Research Statement

Matt Lutey

My research revolves around asking whether nonlinear stock price patterns profitable when conditioning on them. Second, can digital image processing detect the patterns in images of time series data. Third, stemming from the second, can image processing provide any advantage over traditional methods in pattern detection? My dissertation investigates whether image processing can provide any advantage over traditional methods of nonlinear pattern detection and be a useful tool for economists. This is discussed in two essays that address this topic. The first, "Reliability of Pattern Recognition in Recognizing Stock Price Patterns" discusses objectively detecting patterns such as Head and Shoulders in financial time series data. The second, "Stock Price Pattern Recognition and Conditional Returns" discusses whether the patterns are indeed profitable and if image processing can detect them in financial time series data. The contribution of this work is to benefit academia and industry through market efficiency research, program trading, and aggregating professional technical analyst recommendations in building a robust pattern classifier.

My first essay discusses pattern recognition in financial time series data. This builds off the methodology and pattern rules identified in Lo, Mamysky, and Wang (LMW, 2000). Their paper discusses a head and shoulders pattern (among others) to be identified by a series of five consecutive extrema. The extrema are identified on smoothed price in rolling windows (LMW use 38 days. 35 days for identifying patterns and 3 days to recognize them.) The rules for a head and shoulders is for the first extrema to be a maximum, the third extrema to be above the first and fifth extrema, and the second and fourth to be within 1.5 percent of their average, and the first and fifth to be within 1.5 percent of their average. This pattern is paired with its inverse (Inverse head and shoulders). Other pattern rules follow. The purpose of the patterns is that investors believe they are conveying information about future stock price movement. LMW (2000) showed they do contain incremental information when conditioned on them. This first paper objectively identifies the pattern as the method of LMW (2000) is unclear and calls for such updates. An initial study using one stock (Centex, ticker: CTX) shows 9500 observations from 1971-2009 and fewer than 250 completed patterns. The complete paper will include all firm year observations in CRSP.

The second essay discusses conditioning returns on the patterns and identifying all the patterns in rolling windows from computer vision methods. This involves sliding a pattern template over a larger window to identify completed patterns. This ultimately gives a probability of the pattern. The advantage to this is we can create hybrid patterns as well as aggregate the output from professional technical analysts and the output from our digital classifier. This has advantages when compared to traditional time series methods which would be unable to detect such patterns in stock prices. The purpose of this research is to bring computer vision tools to finance and economics literature while testing the implication of nonlinear patterns in prices which are visual in nature. This replicates the ocular abilities of professional technical analysts. This is tested using template matching and support vector machines with a benchmark on the patterns identified in the first essay. Half of the data will be used for training and half will be used for

testing. It will be benchmarked on speed and accuracy. The implications will benefit academia and industry through market efficiency research and program trading. Also, if the patterns are indeed profitable, a digital classifier with robust pattern definitions may have further benefits.

My working papers include compensation pay gap between inside and outside CEOs. This uses methodology of a working paper (Talukdar, 2016) and provides control variables outlined in literature for testing whether outside CEOs bring anything extra to the table when compared to a CEO who started within the firm and worked their way up. This paper needs data from Execucomp or Boardex to be complete but the literature, and methodology including control variables are laid out. It is expected that outside CEOs earn an additional premium when compared to their internal CEO counterparts. This is discussed by using size and 2-digit SIC matched firms in the S&P 500, and S&P 1500.

Another working paper on equity risk premium is discussed using a new technical indicator which is used widely by practitioners and is discussed in print literature (Ichimoku cloud). The role of technical indicators in forecasting equity risk premium is discussed by Neely et al. (2010) from the Federal Reserve bank of St. Louis. They show that technical indicators such as moving averages, moving average convergence divergence, on balance volume, and relative strength index contain forecasting power above and beyond the typical macroeconomic indicators discussed in Goyal and Welch (2008). The purpose of this paper is to bring in a new technical indicator which is widely used by practitioners as discussed by Linton (2010). It is expected that the Ichimoku cloud will provide additional forecasting power above and beyond moving averages because its construction is based off high and low values rather than just the close. High and low bars (read OHLC, or Japanese Candlesticks) may have implications for volatility and thus may provide an important forecasting tool in equity risk premium.

My previous research has been published in peer reviewed journals listed by Cabel's. These papers include empirical testing of the fundamental stock selection criteria outlined by Investor's Business Daily and fund manager William O'Neill. The significance of this study is that the AAII and college of business from East Carolina University found significant returns when compared with a simple buy and hold. My papers test this over three decades using simple rules for earnings, sales, volume, and stock price. The results favor the use of the CAN SLIM methodology when simplified. Future work may include using the full definition of the system over the entire CRSP/Compustat database. Limitations of my previous work include data limitations and requiring use of an external source for programming. My essay titled "An Application of Can Slim investing in the Dow Jones Benchmark" was published in 2018 in the Asian Journal of Economic Modeling. My essay titled "OPBM II: An Interpretation of the CAN SLIM Investment Strategy" was published in 2014 in the Journal of Accounting and Finance. My essay titled "Outperforming the Broad Market: An Application of Can Slim Strategy" was published in 2013 in ASBBS e-journal. These discuss the implications of various simplified versions of the CAN SLIM system on major index benchmarks.

My research ability is further evidenced by presenting original essays at Southwestern Finance Association (SWFA), MBAA International, American Society of Business and Behavioral Sciences (ASBBS), Academy of Economics and Finance, and World Business Institute (WBI).

As well as serving as a finance track referee at these conferences. My paper in ASBBS won a best paper award, and my paper at WBI won a best prize for journal award.

In addition to my working papers and my dissertation, future research projects will stem from including additional pattern definitions and engaging in program trading and market efficiency research. My precise research agenda will be more evident as I progress in my path as an Assistant Professor and collaborate with other scholars through conferences and at the university. My current co-authors (Maroney, and Rayome) should provide useful resources of collaboration in the future.

Sincerely,
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