經濟預測方法與應用 研討會

時　　間：2019 年 7 月 26 日 (星期五)
地　　點：中央研究院經濟研究所

主辦單位：中央研究院經濟研究所、國立臺灣大學經濟學系
合辦單位：台灣經濟學會、臺灣經濟計量學會
研討會網址 http://www.econ.sinica.edu.tw/MAEF2019

8:30-	**報到**	**B 棟大廳**

8:55-9:00 　**開幕致詞**　簡錦漢所長 (中央研究院經濟研究所)

9:00-10:30　**場次 A**　**Model Selection and Average**
主　席：陳宜廷(中央研究院經濟研究所)

Model Selection in Utility-Maximizing Binary Prediction
*Jiun-Hua Su(蘇俊華, 中央研究院經濟研究所)

Model Averaging for Optimal Combined Forecast
Yi-Ting Chen, *Chu-An Liu(劉祝安, 中央研究院經濟研究所)

An Attention Algorithm for Solving Large Scale Structured l_0-norm Penalized Estimation Problems
*Tso-Jung Yen(顏佐榕, 中央研究院統計科學研究所), Yu-Min Yen

10:30-10:45 茶敘

10:45-12:15　**場次 B**　**Economic Indices**
主　席：王泓仁(國立臺灣大學經濟學系)

再探臺灣金融情勢指數
*黃裕烈(國立清華大學計量財務金融學系)

A Smooth Measure for Business Conditions
*Yi-Ting Chen(陳宜廷, 中央研究院經濟研究所)

~~*Forward Looking Anticipation and Monitoring Applications with Non-Causal Time Series Models*　Ruey Tsay, *Jin-Huei Yeh(葉錦徽, 國立中央大學財務金融學系)~~
定期定額的迷思與自選優化—靜態預期的觀點
*葉錦徽(國立中央大學財務金融學系), 黃鵡, 宋學鳳

12:15-14:00　大合照 暨 午餐

14:00-15:30　場次　C　Financial Forecast

主　席：簡錦漢(中央研究院經濟研究所)

Forecasting Expected Shortfall and Value-at-Risk with the FZ Loss and Realized Variance Measures

Ray Yeutien Chou, Tso-Jung Yen , *Yu-Min Yen(顏佑銘, 國立政治大學國際經營與貿易學系)

Quantile Forecasting Based on a Multivariate Hysteretic Autoregressive Model with GARCH Errors and Time-Varying Correlations

*Cathy W.S. Chen(陳婉淑, 逢甲大學統計學系), Than-Thi Hong, Mike K.P. So, Songsak Sriboonchitta

匯率階層式因子模型之建構與預測績效評析

*徐士勛(國立政治大學經濟學系), 徐之強, 黃裕烈, 管中閔, 何耕宇

15:30-15:45　茶敘

15:45-17:15　場次　D　Macroeconomic Impacts

主　席：陳旭昇(國立臺灣大學經濟學系)

A Shift from Pay-as-You-Go to the Individual Retirement Accounts: in the Case of Taiwan

*Hsuan-Chih (Luke) Lin(林軒馳, 中央研究院經濟研究所), Atsuko Tanaka, Po-Shyan Wu

Understanding the Macroeconomic Impact of Illiquidity Shocks in the US

*Yu-Hsi Chou(周有熙, 國立臺灣師範大學公民教育與活動領導學系), Chia-Yi Yen

Long-Term Macroeconomic Effects of Climate Change: A Cross-Country Analysis

Matthew E. Kahn, Kamiar Mohaddes, Ryan N. C. Ng, M. Hashem Pesaran, Mehdi Raissi, *Jui-Chung Yang(楊睿中, 國立清華大學經濟學系)

18:00-　　　晚宴　(invited only)

每篇文章 30 分鐘(報告 25 分鐘，現場提問討論 5 分鐘)

Model Selection in Utility-Maximizing Binary Prediction

Jiun-Hua Su[*]

Institute of Economics
Academia Sinica

February 28, 2019

Abstract

The semiparametric maximum utility estimation proposed by Elliott and Lieli (2013) can be viewed as cost-sensitive binary classification; thus, its in-sample overfitting issue is similar to that of perceptron learning in the machine learning literature. Based on structural risk minimization, a utility-maximizing prediction rule (UMPR) is constructed to alleviate the in-sample overfitting of the maximum utility estimation. We establish non-asymptotic upper bounds on the difference between the maximal expected utility and the generalized expected utility of the UMPR. Simulation results show that the UMPR with an appropriate data-dependent penalty outweighs some common estimators in binary classification if the conditional probability of the binary outcome is misspecified, or a decision maker's preference is ignored.

Keywords: Decision-based binary prediction, Maximum utility estimation, Model selection, Structural risk minimization, Perceptron learning

JEL Classification: C14, C45, C52, C53

Model Averaging for Optimal Combined Forecast

Yi-Ting Chen

Chu-An Liu

Abstract

We propose a new model-averaging method for constructing a sequence of optimal combined forecasts, in which the optimality is defined by minimizing a normalized asymptotic mean squared forecast error (AMSFE) of an arbitrary convex combination of the forecast sequences generated by a set of locally misspecified predictive regressions. Compared to existing model-averaging methods for once-for-all optimal combined forecasts, our method accounts for the fact that the AMSFE is dependent on the in-sample estimation method, such as the fixed (rolling) or recursive scheme, being used and relied on the asymptotic ratio of the length of the forecast sequence over the sample size for the first in-sample estimation. Monte Carlo simulations show that our proposed method compares favorably with existing once-for-all model-averaging methods.

An attention algorithm for solving large scale structured l_0-norm penalized estimation problems

Tso-Jung Yen[a] and Yu-Min Yen[b]

[a]*Institute of Statistical Science, Academia Sinica, Taiwan,* [b]*Department of International Business, National Chengchi University, Taiwan*

Technology advances have enabled researchers to collect large amounts of data with lots of covariates. Because of the high volume (large n) and high variety (large p) properties, model estimation with such kind of big data has posed great challenges for statisticians. In this paper we focus on the algorithmic aspect of these challenges. We propose a numerical procedure for solving large scale regression estimation problems involving a structured l_0-norm penalty function. This numerical procedure blends the ideas of randomization, blockwise coordinate descent algorithms, and a closed form representation of the proximal operator of the structured l_0-norm penalty function. In particular, it adopts an "attention" mechanism that exploits the residual errors to build a sampling distribution for picking up regression coefficients for updates. Simulation study shows the proposed numerical procedure is competitive to the benchmark algorithm for sparse estimation in terms of runtime and statistical accuracy when both the sample size and the number of covariates become large.

Yen, T.-J. and Yen, Y.-M. (2018). An attention algorithm for solving large scale structured l_0-norm penalized estimation problems (submitted).

再探臺灣金融情勢指數

黃裕烈

清華大學計量財務金融系

摘要

本文主要依循 Federal Reserve Bank of Chicago 以及管中閔等人 (2014) 的做法，從 3,752 筆跟臺灣財經相關的變數中以人工方式篩選出 404 筆變數，再過濾掉資料異常 (如遺漏值/資料變化異常或無法計算成長率/資料均為固定值) 情況，最後選取 267 筆資料來進行分析；資料期間為 2003 年 1 月至 2018 年 12 月，其含概的層面是目前國內文獻中最廣泛的。值得一提的是，利用 Federal Reserve Bank of Chicago 的做法建構指標時，其特性在於資料的分類方式是以 credit/leverage/risk 這三個面向來進行分類，跟國內文獻以市場面向 (如股票/匯率/利率市場) 來區分資料有所不同，因此所建構出的指標也會有些差異。

A Smooth Measure for Business Conditions

Yi-Ting Chen

Abstract

We propose measuring business conditions via estimating a smooth function of time that serves as a common factor explaining the comovement of economic indicators across business cycles. This smooth measure can be easily estimated using mixed-frequency indicators and updated in real time. It is useful for reducing the noises in measuring business conditions and generating a time derivative to characterize the change of business conditions in speed and in direction. We also discuss the estimation and statistical-inference methods, and conduct an empirical study to illustrate the usefulness of this measure in backcasting and nowcasting business conditions.

定期定額的迷思與自選優化─靜態預期的觀點

葉錦徽、黃鶺、宋學鳳

國立中央大學財務金融學系

摘要

因應未來退休基金自選的管理優化，本文以靜態預期觀點重新檢視定期定額投資策略的績效與其可能的改善。在同時考慮持有期間報酬與風險的角度下，我們以理論結果證實定期定額的跨時風險分散效果有限，持有期間理論期望報酬率與風險會隨著扣款期數的增加而遞增，因此定期定額並不適合長期持有。據此，我們進而以持有期間報酬率可能變動區間做為調整加減碼的擇時策略，結合再平衡的概念來優化定期定額長期累積報酬。實證結果發現，融合區間擇時再平衡的策略可以有效地提升單純定期定額的跨時風險分散化的侷限，不僅長期總部位累積報酬較為穩定 (波動風險降低)，並減少負報酬的頻率之外；利用這一套持有期間報酬靜態預期邏輯所得的變動區間，也有助於在橫斷面廣大的可選基金集合中，挑選出真正有經營績效的基金於自選退休投資組合中。

Forecasting Expected Shortfall and Value-at-Risk with the FZ Loss and Realized Variance Measures*

Ray Yeutien Chou[†], Tso-Jung Yen[‡] and Yu-Min Yen[§]

February 13, 2019

PRELIMINARY, COMMENTS WELCOME

Abstract

Value at risk (VaR) and expected shortfall (ES) are two of the most widely used risk measures in finance. In this paper, we use a semiparametric method, together with the realized variance measures, to jointly estimate the two risk measures. The semiparametric method relies on a newly proposed consistent loss function by Fissler and Ziegel (2016). In addition, we also propose a two-stage method to implement the estimations. We estimate various structural models and compare their in-sample estimation and out-of-sample forecast performances with other existing methods. We find our proposed models featuring with realized variance measures as exogenous variables can deliver comparable or even better performances on estimating or forecasting VaR and ES of S&P500 index than the existing methods.

KEYWORDS: Expected shortfall, Forecast, Realized variance measure, Semiparametric estimation, Value-at-risk.
JEL codes: C22, C53, C58, G17.
AMS 2010 Classifications: 91B84, 62M20

Quantile Forecasting Based on a Multivariate Hysteretic Autoregressive Model with GARCH Errors and Time-varying Correlations

Cathy W.S. Chen[1], Hong Than-Thi[1], Mike K.P. So[2], & Songsak Sriboonchitta[3]

[1]Feng Chia University, Taichung, Taiwan
[2]Hong Kong University of Science and Technology, Hong Kong
[3]Chiang Mai University, Chiang Mai, Thailand

To understand and predict chronological dependence in the second-order moments of asset returns, we consider a multivariate hysteretic autoregressive (HAR) model with GARCH specification and time-varying correlations, by providing a new way to describe a nonlinear dynamic structure of the target time series. The hysteresis variable governs the nonlinear dynamics of the proposed model in which the regime switch can be delayed if the hysteresis variable lies in a hysteresis zone. The proposed model combines three useful model components for modeling economic and financial data: (1) the multivariate HAR model, (2) the multivariate hysteretic volatility models, and (3) a dynamic conditional correlation structure. We incorporate an adapted multivariate Student-t innovation based on a scale mixture normal presentation in the HAR model to tolerate for dependence and different shaped innovation components. We carry out multivariate volatilities, Value-at-Risk, and marginal expected shortfall based on a Bayesian sampling scheme through adaptive Markov chain Monte Carlo (MCMC) methods, which allow us to statistically estimate all unknown model parameters and forecasts simultaneously. We illustrate the proposed methods herein by using both simulated and real examples and measure for industry downside tail risk jointly.

匯率階層式因子模型之建構
與預測績效評析 *

徐士勛　　　徐之強　　　黃裕烈　　　管中閔　　　何耕宇

國 立 臺 灣 大 學 計 量 理 論 與 應 用 研 究 中 心

| 政治大學經濟 學系 | 中央大學經濟 學系 | 清華大學計量 財務金融學系 | 臺灣大學財務 金融學系 | 臺灣大學財務 金融學系 |

摘要

針對全球主要 38 個國家貨幣兌美元（含 G10、Asia、CEEMEA 以及 Latin 四大區域）的匯率月資料隔月匯差，我們首先建立了階層式因子模型（Hierarchical Factor Model），試圖將各匯差拆解成分別為受到全球變動、受到區域變動以及自我因素的影響等三大部分，並透過移動窗格（rolling window）與遞迴（recursive）兩大估計方法呈現不同樣本期間中的可能變化趨勢。研究結果大致可發現，G10 國家（除日本外）匯率變動普遍受全球影響較大，而自我變動比例最高的是英國（幾乎佔了一半比例）。Asia 經濟體中，除了中國、香港與越南外，各國匯率變動受到全球與區域影響的變動的總和影響都高於 60% 以上；其中，新加坡幣的自我變動比例（不到 4 ％）是所有 38 個幣別中最低的。CEEMEA 區域國家中，CZ、Hungary、Poland 與 Romania 的幣別變動 6 成以上都受全球波動的影響；相對地，Iceland、Russia、Egypt、Israel 與 Nigeria 則有高達 5 成以上的匯率變動都是該國自我變動所造成。Latin 區域中，除阿根廷外，所有國家的全球與區域影響的變動都高於 65% 以上，顯示此區域國家幣別的特性。至於新台幣兌美元匯率的隔月變動匯差，其受到自身影響的變動比例，從 2001 年的 60% 一路下

滑至近年的 40% 左右。相對地,該匯率變動受到全球影響則逐步上升,2008 年 7 月之後超越區域影響,2015 年 9 月更為新台幣變動的主要變動來源。

之後,我們利用所建構的階層式因子模型估計結果,進一步建立兩個因子對應的預測模型,此兩種模型可視為 Engel, Mark and West(2015, *Econometric Reviews*) 所提出建立在傳統因子模型上的匯率預測模型的延伸。為了驗證與比較這兩類模型的預測能力,我們也將資料分成多段的回測期間,以模擬評估模型的樣本外預測表現。回測過程中,階層式因子模型與兩大預測模型都是以遞迴估計法估計模型中的參數並產生未來多期後的匯率預測值。此外,如同一般文獻,在評析此兩類預測模型對於匯率變動短中長期的預測能力優劣時,我們也以隨機漫步模型(Random Walk Model, RW Model)當作基準模型,該模型對應的預測稱為 No-Change Forecast。在回測期間,我們計算這兩個預測模型與隨機漫步模型預測誤差的標準差(sd)以及各自對應的均方誤差(MSE)。採用至 2018 年 6 月為止的資料,我們比較兩預測模型對 2018 年 6 月之後(樣本外一年)的匯率預測結果。預測績效的結果大致顯示,針對 G10 中的 3 個國家匯率(歐元、英鎊與日圓),模型都預測未來 1 年將會呈現相對升值的走勢。而 Asia 中的人民幣、韓元、新加坡幣以及新台幣,則都相較於 2018 年 5 月時貶值;雖然幅度不一,但人民幣、韓元、新加坡幣以及新台幣的貶值趨勢預測大致符合 2018 年 6 月之後的各匯率實際值走勢。此外,當我們進一步分析所建構的預測模型的估計結果,我們發現歐元、英鎊、人民幣與新加坡幣,其當下自我變動的部分資訊,對於未來的匯率走勢具較強的關連性;區域各因子當下的變動資訊對於這些貨幣未來的走勢預測則幫助不大。相對地,日圓的預測則以當下 G10 的區域因子的波動隱含較多未來匯率走勢的訊息;之後的重要性大小約略是全球因子、Asia 區域因子以及 CEEMEA 區域因子。至於韓元的匯率預測,6 個月內則以全球因子與 Asia 區域因子較為重要;針對未來 6 個月後的匯率預測,Asia 區域因子以及 G10 區域因子所蘊含的訊息在預測的重要性則逐漸增強。最後,關於新台幣匯率的短期預測中,

其自我變動的重要性最高，其次則為全球因子以及 Asia 的區域因子；但 G10 以及 CEEMEA 的區域因子在 6 個月後的新台幣預測則顯現其相對重要性。整體而言，我們認為，全球階層式因子模型的建立，除了可以明辨影響各國匯率變動的來源變化態勢外，針對匯率的短中長期預測，也具有一定的優勢。因此，此研究成果不論對於學術界或實務面而言，應具有一定的參考價值。

A Shift from Pay-as-You-Go to the Individual Retirement Accounts: in the Case of Taiwan

Hsuan-Chih (Luke) Lin   Atsuko Tanaka   Po-Shyan Wu*

April 20, 2019

Abstract

This paper analyzes the effects of replacing the current pay-as-you-go public pension system with the Individual Retirement Accounts (IRA) in Taiwan. To compare the consequences of the transition dynamics, we incorporate the IRA into the general equilibrium life-cycle model of Cheng et al. (2018). By conducting counterfactual analysis with focus on the aging population, we evaluate how the economy benefits from the shift to the IRA system, using various measurements of social welfare. In particular, we look at the welfare implications, changes in the macroeconomic variables (e.g. capital, labor, wages, and GDP), and the intergeneration trade-offs. The calibration exercise shows that among the key determinants for successful pension reform are the magnitude and the timing of the reforms, as well as the individuals' self-insured motives.

Keywords: Pension Reform; Individual Retirement Accounts; Labor Supply; Intensive and Extensive Margins

JEL Classification: E2, E6, H5, J2

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Understanding the Macroeconomic Impact of Illiquidity Shocks in the US

Yu-Hsi Chou, Chia-Yi Yen

In this paper, we empirically investigate the role of stock market illiquidity shocks, stemming from Amihud (2002)'s illiquidity measure, in explaining US macroeconomic fluctuations from 1973 to 2014.

We find that the impact of the illiquidity shocks on economic activity is substantial, and the historical decomposition analysis shows that the cumulative illiquidity shocks were an essential contributor to the prolonged economic slump of the Great Recession.

Moreover, our identified illiquidity shocks represent a distinct source of macroeconomic instability, and the economic significance of the illiquidity shocks is as large as that of other types of shocks in recent studies, such as financial shocks and uncertainty shocks.

This suggests that the illiquidity shocks, measured by the change in stock prices, may contain the information about both the first-moment and second-moment shocks to financial markets.

Long-Term Macroeconomic Effects of Climate Change:

A Cross-Country Analysis

Matthew E. Kahn, Kamiar Mohaddes, Ryan N. C. Ng,
M. Hashem Pesaran, Mehdi Raissi, Jui-Chung Yang

Abstract

We study the long-term impact of climate change on economic activity across countries, using a stochastic growth model where labour productivity is affected by country-specific climate variables—defined as deviations of temperature and precipitation from their historical norms. Using a panel data set of 174 countries over the years 1960 to 2014, we find that per-capita real output growth is adversely affected by persistent changes in the temperature above or below its historical norm, but we do not obtain any statistically significant effects for changes in precipitation. Our counterfactual analysis suggests that a persistent increase in average global temperature by 0.04C per year, in the absence of mitigation policies, reduces world real GDP per capita by 7.22 percent by 2100. On the other hand, abiding by the Paris Agreement, thereby limiting the temperature increase to 0.01C per annum, reduces the loss substantially to 1.07 percent. These effects vary significantly across countries. We also provide supplementary evidence using data on a sample of 48 U.S. states between 1963 and 2016, and show that climate change has a long-lasting adverse impact on real output in various states and economic sectors, and on labour productivity and employment.