The Impact of Biochemical Oxygen Demand Emissions on Malaysia’s Manufacturing Productivity Growth

ELSADIG MUSA AHMED
Faculty of Business and Law, Multimedia University, Melaka, Malaysia

ABSTRACT This study examines the impact of organic water pollutant biochemical oxygen demand (BOD) emissions on Malaysia’s manufacturing sector productivity growth and the factors that determine its growth. Exclusion of externalities such as BOD pollutant emissions created a deficiency in growth accounting models as those BOD pollutant emissions were internalized in order to calculate the green total factor productivity (TFP). The results show a slowdown in the contribution of TFP growth and a negative impact of BOD pollutant emissions produced by the sector on productivity growth in general and TFP growth in particular in comparison with other productivity indicators of the sector.

KEY WORDS: Malaysia, biochemical oxygen demand (BOD), economic impact, manufacturing, green total factor productivity (TFP)

Introduction
The transformation of Malaysia’s economic structure from that led by import substitution in the early 1960s to the export-orientation towards the second half of the 1980s was responsible for spurring the growth of the manufacturing sector. The manufacturing sector’s share of total gross domestic product (GDP) rose from less than 10% in the early 1960s to 26% three decades later. The manufacturing output growth declined by 4.9% between 1981/1985 due to stiff competition and excess supply of electrical and electronics component parts which dominated that sector, and the onset of recession in 1985. However, it recovered in 1986 and recorded an average growth of 12.6% per annum from 1986–1989. The period of the early 1990s continued to see a steady growth in manufacturing output culminating in an average of 14.5% annual growth in 1995 and 12.5% in 1997. Nevertheless, 1998 marked a drastic decline in manufacturing output by 5.8%. This was mainly due to the financial crises in the East Asian region that lowered sales, depressed domestic demand and increased global competition (Economic Report, 1980–2002).

Efforts were made by the Government to reduce Malaysia’s dependence on primary exports and to increase foreign earnings through exports of manufactured...
goods. The manufacturing sector became the engine of growth in the Malaysian economy taking over from the agricultural sector since the structural transformation took place in the Malaysian economy in 1987.

As the Malaysian economy continues to face the challenges brought about by the dynamics of globalization, it has to be more resilient and competitive. To achieve this, economic fundamentals have been strengthened with the emphasis on the productivity and quality driven growth strategies that enhanced efficiency in the utilization and management of productive resources. In this context, the enhancement of total factor productivity (TFP) is imperative (National Productivity Corporation, 1994–2001).

The sustainability of higher economic growth is likely to continue to be productivity-driven through the enhancement of TFP. Such enhancement needs to put an emphasis on the quality of workforce, demand intensity, economic restructuring, capital structure, technical progress and environmental standards. In the Seventh Malaysia Plan (1996–2000), approximately RM 1.9 billion was allocated in the Government’s development budget for the improvement and protection of the environment as well as to conserve and promote sustainable resource use.

It was found that industrial activities were the major source of heavy metal pollution in the rivers based on questionnaires returned in 1998, a total of 5498 agro-based and manufacturing industries were identified. Out of the 16 types of manufacturing industries, the dominant industrial types were food and beverage industries with 1158 constituting 21.1% of the total number, followed by chemical-based industry, 638 (11.6%), electronic and electrical industries, 452 (8.2%) electroplating and metal finishing industries, 433 (7.9%), paper industry, 409 (7.4%) and textile industry, 387 (7.0%), (Environmental Quality, 1998).

This study attempts to close the gap of the divisia translog index approach that was developed by Jorgenson et al. (1987). Their study did not include the explicit specification of a production function that created a major drawback in other studies of Tham (1995, 1997), and Choong and Tham (1995) in Malaysian manufacturing sector productivity growth. Those studies were not based on statistical theory and, hence statistical models cannot by applied to evaluate their reliability, thus casting doubts on their results. The current study suggests closing this gap by providing statistical analysis in the first step of the estimation and in the second step plugging the parameters of the variables into the model of the earlier mentioned divisia translog index. This approach enables us to calculate the growth rates of productivity indicators including the calculation of the residual of the model (i.e. TFP growth) and output growth.

Economists are interested in intensive growth, which is expressed in the form of growth in output per worker (labour productivity). Moreover, an economy’s standard of living is not determined by its total output but by the amount of output available per person as stated by many economists such as Dollar and Sokoloff (1990). Our study also uses the second model in addition to the first one which was used in previous studies, in order to decompose labour productivity growth into contributions of capital deepening, increased usage of materials input per unit of labour, and the simultaneous contribution of the quality of these factors expressed as the TFP per unit of labour (intensity) growth.

Furthermore, the most obvious deficiency in the growth accounting models used in previous studies was found to be the exclusion of externalities such as BOD pollutant