台灣資訊產業產值預測模型之研究

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摘　要

近幾年來，台灣電子資訊等相關高科技產業呈現高度成長，取代八十年代的金融產業成為台灣經濟成長的骨幹。然而高科技產業往往有週期性景氣循環，產品生命週期短，因此產值預測困難。它會影響政府產業政策以及整體環境之投資計畫，以及廠商投資擴廠之決策，對於企業經營的獲利或虧損影響甚巨。

有鑑於此，本文之研究目的則利用時間序列模型中自我迴歸模型(ARIMA) 、向量自我迴歸模型(VAR) 、貝氏向量自我迴歸模型(BVAR)結合產業群聚效應，探討台灣IT產業（光電產業、半導體產業以及電腦製造業）與其他週邊產業彼此之間是否具有長期之均衡關係，將收集10年間的季資料區分為兩部分，第一部分用來建立模型，第二部分則作為預測之比較值。

結果發現，在三個產業的模型驗證中均呈現VAR的表現較差，其次為AR，而BVAR則是驗證模型中最好的，證明BVAR模型可以用於少樣本的時間序列與動態預測中。而跟其他研究機構比較結果如下(1)與IT RI的產業報告比較半導體產業：BVAR模型不論在1998年以及2001年產業大幅成長衰退時預測均較ITRI精準。(2)與III的產業報告比較電腦製造產業：BVAR模型預測較III精準。

關鍵字：貝氏向量迴規模型、冪轉換、半導體產業、光電產業, 電腦製造業、產業群聚

Production Forecasting of Taiwan's IT Industries: Bayesian Vector Autoregressive Approaches

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Abstract

The production forecasting of high technology industries is an important issue for entrepreneurs and governments, but it suffers from the situation of fast growth and frequent fluctuation. In this article, we propose a forecasting method that combines the clustering effect, different transformation of data, and non-informative diffuse-prior Bayesian vector autoregression (DBVAR) model to forecast the productions of technology industries. The BVAR model possesses the superiority of Bayesian statistics in small sample forecasting and holds the dynamic property of VAR (Vector autoregression) model. Three industries are examined to verify the proposed method. The subjects are: (1) Using Four Forecasting Models to Forecast of Total Production Output of Taiwan's Photonic Industry, (2) Using Four Forecasting Models to Forecast of Total Production Output of Taiwan's Semiconductor Industry, (3) Using Four Forecasting Models to Forecast of Total Production Output of Taiwan's Computer Manufacturing Industry. It is found that the DBVAR models outperform the other three conventional time series models including the autoregression (AR), vector autoregression (VAR), and Litterman Bayesian VAR (LBVAR) models. Moreover, the DBVAR models also could exactly find the inflection point of the trend and give a promising forecasting. Our forecasting method is therefore concluded as a feasible approach for production prediction, especially for technology industries in volatile environment.

Keywords: **Bayesian Vector autoregressive, power transformation semiconductor, photonics, computer manufacturing, industrial clusters**

誌　謝

在交通大學已歷經了十年的光陰，在這 3650 個日子裏有歡笑、有辛苦也有悲傷，從 85 年 7 月就讀了統計研究所，所長李昭勝教授以及周幼珍副教授在研一至博三的求學過程中給予我許多的指導，尤其以周幼珍副教授在我心情低落的時候扮演了媽媽的角色，給予我許多的安慰。時間回溯至 6 年前，一次偶然的際遇中讓我踏進了管理的領域，那時的我正在思考拿到了統計所的博士出來能夠做些什麼，似乎只能教書而已吧，在我同學戴允強的的鼓勵下讓我毅然決然的放棄攻讀統計所的博士學位，到了科技管理研究所修習輔所，也由於到了該所讓我深刻體驗到統計能夠發揮的地方。剛開始接觸了新的領域讓我非常的慌恐，所幸學弟許博炫、游朝成等以及學妹郭佩蓁的幫助下，讓我成長了許多，從他們的身上學習許多的東西，讓我體驗到管理的偉大之處，兩年後我便考上了科技管理研究所的博士班。在博士班的求學階段，學長李宗耀、吳念祖、朱克聰、同學張世其、曹嘉倩、學弟賴賢哲以及學妹陳筱琪相互扶持之下，讓我更茁壯對管理有更深一層認識。當然不可或缺的兩位老師就是徐作聖教授—它是我第一個在管理領域中接觸的啟蒙老師，當時位居所長的他，與學生接觸最為頻繁，豪爽的性格最讓我欣賞，其次，就是我的指導教授—虞孝成教授，它給予了我許多揮灑的空間，從不限制我一定要作哪方面的研究，我能夠順利畢業對於這兩位恩師則銘感五內。最後終於順利的畢業了。

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