Recent Trends in Firm-Level Total Factor Productivity in the United Kingdom: New Measures, New Puzzles

This paper examines the productivity performance of the UK economy since the financial crisis and addresses the challenges associated with estimating total factor productivity using revenue data. Consistent and unbiased TFP measures are essential to better understanding the productivity slowdown in the UK since 2008.

The UK's productivity puzzle

By the end of 2019, nearly eleven years after the financial crisis, aggregate labour productivity in the UK was about a fifth lower than if the 1990-2007 trend had continued, according to the Office for National Statistics.

The slowdown has been more pronounced in the UK than in other OECD economies. To explain this pattern, a number of researchers have found that the productivity puzzle can in large part be accounted for by productivity growth slowdowns in certain sectors: parts of manufacturing, information and telecommunications (ICT), electricity, transportation, and finance.

Other research noted the increasing heterogeneity - or diversity - among UK firms' productivity performance, in areas such as size, use of digital technology, R&D performance and export intensity. This suggests that the UK productivity puzzle post-2008 must combine firm-level evidence with sectoral insights, helping to obtain a consistent picture of the sources that drive productivity differences between firms.

The study

This paper uses data on output revenue and input expenditures to develop a new estimation framework that derives quality-adjusted TFP, known as TFPQ.

This new methodological framework incorporates deflated industry revenue into a firm-level revenue function. By allowing quality changes to influence firm-level demand, the resulting measure of total factor productivity combines both product quality and technical efficiency components.

This paper applies the Blundell-Bond System GMM estimator framework to micro data from two key sectors in the UK economy - manufacturing and ICT - covering the period 2008 to 2019.

Total Factor Productivity (TFP)

This is a measure of economic performance which examines the overall efficiency with which labour and capital inputs are used together in the production process. TFP, also known as Multi-Factor Productivity, is part of GDP growth that cannot be explained by changes in labour and capital inputs. The TFP growth framework can be derived by performing a regression analysis for gross output or value added based on inputs. By extracting the residual (as TFP) from the regression, it implies that productivity growth can occur through TFP, accounting for multiple inputs in the production process. The Office for National Statistics has been publishing experimental statistics for the UK at the market sector (aggregate) level for a considerable time. Please see the ONS website for more details.

To read more about the research synthesised in this Executive Summary, please read *Recent Trends in Firm-Level Total Factor Productivity in the United Kingdom: New Measures, New Puzzles* Working Paper 036, The Productivity Insitute by Diane Coyle, John McHale, Ioannis Bournakis and Jen-Chung Mei

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Manufacturing

The estimates from the analytical framework reveal that within-firm changes in manufacturing are the primary drivers of the UK productivity slowdown for 2008-2019. The findings indicate a consistent decline in revenue-weighted within-firm quality-adjusted total factor productivity for the manufacturing sector, driven further by adverse reallocation effects. Annual firm-level TFPQ fell for a majority of firms, leading to a more than 10 percent decline in the within-firm measure of TFPQ at the industry level over the sample period. Adverse reallocation effects, including allowance for firm entry and exit, reinforced these within-firm declines

ICT

In contrast, the ICT sector grew over the period 2008-19, experiencing a small decline in within-firm TFPQ, which is more than compensated by favourable reallocation effects.

Findings

By shedding light on the factors influencing productivity in these sectors, this study provides valuable insights into the disappointing productivity performance of the UK economy following the financial crisis.

We find that removing 'zombie' firms does not alter the findings, nor do the results differ substantially by ownership status – domestically-owned, foreign-acquired or foreign-owned – in both sectors. These results generally hold under the assumption of constant returns to scale and when considering a fixed component in labour costs.

A limitation of the present study is that the modelling framework assumes a closed economy. While the data does include revenues from the exports of UK firms, we do not observe the share of revenue from exports as well as the share of imports expenditure.

One plausible explanation for our within-firm TFPQ is that UK companies may be struggling to compete in terms of quality with international counterparts.

Given the importance of this finding for social welfare and prosperity, the investigation of the issue is a priority for future work. This would focus on understanding the drivers of TFPQ performance, such as the adoption of digital technologies and the relevance of foreign ownership; and the evolution of price markups in UK firms and their associated impact in the observed productivity slowdown of specific sectors.

These findings can inform policymakers and industry stakeholders in their efforts to address productivity challenges and promote economic growth.

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