ETF5550 Research Project (Semester 2, 2015)

Master of Applied Econometrics (3822)

Master of Applied Finance and Master of Applied Econometrics (4412)

Research Topics

I’d like to advise that each student choose a project and then make an appointment with the supervisor. If both the student and supervisor mutually agree to carry out this project, the student can start research work on this project.

All students should email me their final decisions on project choice by 5pm Friday 31st July.

I’d like to recommend that students have weekly meetings with supervisors. Final presentation will be held during the 13th week.
Modelling Tacit Knowledge and Performance in Teams: A Sporting Example

A major issue in modelling the performance of teams is how the tacit knowledge that team members acquire from working together impacts team performance. However the challenge in any business modelling of this situation is around data on individuals and team performance. In this regard the sports economics literature provides a broad set of publicly available data on performance. This project builds on previous studies that have considered college basketball (Harris, McMahan and Wright, 2012), major league baseball (Shamsie and Mannor, 2013) and American football (Davis et al., 2014). This project will extend this analysis to other sports and involves both data construction and data modelling issues.

References


Fiscal policy in good times and bad

Several researchers have found evidence that fiscal policy in the USA can have a stronger effect on output during recessions than during expansions. This project asks you to re-examine this issue using data relating to Australia or another economy.

This topic would suit a student who is interested in macroeconomics, and who is willing to learn some programming. The student’s background should include some macroeconomics and some multivariate time series analysis (such as that in ECT3450/ETF5345 or ETC4410/ETF5200).

References


Decomposition Modelling Framework: Robust Risk-Return Tradeoff

The literature on the relationship between risk and return has now begun to move away from the linear specification between risk and return posited by Merton (1973). As a result, flexible modelling approaches that do not require the imposition of strong modelling assumptions are now commonly used in estimating the risk-return tradeoff. However, while these approaches allow for more flexible estimates of the risk-return tradeoff, they are generally not robust to changes in the modelling assumptions used in estimating this relationship. The goal of this research is to analyse the robustness of one particular flexible method for risk-return tradeoff estimation: the decomposition approach, which splits excess returns into the product of signs and magnitudes, and jointly models the dynamics of the signs and magnitudes. In particular, inside a simple decomposition framework, this research will nonparametrically analyse the relationship between risk and return and determine the sensitivity of the decomposition approach to different risk proxies, different trading periods, and different assets.

Completion of this project will require knowledge of univariate and multivariate nonparametric regression, and minor knowledge of asset pricing theory. The estimation procedures will be carried out numerically and so familiarity with computing packages, such as, say R or Matlab, will be necessary.

References


*Note: This project can be investigated by multiple students.*
Supervisor: Professor Farshid Vahid  
Department of Econometrics and Business Statistics  
Email: farshid.vahid@monash.edu

Forecasting mortality rates with multiple time series models

It is important and natural to look at some variables by age group. For example, labour force participation rates of 20 year olds, 40 year olds and 60 year olds are different for good reasons, and it is natural to want to monitor the participation rate of each age group separately. Moreover, labour force participation rates are available for all ages. Similarly, mortality rates are naturally different for each age group, and data on mortality rates are available for all ages. For some social and economic policies, forecasts of participation rates and mortality rates are quite important. For example, any analysis of sustainability of a social insurance scheme depends on forecasts of mortality rates.

Reliable post-war time series data on mortality rates for all ages are available for many developed countries. A distinctive characteristic of these data sets is that their cross section dimension (age) is also naturally ordered. The mortality rate of 29 year olds is likely to be very close to that of 30 year olds and less close to that of 50 year olds. Moreover, 29 year olds who survive this year, will be 30 year olds next year, and the fitness of 30 year olds next year is likely to be highly correlated with the fitness of 29 year olds in the current year. This is in contrast to panel or most cross section-time series data sets in which the cross sectional dimension is unordered.

The objective of this project is to explore ways to model this dependence and exploit it for forecasting using simple time series models. The emphasis is in thinking about the nature of dependence and how to incorporate it into simple time series models, rather than adding further complexity to existing mortality models. However, even though the project involves simple time series models, adequate modelling of this kind of dependence will require programming, and you need to know or be willing and interested in learning some computer programming.

References


Estimating Consumer Welfare in the U.S. Airline Markets

The U.S. airline markets have been facing dramatic changes such as alliance, bankruptcy, merger, and the advent of low cost carriers since last few decades. However, due to the complicated market structure of the industry, it is difficult to disentangle the effects of such changes on consumer welfare. Following by the demand estimation method in Berry, Levinsohn and Pakes (1995), this project will study consumer welfare changes in the airline markets. Estimating the market demand and hence consumer welfare is important since the results can provide a rationale to regulate firm behaviors such as mergers. Focusing on the Airline Origin and Destination Survey (DB1B) data before and after Southwest Airlines’ acquisition of AirTran Airways in 2010, this project will show the effects of airline mergers on consumer welfare.

References

Supervisors:
Professor Param Silvapulle
Department of Econometrics and Business Statistics, Caulfield
Email: param.silvapulle@monash.edu

Associate Professor Xibin (Bill) Zhang
Department of Econometrics and Business Statistics, Caulfield
Email: xibin.zhang@monash.edu

Modelling the relationship between oil price and stock market price indices in the top ten net oil importing countries: A panel data approach

In this project, the presence of cross-section dependence will be tested, followed by the use of panel unit root and panel cointegration tests to establish the long-run relationship between the oil prices and stock indices in the top ten net oil importing countries. The top ten net oil importers include the US, Japan, China, South Korea, India, Germany, France, Singapore, Italy and Spain. Furthermore, the presence of flexible common trend in the panel data model will be tested against a specific flexible trend for each country.

References


Predicting the Stock Market Returns

Goyal and Welch (2003, 2008) study the out-of-sample forecasting ability of the predictive regression for the excess stock return (or equity premium) using dividend-price ratio as a regressor. They however impose a linear functional form for the predictive regression model and hence their results may not be robust to functional form mis-specification. By not imposing a specific function form, Kasparis, Andreou and Phillips (2014) develop a non-parametric predictive regression model. Using the same data employed by Goyal and Welch, you will evaluate the forecasting performance of this recently proposed technique for the excess stock return.

References


Cointegration based statistical arbitrage

Statistical arbitrage, colloquially known as StatArb amongst traders, is a set of trading strategies that exploit statistical relationships amongst financial securities for a profit. Gatev, Goetzmann and Rouwenhorst (2006, Review of Financial Studies – a top 3 finance journal) study a version of StatArb called pairs trading where pairs of statistically related stocks are found by minimizing a Euclidean distance and trading rules are formulated that result in significant monthly excess profits in the US equity market. My current working paper (Do and Lee, 2014) propose a parametric method using the cointegration framework to identify and trade baskets of cointegrated stocks of any arbitrary size. Empirical implementation on US equity markets reveals interesting results. Opportunities exist for a Master/Honours student to explore the new method on alternative markets such as emerging markets, Australian equity market or currency markets. MATLAB codes will be made available to interested students even though they are expected to tailor the codes to suit new empirical settings.

References


Supervisor: Associate Professor Paul Lajbcygier
Department of Banking and Finance, Clayton
Email: paul.lajbcygier@monash.edu

TRADERS USE OF SPECIAL ORDERS

Most orders entered onto equity markets are not simple market orders which facilitate immediate trading. Instead, many new order types have been created by exchanges in order to facilitate high frequency trading and attract such traders. Recently, exchanges such as the ASX, have developed a number of specialized orders. In particular, the ASX has developed orders such as “fill or kill”, “minimum acceptable quantity” or “iceberg” orders. In this study we propose to ascertain who uses such orders (institutional, retail or HFTs), under what circumstances they use them, and when they use them. Ultimately, we will ascertain if better execution occurs using these new orders by matching them with standard orders and comparing the properties of the executed orders (price, duration).

LIMIT ORDER EXECUTION, PRICE IMPACT & DURATION

Immediate price impact represents the largest cost of executing a trade, not broker or exchange fees. Due to supply and demand pressures, the price of a stock will increase when a buy trade is executed and vice versa. Understanding how trading affects stock price is important when estimating the cost of trading. There are many models for immediate price impact. However, most orders entered into markets are not market orders and do not result in immediate trading. Limit orders, which specify at what price a trade must be executed, are by far the most prevalent types of orders. Limit orders will not execute immediately and may reside in the order book for an extensive period of time. Such limit orders signal information to market participants. We consider how equity stock (mid-point) prices change after limit orders enter the order book. We not only consider immediate but also permanent price impact changes (after some delay, such as 5min or 30min) which indicate what brokers have information. Finally, we consider the effect of anonymity on limit orders.

HIGH FREQUENCY TRADING PROFITS AROUND INDEX REBALANCING DATES

Passive investors rely on index investing. By investing in indexes, passive investors obtain market returns at low cost, which mean that in the long run they outperform most active managers. As a consequence, hundreds of billions of dollars is invested in indexing across the globe. The low cost of indexing is achieved not only because of the low management fees charged by indexers, but also because investing in indexes results in low portfolio turnover. Although some index rebalancing is required in order to track the index this is small compared to the typical active investor whose turnover is 100% of their portfolio per annum. Such low index turnover results in low trading and hence low trading costs. However, these costs can be reduced further: in order to reduce tracking error, indexers must rebalance as the index composition changes, which for the Australian index (i.e., ASX200) is once a quarter. Indexers effectively have no choice, they must rebalance at such times in order to
eliminate (or at least reduce) index tracking error. This means that nimble predatory traders, such as high frequency traders, know which stock and on what days the index behemoths must trade and can exploit that information to ‘front run’ the indexers and make quick profits at the indexers expense. Our aim is to study if HFTs trade and profit from indexers on index rebalancing dates and ascertain how much profits HFTs obtain at these times.
Supervisors:
Professor Francis In
Department of Banking and Finance, Clayton
Email: francis.in@monash.edu

Associate Professor Xibin (Bill) Zhang
Department of Econometrics and Business Statistics, Caulfield
Email: xibin.zhang@monash.edu

An Intertemporal CAPM with Stochastic Volatility

The fundamental insight of intertemporal asset pricing theory is that long-term investors should care just as much about the returns they earn on their invested wealth as about the level of that wealth. However, in a more realistic model, long-term investors will seek to hold intertemporal hedges, assets that perform well when investment opportunities deteriorate. We will extend the intertemporal capital asset pricing model of Campbell (1993) to allow for stochastic volatility in an Australian context. We will examine how the addition of volatility risk helps explain the cross-section of stock returns.

References

The role of Australian Pension Fund in corporate governance: evidence from proxy voting

Australian Superannuation funds have experienced significant growth over past decades. Given its sizable asset under management, it is crucial to examine its impact on financial markets. More specifically, we aim to investigate the effect of superannuation fund proxy voting on firm value, trading volume and corporate governance. In addition, we investigate how Australian superannuation funds exercise their voting right and its potential influence on firms by calculating possibility that the funds win in the proxy voting contest against controlling shareholders.

References

The detection of Morningstar rating movements of US mutual funds using DEA efficiency scores

It has been documented that a lack of financial literacy by significant members of the population is a reason for the excessive mutual fund remuneration demanded within the industry. Fund managers can often demand high remuneration due to lack of investor education and cognitive dissonance by many individual investors. Some researchers argue that rational investors, if given the option would choose to remunerate fund managers based upon relative and not absolute performance, thus remunerating for skill and not external factors, such as broad market movements. Given the industry’s structure and lack of financial literacy by many, Morningstar ratings in particular have become an integral part of the US financial vocabulary. Therefore, fund ratings are expected to play an important role.

Data envelopment analysis (DEA) is a non-parametric technique that may be used to assess relative performance of homogeneous units such as mutual funds. Morningstar Research Pty Ltd is a leading private sector provider of mutual fund performance. Morningstar provides star ratings (1-5 stars) for mutual funds.

Research questions:
1. Determine the contemporaneous association between DEA efficiency scores and Morningstar ratings.
2. Given an association between DEA efficiency scores and Morningstar ratings, whether DEA efficiency score estimated for the past periods is able to predict movement (upgrade/downgrade) of Morningstar rating in subsequent periods.

References


Appraising hedge fund performance in a multi-dimensional risk-adjusted return framework

Hedge fund performance is often evaluated by classic performance measures such as; the Sharpe ratio; the Treynor measure; and/or Sortino ratio. Under such measures, hedge funds appear to be very attractive investments. However, recent research point out special characteristics of hedge fund returns (tail distribution) questioning the suitability of classical measures. This led to the development of numerous new performance measures. Both (classic and new) approaches to hedge fund performance measurement, however, exhibit a fundamental drawback; they are two two-dimensional measures. In particular, integrate only one aspect of risk and one aspect of return in performance measurement. Data envelopment analysis (DEA), which is a nonparametric approach that uses linear programming, can measure performance in a multi-dimensional framework and therefore is able to capture multiple hedge fund risk and return characteristics. In this study, different characteristics of hedge fund returns and risk is captured, among others, through lower and higher partial moments.

Aim 1: Assess hedge fund performance using DEA approach
Aim 2: Compare the results with that of two-dimensional measures
Aim 3: Evaluate the implications of instability of higher moments on hedge fund performance measurement

References


Extreme Value Analysis of Time Series

Statistical analysis of the extremes of time series has traditionally had applications in hydrology and insurance, but in recent decades there have been applications in areas of finance, oceanography, meteorology, climatology, environmental science and engineering. The most common approaches for describing the extreme events of stationary data are the block maximum approach, which models the maxima of a set of contiguous blocks of observations using the generalized extreme-value (GEV) distribution, and the peaks-over-threshold approach, in which a Poisson process model is used for exceedances of a fixed high or low threshold level; often this entails fitting the generalized Pareto distribution (GPD) to the exceedances. The two approaches lead to different but closely related descriptions of the extremes, determined by the marginal distribution of the series and by its extremal dependence structure. The project will focus on the extreme value analysis of sea-level time series.

References


Note: This project can be investigated by two students.
Bayesian estimation methods for GARCH models

This project involves Bayesian estimation for GARCH models, where the error density can be specified as the standard Gaussian, Student t, and Hansen’s skewed t densities. A fundamental issue in Bayesian estimation is the choice of prior density for each parameter, and often a prior density is chosen from a known family of distributions characterised by hyperparameters, such as the inverse Gamma density which is often chosen as the prior density of a variance parameter. A genuine question is how one can estimate hyperparameters.

In the literature, empirical Bayes is able to provide a solution to this problem. Nonetheless, as GARCH parameters can be estimated through Markov chain Monte Carlo (MCMC) techniques, we aim to estimate hyperparameters within an MCMC sampling procedure. This involves estimate hyperparameter through a frequency approach such as maximum likelihood estimation at each iteration of the above-mentioned MCMC sampling procedure. Using forecasting procedures for both simulated and real data, including financial returns, the finite-sample performance of the estimation methods involved will be evaluated.

References


Forecasting tourist flows in the Asia Pacific Region

This project aims to generate short- to medium-term forecasts for hundreds of source-destination markets in the Asia Pacific region. Using hierarchical times series approaches forecasts will be reconciled to be aggregated consistent across the whole region. The project will involve working with a large number of time series in R and using the hts package.

References


Elective surgery waiting time in Victoria public hospitals: equity by types of surgeries

There has been increasing media attention regarding prolonged waiting times for elective surgeries in public hospitals, especially for those without private health insurance. Access to elective surgery is one of the key indicators for equity in health service provision in a universally public insured healthcare system like Australia. The demand for elective surgery services in Victoria has increased and waiting times have been under public attention. Patients suffer or die while awaiting a hospital bed. The objective of this project is to identify factors contributing to inequality in waiting times for elective surgery services in the Victoria public hospitals. Individual patient level data for waiting times in Victorian hospitals ESIS (Elective Surgery Information System; see http://www.health.vic.gov.au/hdss/esis/index.htm) will be used and particular attention will be given for example to rural versus urban patients or for different types of surgeries. One hypothesis is that rural and remote patients are disadvantaged for higher urgency category procedures such as cardiovascular surgeries whilst urban patients are disadvantaged for less urgent categories such as hip replacement.

Econometric models for panel or multi-level clustered data will be used. Quantile regression for panel data is an option to look at different parts of the waiting time distribution. Detailed research questions and econometric techniques used can vary by the student’s interest and background.

The student should have completed second and third year Applied Econometrics subjects (ETC2410 and ETC3410) or equivalent, and preferably has completed ETC4420 Microeconometrics.

For research motivation and related studies using NSW hospital patient data, see for example:


ANZ Bank's list of research projects

A research group at the ANZ Bank presented a list of research projects. Each project will be supervised by at least one supervisor from Monash University. If you choose a project from this list, you are expected to spend one day at the bank’s research group, communicating with its professionals on various practical issues that are related to the chosen project.

If you meet the following criterion, you may consider choose a project from ANZ Bank’s list.

- WAM 70 or above
- Strong background in statistics, database and econometric modelling
- Very good verbal communication skills
- Familiar with a programming language such as R etc.

If you decide to choose a project from ANZ Bank’s list, please contact the corresponding supervisor at Monash.

Supervisors:
Dr Jean-Pierre Fenech
Department of Econometrics and Business Statistics, Caulfield
Email: jeanpierre.fenech@monash.edu

Associate Professor Xibin (Bill) Zhang
Department of Econometrics and Business Statistics, Caulfield
Email: xibin.zhang@monash.edu

Flows of Money in Financial Institutions Group over time:
There are a number of players in the Financial Institutions Group (FIG) industry, some of them include banks, non-banks, investors, superannuation and insurance institutions among others. These entities transact the majority of the funds moving around the world. This project will look to model and understand where the flows come from, who moves them and where do they go; as well as the many changing industry dynamics over the years. This will help understand the next steps in this fast-paced sector.

Macro vs EFTpos Modelling:
Macroeconomic indicators are known to affect the behaviour and spending patterns of consumers but how quickly and by how much? This project looks to combine macroeconomic indicators and consumer spending patterns to understand the impact and to be able to predict how future changes will affect the retail industry.
Modelling Dairy Consumption in Asia:
As countries become wealthier their consumption patterns changeover time leading to important structural changes in the industry. This project will look at how a series of indicators (macro and micro) can be used to understand a country’s or a region’s changes in consumption of dairy. Highly relevant is to also look at the impact of alternatives to dairy products (powdered milk, etc) as well as technological improvements impacting the industry and compare different countries on these factors.

Modelling Beef Production and Consumption:
There are a series of players in the beef industry including farmers, slaughterhouses, packagers, distributors, wholesalers, retailers and consumers. All of them play in an interconnected international economy affected by weather patterns, free trade agreements, economies of each country, amount of agricultural land, labour costs and return on equity among many others. This project tackles the interconnectedness of the world economy and how it affects this industry in the past, today and into the future. The main outcome of this project is to model these changes at a country and industry level.