

The Changes of Productivity, Profitability, and Operation Performance of High-Technology Firms: Case Study on IC Design Industry in Taiwan

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Abstract

This study aims to investigate the changes of productivity and profitability of Taiwan's IC design industry. This study further analyzes, through the performance-matrix method, if IC design firms can give dual attention to both productivity and profitability. First of all, this study employs panel data from 42 firms from 2002 to 2006 and develops empirical models, proposed by Färe, Grosskopf, Lindgren, & Roos (FGLR, 1989), to calculate the Malmquist index for evaluating the productivity of IC design industry. In addition, the rates for Return-On-Invested-Capital (ROIC) are showed for evaluating the profitability. Finally, this study proposes a performance-matrix, integrated by Malmquist index and ROIC rate, to value changes of both productivity and profitability of Taiwan's IC design firms. The empirical results show that, firstly, besides 2004, the performance of productivity shows improvement, but the profitability fluctuated from 2002 to 2006. Secondly, the performance-matrix shows four types of IC design firms in Taiwan as follows, good productivity and profitability, getting better, unstable, and bad productivity and profitability. The administrative abilities, including both productivity and profitability, of Taiwan's IC design firms are getting better.

Keywords: IC Design Industry, Productivity, Profitability, DEA, ROIC

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高科技廠商的生產效率、獲利能力與經營績效變遷：以台灣 IC 設計產業為例

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摘要

本文之研究目的在於分析台灣 IC 設計產業的生產效率與獲利能力變遷情況，並進一步以經營績效矩陣去探討台灣 IC 設計廠商是否能兼顧生產效率與獲利能力。本研究蒐集台灣 42 家上市上櫃 IC 設計廠商在 2002-2006 年的追蹤資料，應用 Färe, Grosskopf, Lindgren, & Roos (FGLR, 1989) 的實證模型來估算台灣 IC 設計產業的 Malmquist 指數，以評估台灣 IC 設計廠商的生產效率。接著，本研究估算 IC 設計廠商的投入資本報酬率(ROIC)以分析其獲利能力。最後，本研究以整合 Malmquist 指數及資本報酬率(ROIC)的經營績效矩陣，檢測台灣 IC 設計廠商獲利能力與生產效率的變動趨勢。本研究發現：(一)除了 2004 年之外，廠商的生產效率皆呈現生產效率進步的現象，而獲利能力在研究期間則呈現上下波動的变化；(二)「經營績效矩陣」顯示台灣 IC 設計廠商可區分為獲利與生產效率俱佳、獲利與生產效率逐步改善、及獲利與生產效率不穩定、及獲利與生產效率不佳等四類廠商，且台灣 IC 設計廠商的整體經營能力已逐步改善。

關鍵字：IC 設計產業、生產效率、獲利能力、資料包括分析法 (DEA)、投入資本報酬率(ROIC)

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