

# Perspiration versus inspiration: Lessons from a rapidly developing economy

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## Abstract

The ‘perspiration versus inspiration’ debate is revisited by studying the Malaysian manufacturing sector. Estimating a stochastic production frontier model using a new panel data set of Malaysia’s 26 three-digit manufacturing industries from 1970 to 2002, the study confirms previous findings that inspiration in the form of total factor productivity growth is lacking while perspiration in the form of factor accumulation is driving manufacturing output. But more importantly, the causal links between perspiration and inspiration, and how it is related to total factor productivity growth, technical efficiency and technological progress are discussed. This provides the basis to evaluate current policies and suggest how they can be made effective in sustaining growth in the Malaysian manufacturing sector.

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## 1. Introduction

Since the mid-1990s, there has been a proliferation of studies analysing the success as well as casting doubt on the sustainability of growth in the East Asian miracle economies. In particular, the GDP growth of these economies was found to be driven by the perspiration factor of input accumulation rather than the inspiration factor of total factor productivity (TFP) growth. While this raised concern regarding the continued growth of these economies, new endogenous growth theories have been useful in explaining these countries’ ongoing success despite their setback due to the 1997/1998 Asian financial crisis. It is thus timely to revisit the issue of perspiration versus

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inspiration, and discuss the policy implications for sustaining growth in rapidly developing second-tier newly industrialising economies aspiring to join the miracle economies.<sup>1</sup>

The Malaysian experience is used as a case study given its strong performance of an annual average real GDP growth of at least 5% over the 1970–2002 period. The economy has also rapidly transformed from a natural resource-based economy in the 1970s to having a capital-intensive manufacturing sector contributing about 30% of its GDP. As the manufacturing sector is one of the key engines of growth in the Malaysian economy, the growth performance of this sector is closely examined to answer the following questions. What is the role of perspiration and inspiration in driving manufacturing sector growth? What causal links exist between perspiration and inspiration and how are they related to TFP growth, technological progress and technical efficiency in this sector?<sup>2</sup> What implications do these findings have on the current policies pursued in Malaysia? Where does Malaysia go from here? This type of analysis has wide relevance and provides valuable lessons for countries on a similar path in their economic development.

In addition, this paper is different from previous studies that have investigated the productivity growth performance of Malaysia's manufacturing industries in more ways than one. Firstly, this is the first attempt to use the United Nations Industrial Development Organisation (UNIDO) database which provides three-digit manufacturing industry-level data from 1970 to 2002. All earlier studies used data from 1980 to 1997 published by the Department of Statistics in Malaysia. The longer time series used here allows a better understanding of the long-term productivity growth trend.

Second, with the exception of Ibrahim (1997), World Bank (1997) and Mahadevan (2001) who estimated a stochastic production frontier, all studies on the productivity growth of Malaysian manufacturing sector used the Tornqvist index approach instead.<sup>3</sup> The latter approach ignores the concept of technical inefficiency by unrealistically assuming that all industries are technically efficient and inaccurately interprets technological progress as TFP growth.<sup>4</sup> While Ibrahim (1997) and the World Bank (1997) compute only technical efficiency estimates, Mahadevan (2001) estimates TFP growth, technological progress (TP) and technical efficiency (TE).<sup>5</sup>

This study extends the time period analysed in Mahadevan (2001), allows for heterogeneity in the manufacturing industries by the estimation of industry-specific input shares and uses the gross output measure as opposed to the value added measure in Mahadevan (2001). The former output measure explicitly considers and measures the contribution of intermediate inputs, which is an important component in Malaysian manufacturing.<sup>6</sup> In addition, the relationship between

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<sup>1</sup> These economies comprising Singapore, South Korea, Taiwan and Hong Kong are also referred to as first-tier newly industrialising economies.

<sup>2</sup> Although earlier studies interpreted inspiration to mean TFP growth, their empirical methodology based on the non-frontier approach ignored technical efficiency and considered technological progress as the only source of TFP growth.

<sup>3</sup> While the World Bank (1997) study used data on 2200 manufacturing firms, Ibrahim (1997) and Mahadevan (2001) used three-digit manufacturing industry-level data.

<sup>4</sup> Nishimizu and Page (1982) explain that TFP growth is made up of technological progress as well as gains in technical efficiency.

<sup>5</sup> Technological progress results from advanced technology embodied in capital and is represented by outward shifts in the production frontier over time. Increased technical efficiency on the other hand results from the more efficient use of technology and inputs (due to the accumulation of knowledge in the learning-by-doing process, diffusion of new technology, improved managerial practice, etc.) and is represented by movements towards the production frontier.

<sup>6</sup> The ratio of the value of intermediate inputs to GDP (in nominal terms) in Malaysia has been as high as 0.8 on average since 1995.

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