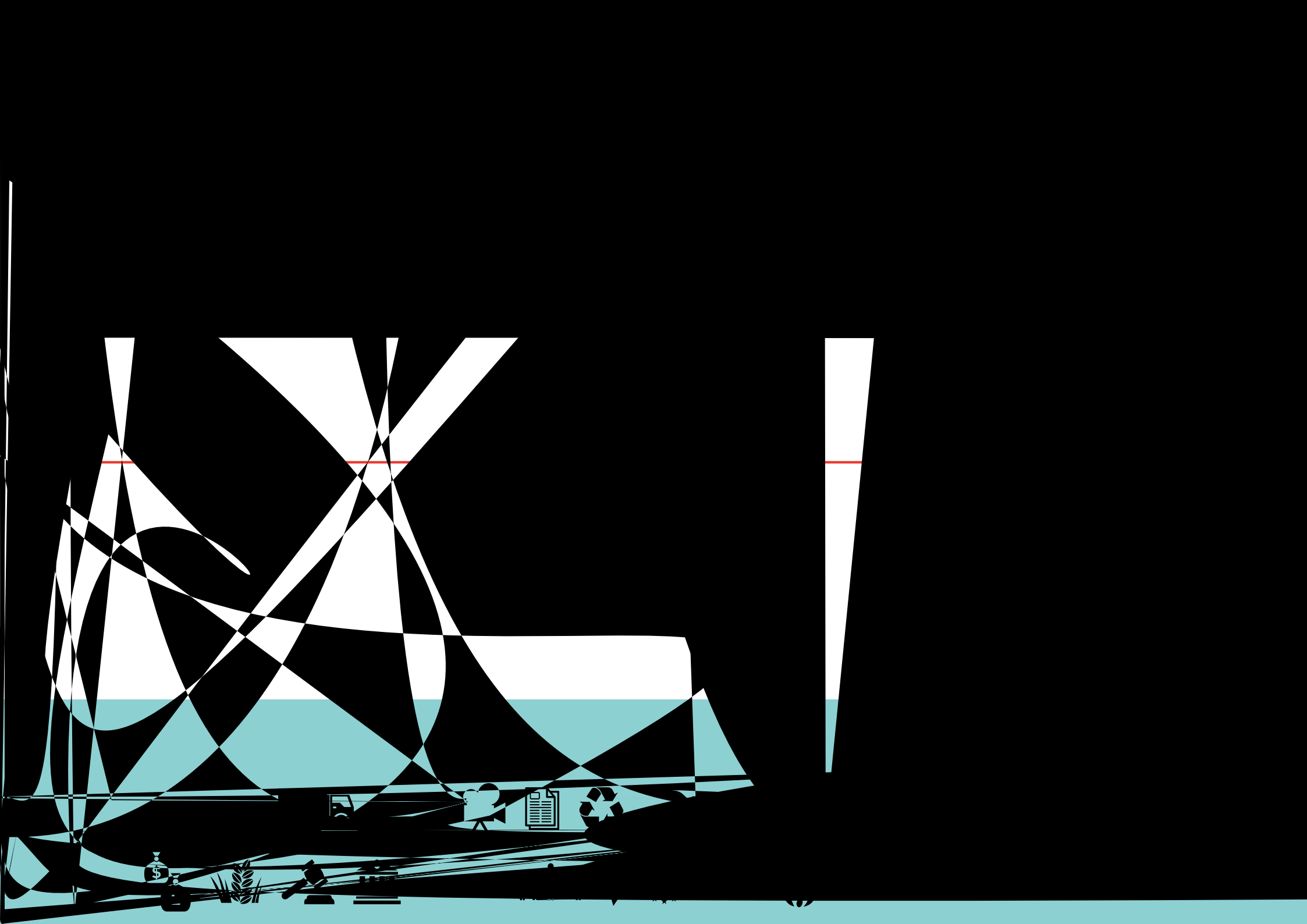
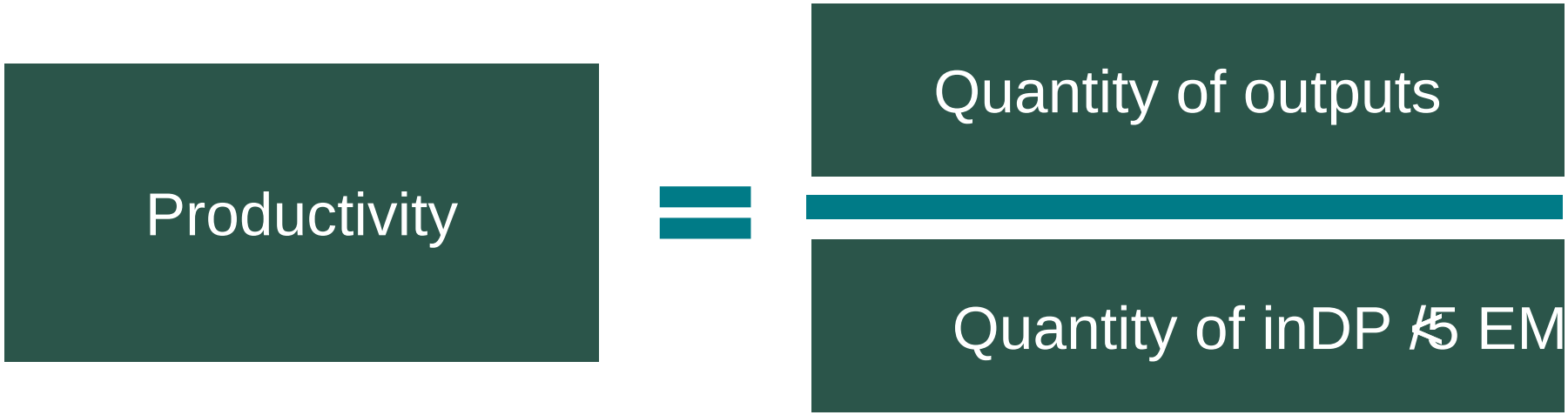


Total factor productivity is the most common measure of growth in productivity and efficiency

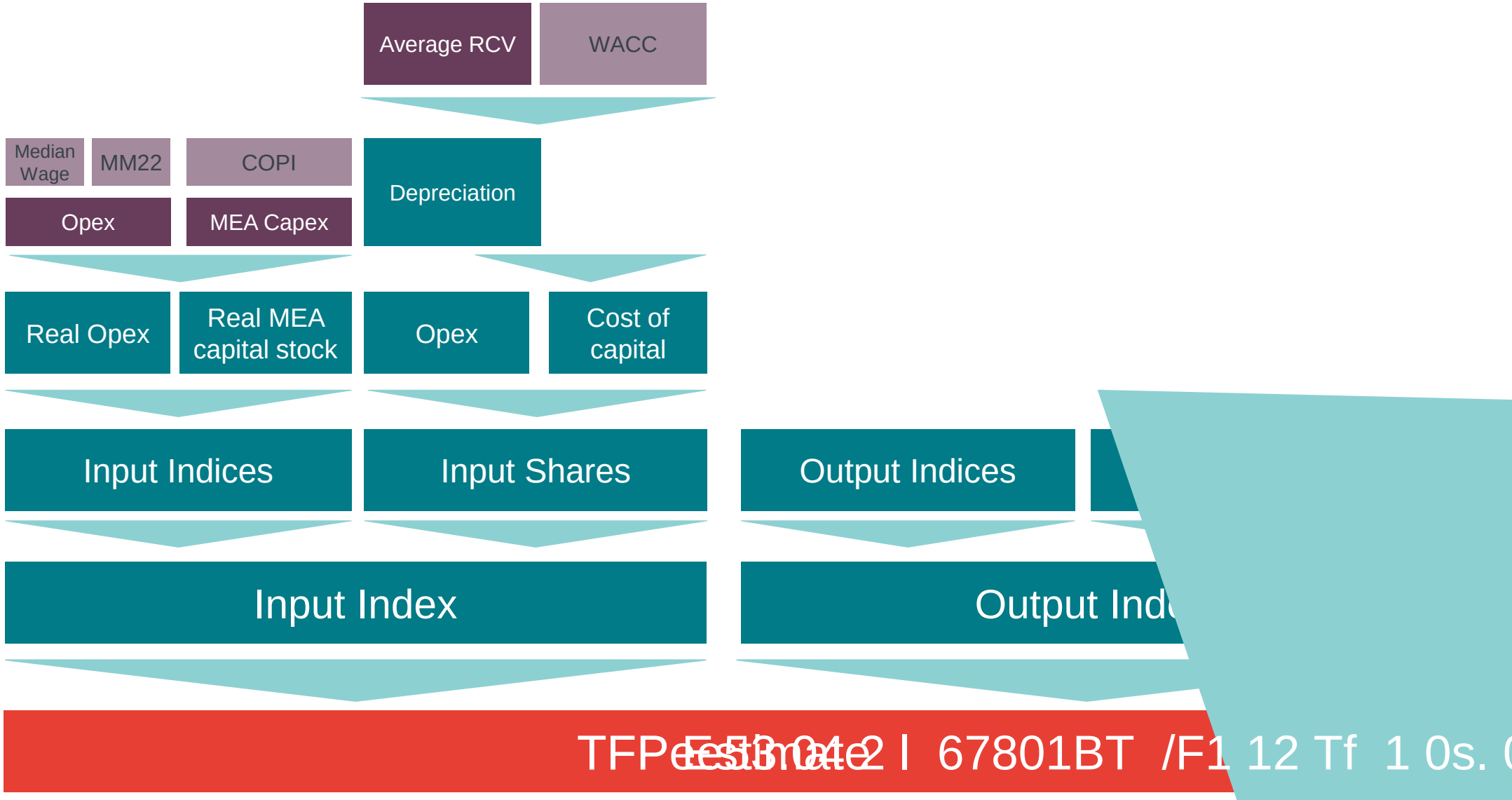


Measuring TFP using the Tornqvist index

Assumptions

- Constant returns to scale
- That inputs are paid the value

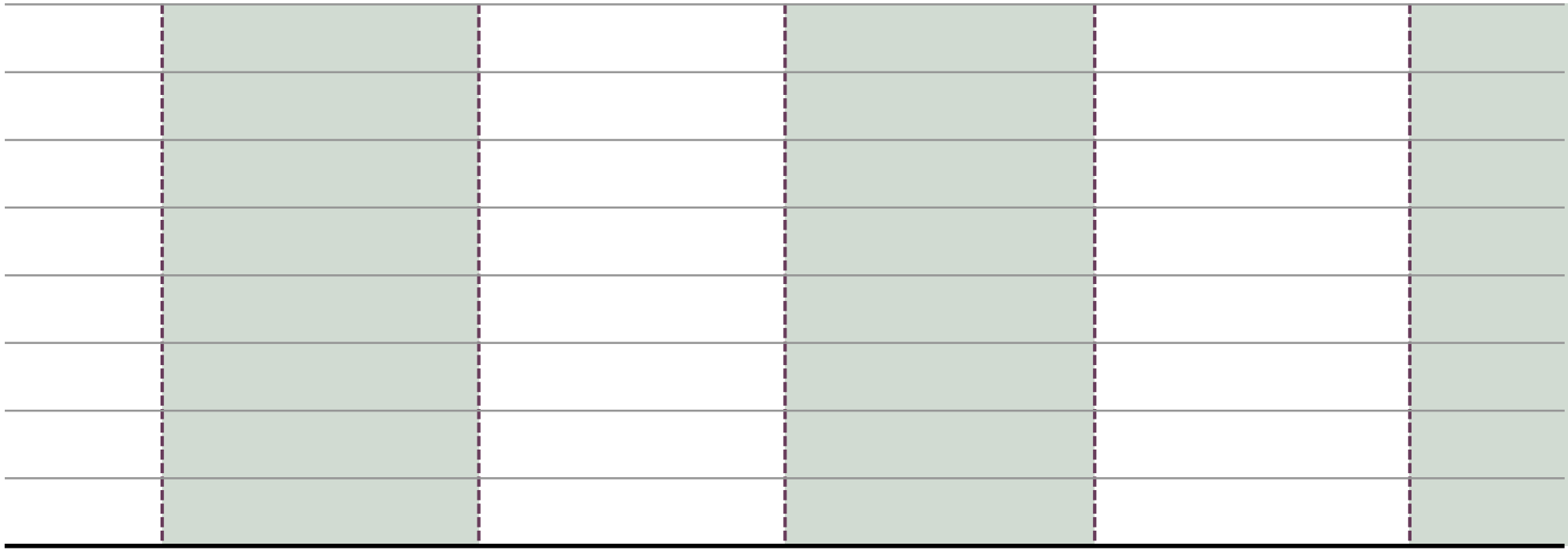
We applied a simplified version of Saal & Parker (2001) separating outputs into water and sewerage, and costs into opex and capex



Average annual quality-

This corresponds to cumulative quality-adjusted growth of 64% since 1993 (27% with no quality adjustment)

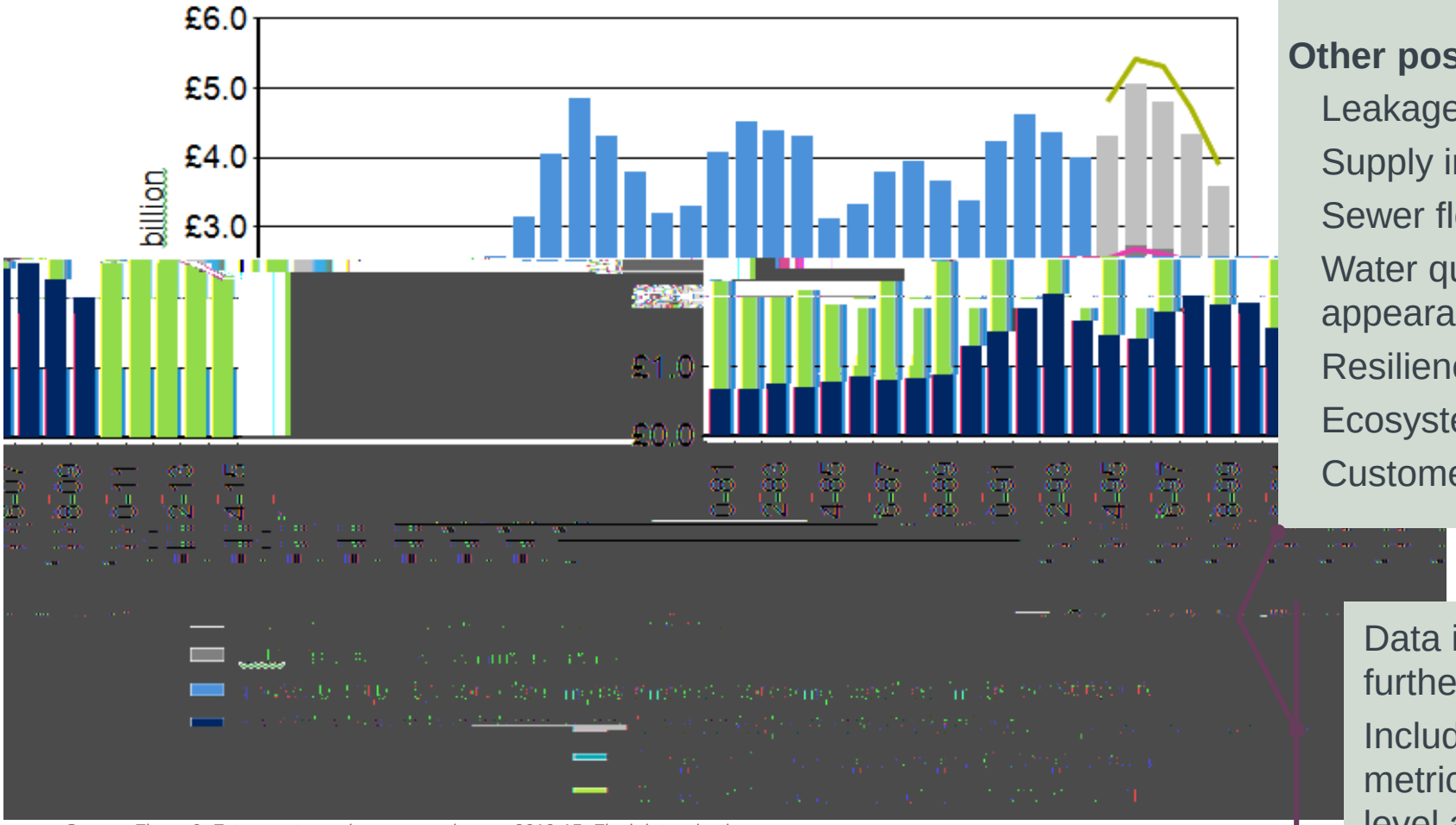
Cumulative TFP growth, 1993-2017



Source: Figure 3, Productivity improvement in the water and sewerage industry in England since privatisation

Expenditure on enhancement has not slowed by the extent that our quality measure indicates

Actual and projected capital investment 1981-2015 – Ofwat figures



Source: Figure 9, Future water and sewerage charges 2010-15: Final determinations

Other possible quality metrics

- Leakage
- Supply interruptions
- Sewer flooding
- Water quality (taste & appearance)
- Resilience metrics
- Ecosystems & habitats
- Customer service

Data issues with including further metrics.

Including other quality metrics would influence level and profile of TFP growth.

Productivity performance in comparator sectors

Choice of comparator UK sectors

Sectors chosen based on similarities of activities, inputs and regulatory environment.

Utilities, transport, chemicals, construction, motor vehicles, post &

frontier economics