Australian Government
IP Australia

Patents | Trade Marks | Designs | Plant Breeder's Rights

If trade marks lead business confidence, can it be forecast reliably?

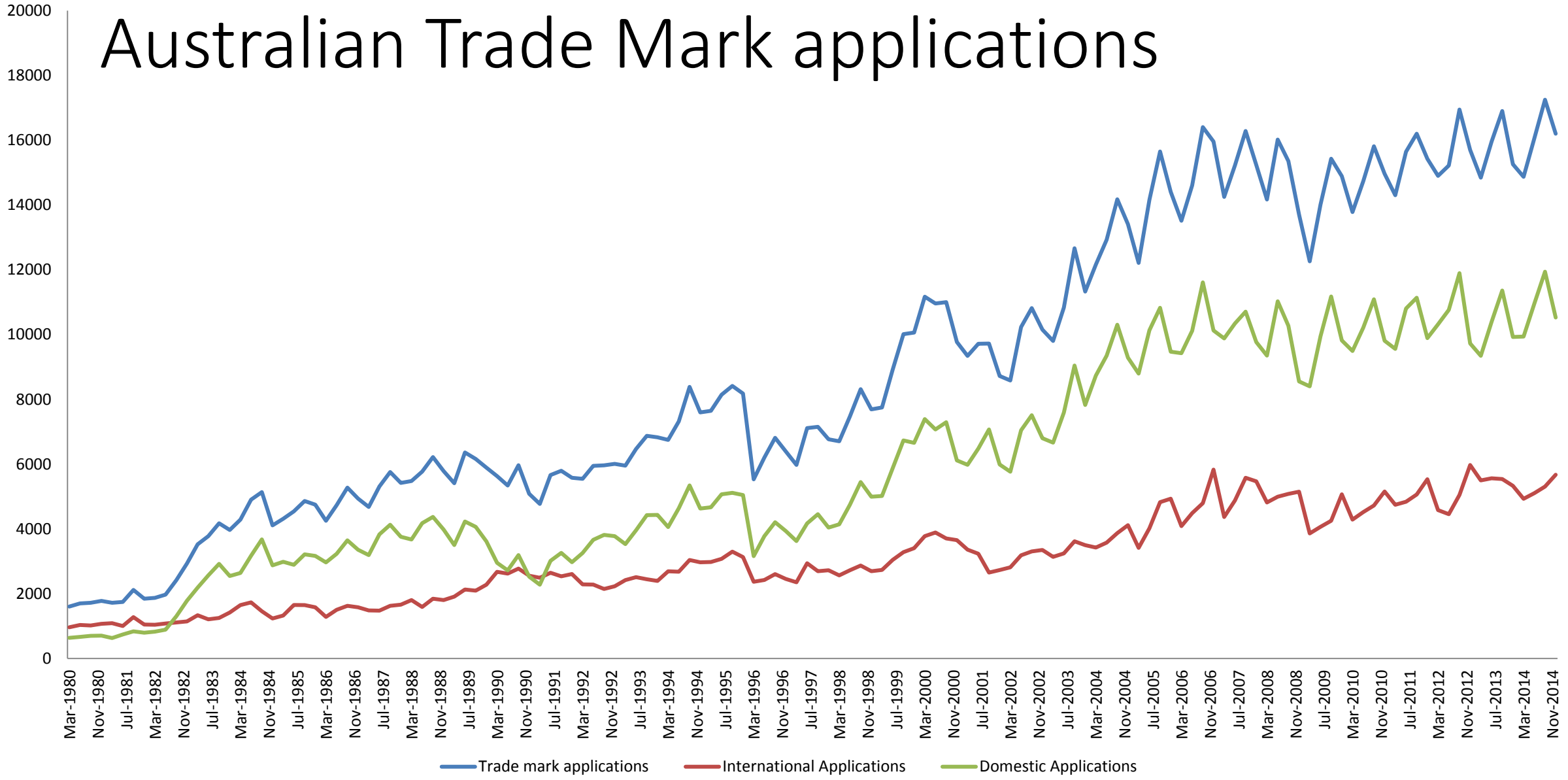
Angelina Bruno (DIIS) & Luke Meehan (IPA)

IPSDM 2016

Yes

- Univariate forecasting for IP Australia resourcing
  - Straightforward
- Multivariate forecasting
  - Requires a macroeconomic model of trade mark applications
- Dynamic searches for a macro model of trade mark applications
- Policy implications

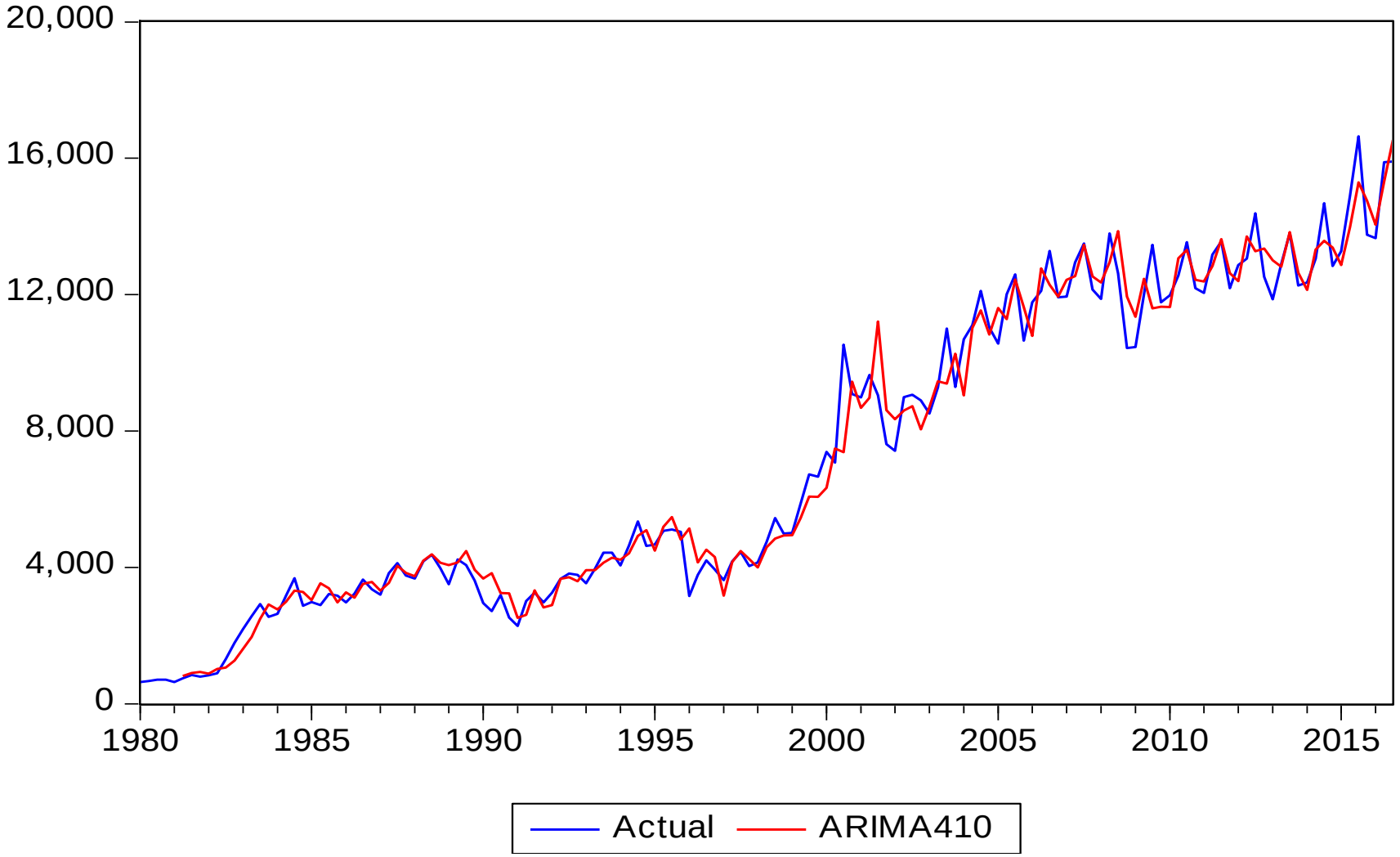
Australian Trade Mark applications



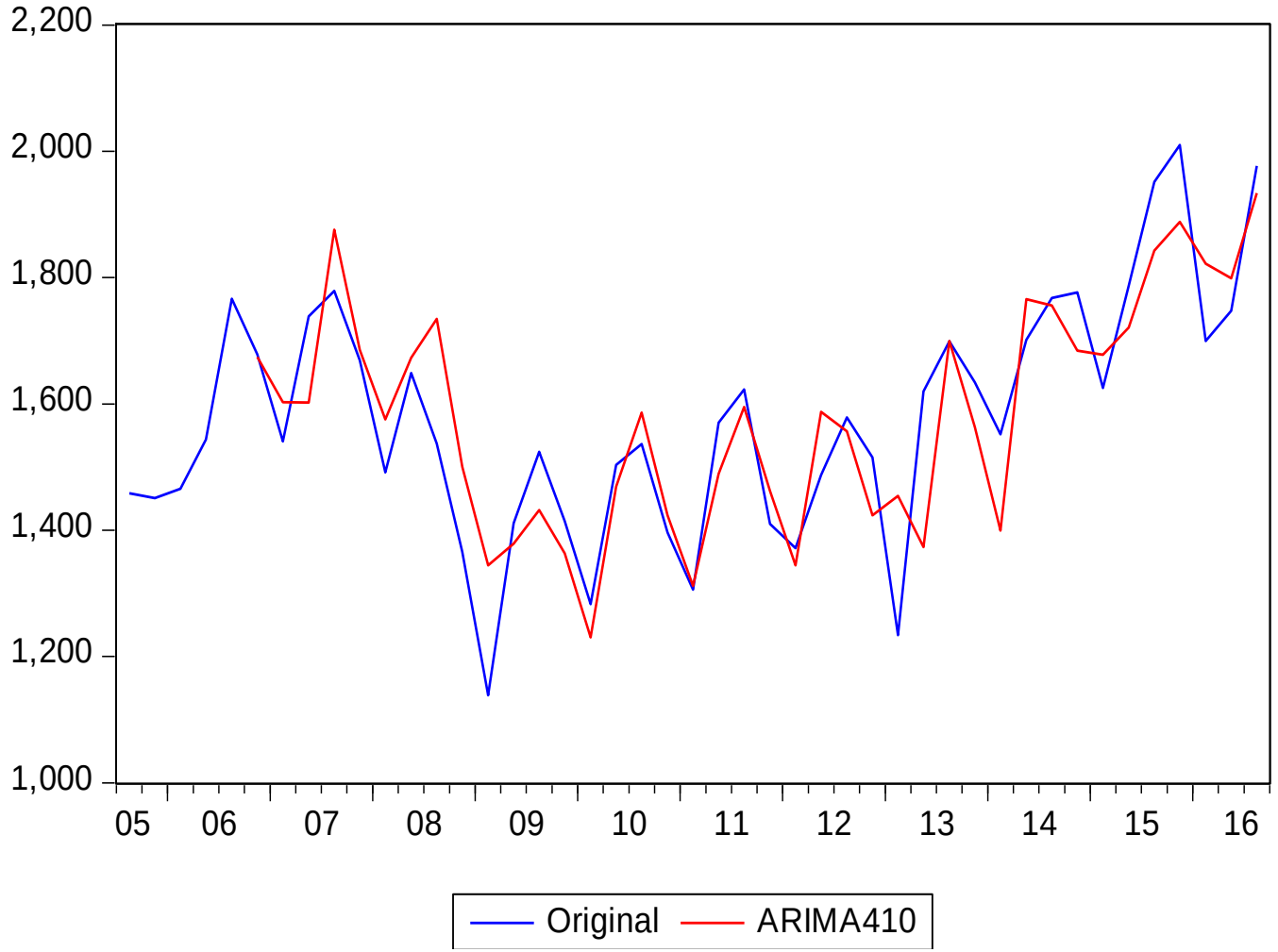
Autoregressive integrated moving average

- ARIMA (p,d,q) models are a widely-used approach to time series forecasting
  - They describe the degree to which the history of a time series predicts its future
  - p – autoregressive
  - d – integrated
  - q – moving average

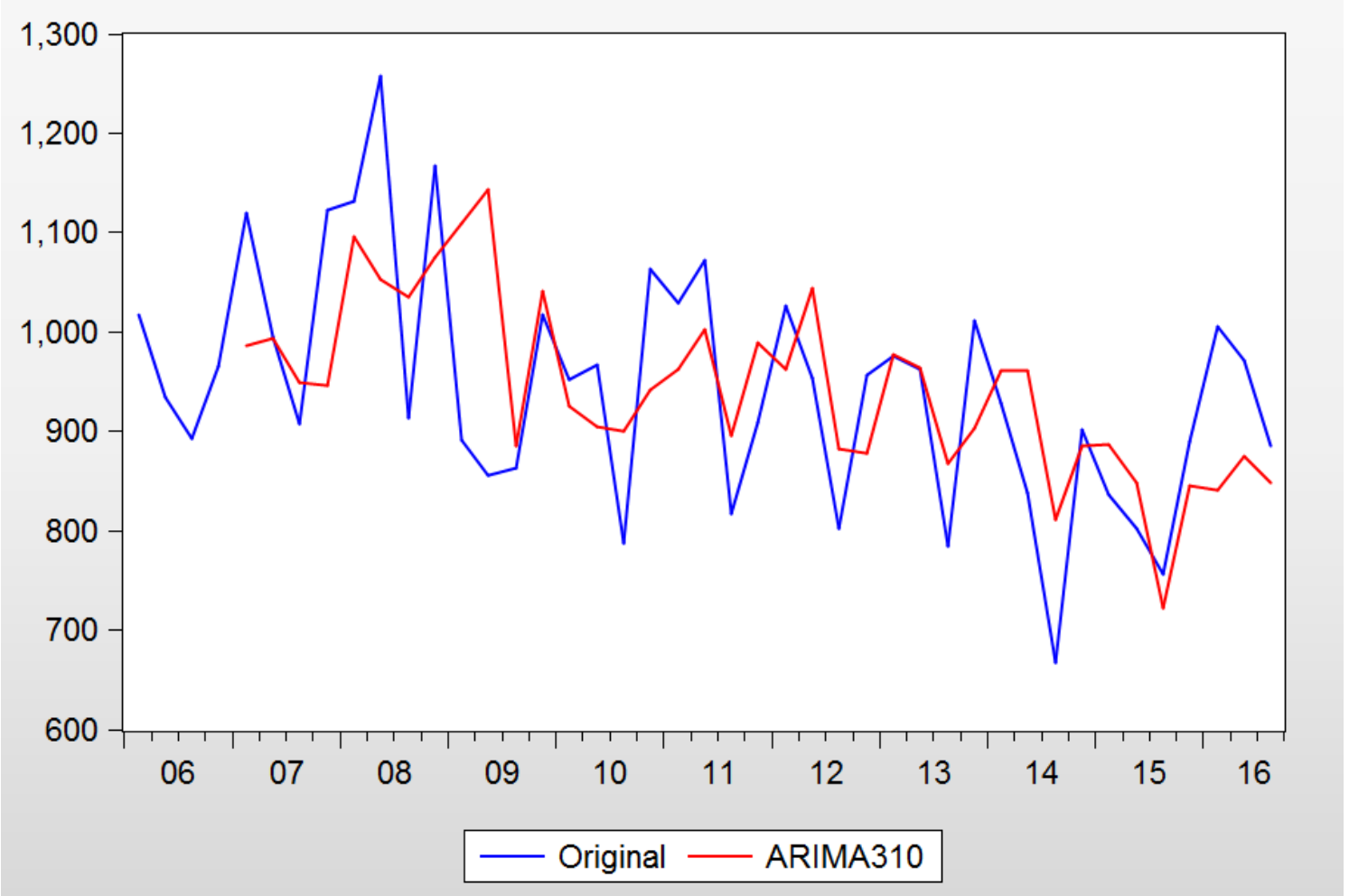
Australian Trade Mark applications - forecast



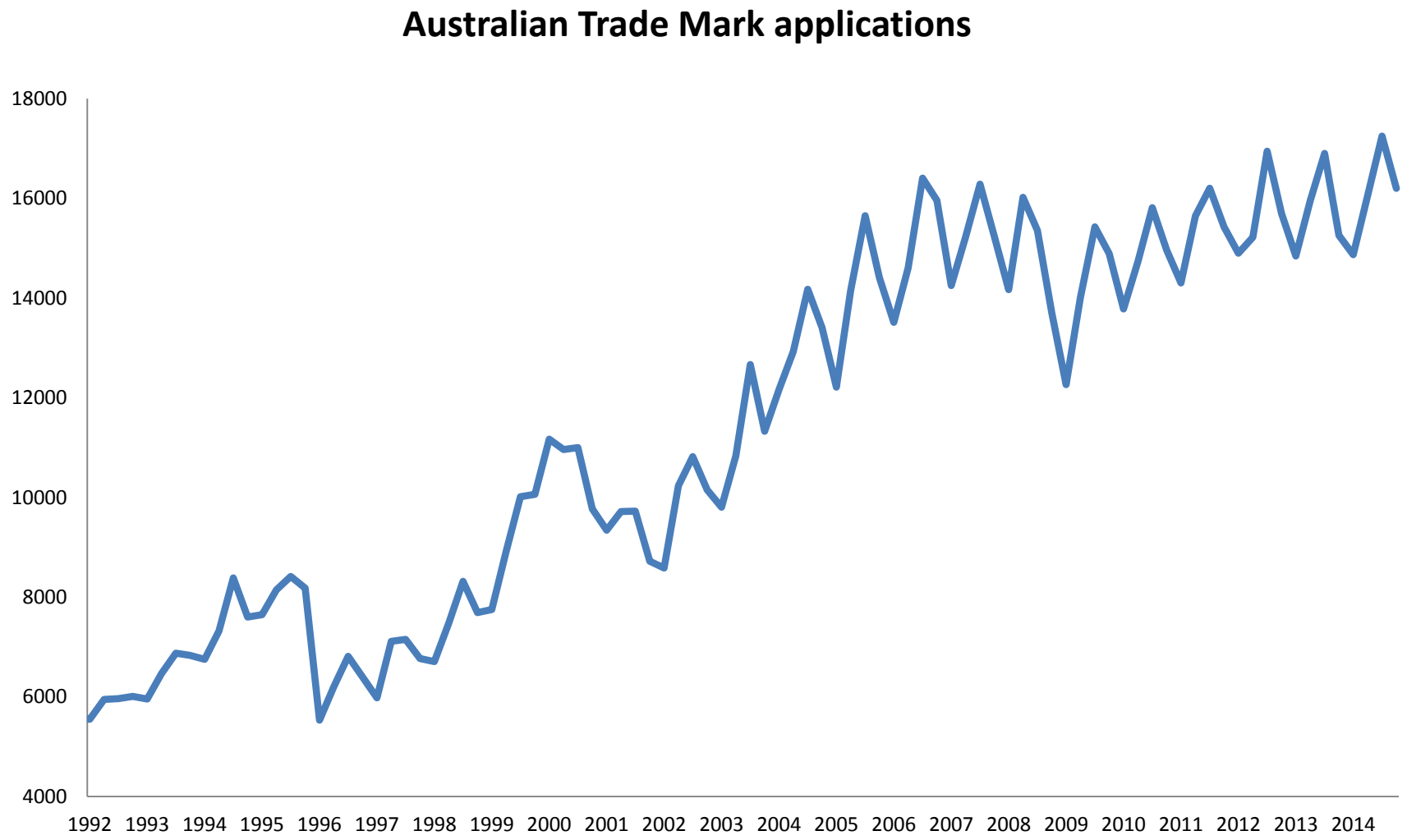
NZ Trade Mark applications - forecast



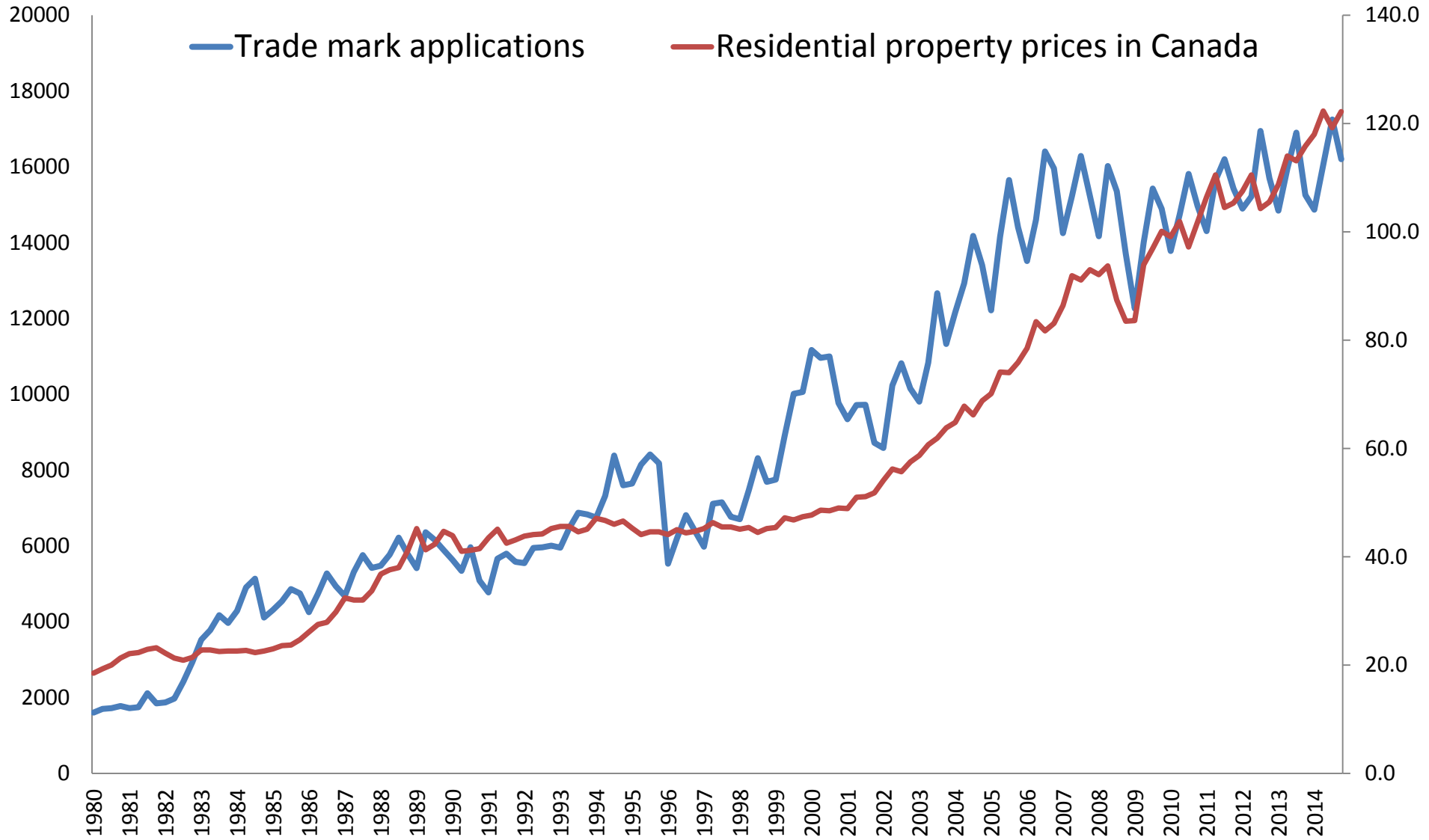
Finland Trade Mark applications - forecast



there are some interesting things here...



…but maybe we should be a bit cautious



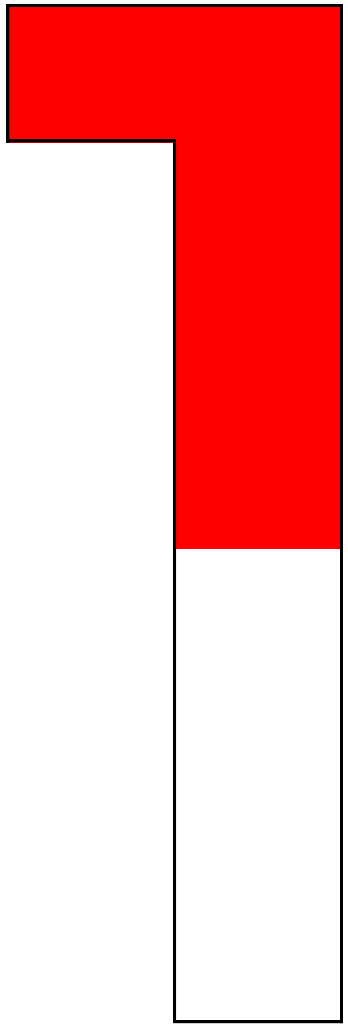
Literature on trade marks

- WIPO 2013 – ‘building brand names is an important investment’ that ‘helps firms differentiate… [promote] goods and services … increase market share’
- Goodridge, Haskel and Wallis (2014) – investment in trade marks is the long-term investment in branding (i.e. net of advertising and market research)
- Allegrezza and Guard-Rauchs (1999) – Beneleux TM application link with firm size, exports and R&D; interpreted as link with innovation
- Millot (2008) – French firms’ sales, export ratio and patenting associated with TM applications.
- Mangani (2007) – TM numbers correlated with product variety

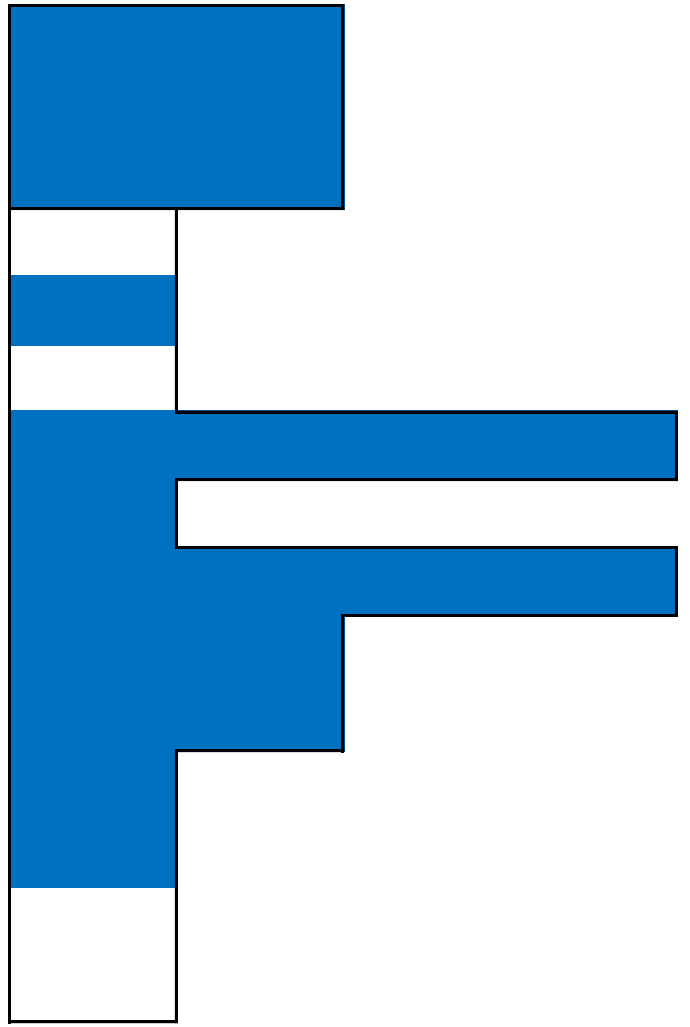
List of candidate macro variables

10 year Australian Federal Government bond yield
AUD/USD
Building approvals
Business Confidence Index
Bank lending to business - new credit approvals
Total value of building jobs
Final consumption expenditure
Consumer Confidence Index
Composite Leading Index
Consumer Price Index
Dow Jones Industrial Average
Domestic trademark applications
Actual expenditure (buildings and structures)
Actual expenditure (equipment, plant and machinery)
Exports
GDP
Government spending
Interbank rate
Imports
Inventories (Total)
Inventories (Manufacturing)
Inventories (Retail)
Madrid trade mark applications
Westpac Consumer Sentiment Index
Westpac Leading Indicator of Economic Activity
NAB Business Conditions Index
NAB Business Confidence Index
Sales (Manufacturing)
Sales (Retail)
Sales (Total)
Total Trade mark applications
Unemployment

Past **Trade mark applications' correlations** **Future**



Exports
Government spending
10 year Australian Government bond yield
AUD/USD
Consumption expenditure
Interbank rate
Inventories (Total)
Unemployment
Investment (equipment, plant and machinery)
Imports
Sales (Total)
Business Confidence Index
NAB Business Conditions Index
CLI
Consumer Confidence Index



Dynamic Model Averaging

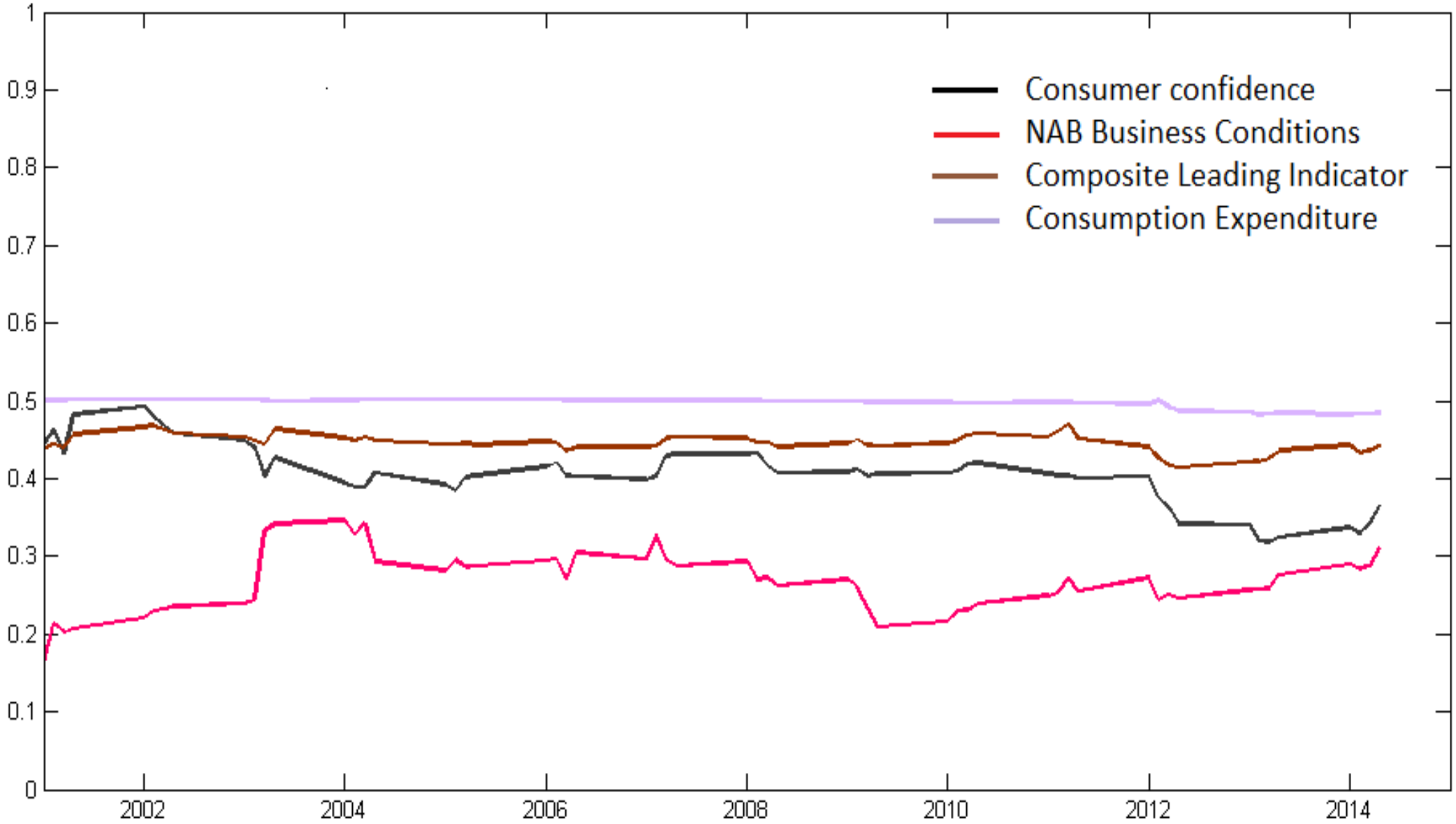
- Optimises forecast performance by selecting an optimally-weighted and constituted group of variables each period.
- The implication is that we can learn a lot about the process being forecast by looking at the components of the optimal forecasting model.
- Kalman filter with forgetting factors set to heavily weight the most recent 5 years of data and models

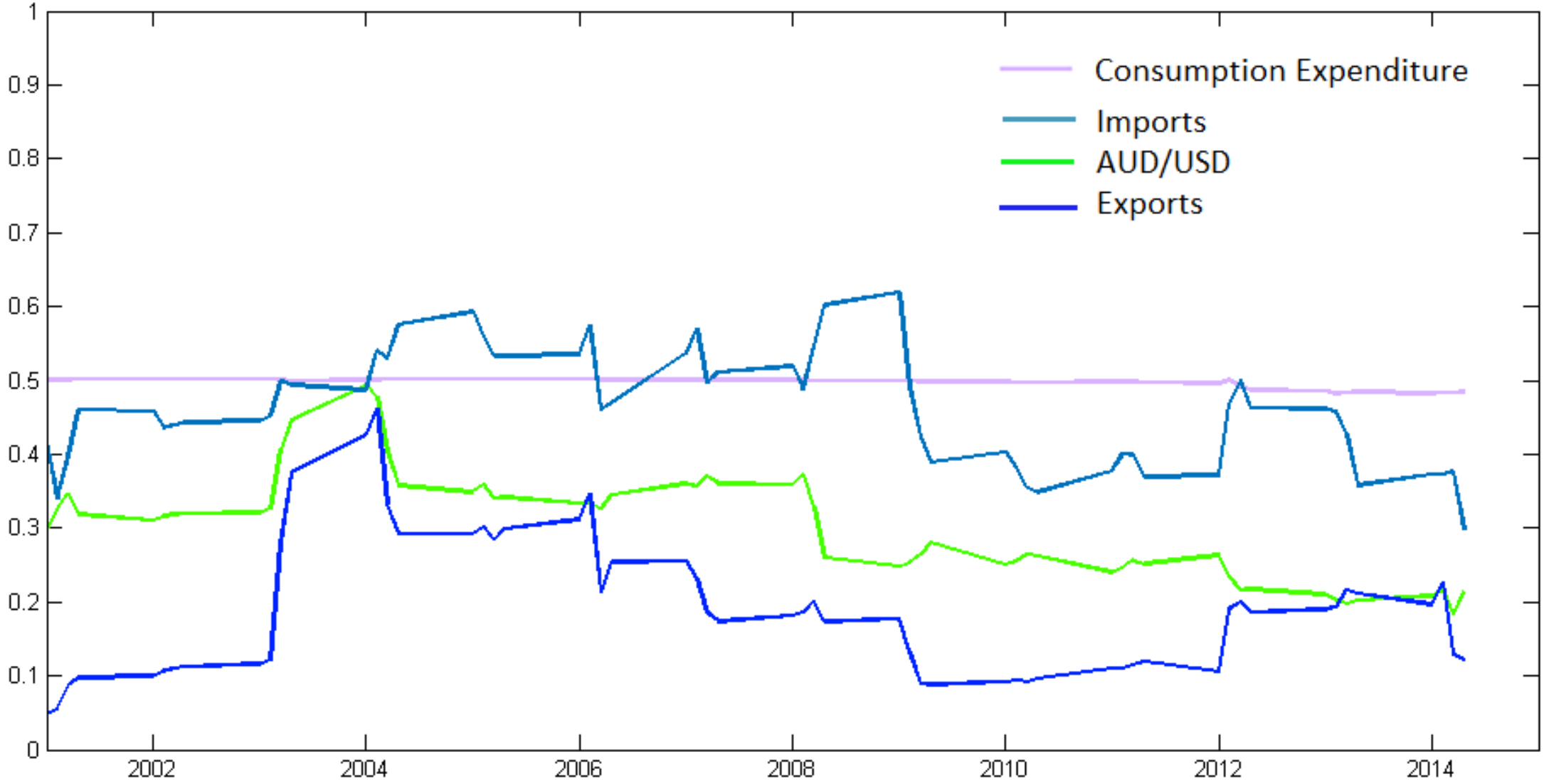
DMA forecasting setup

- The aim is produce an optimal forecast 1 year in advance using 16 candidate variables
  - These are adjusted for lags as per the ‘past’ dynamic correlation results
  - Q1:2001 – Q2:2016

- DMA then selects the best forecasting model for that time period, and weights it by recently ‘good’ models and data

- We plot series of probability of inclusion: > 0.5 being useful


Consumer confidence
NAB Business Conditions
Composite Leading Indicator
Consumption Expenditure
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
2002
2004
2006
2008
2010
2012
2014


Consumption Expenditure
Imports
AUD/USD
Exports
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
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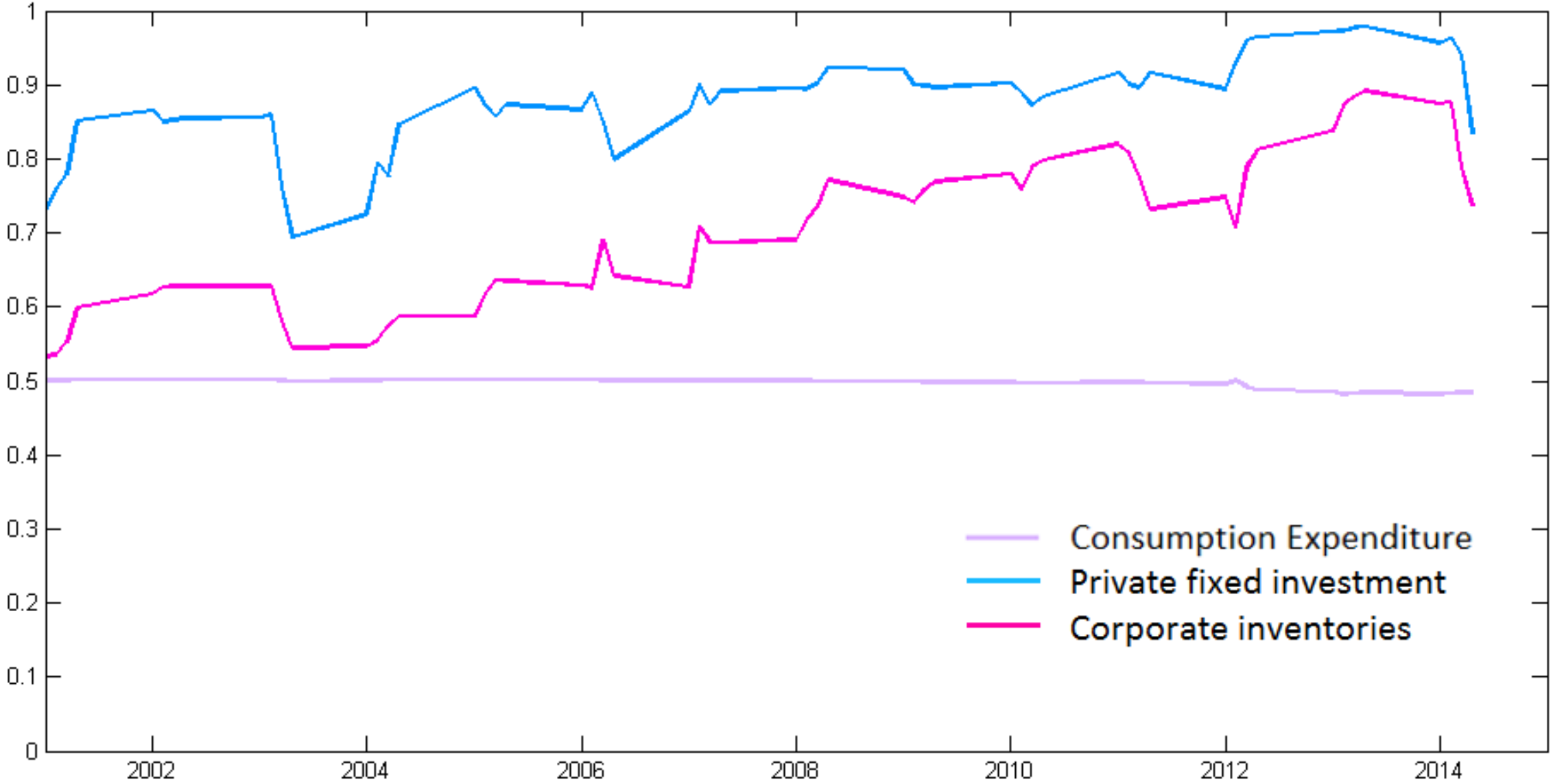
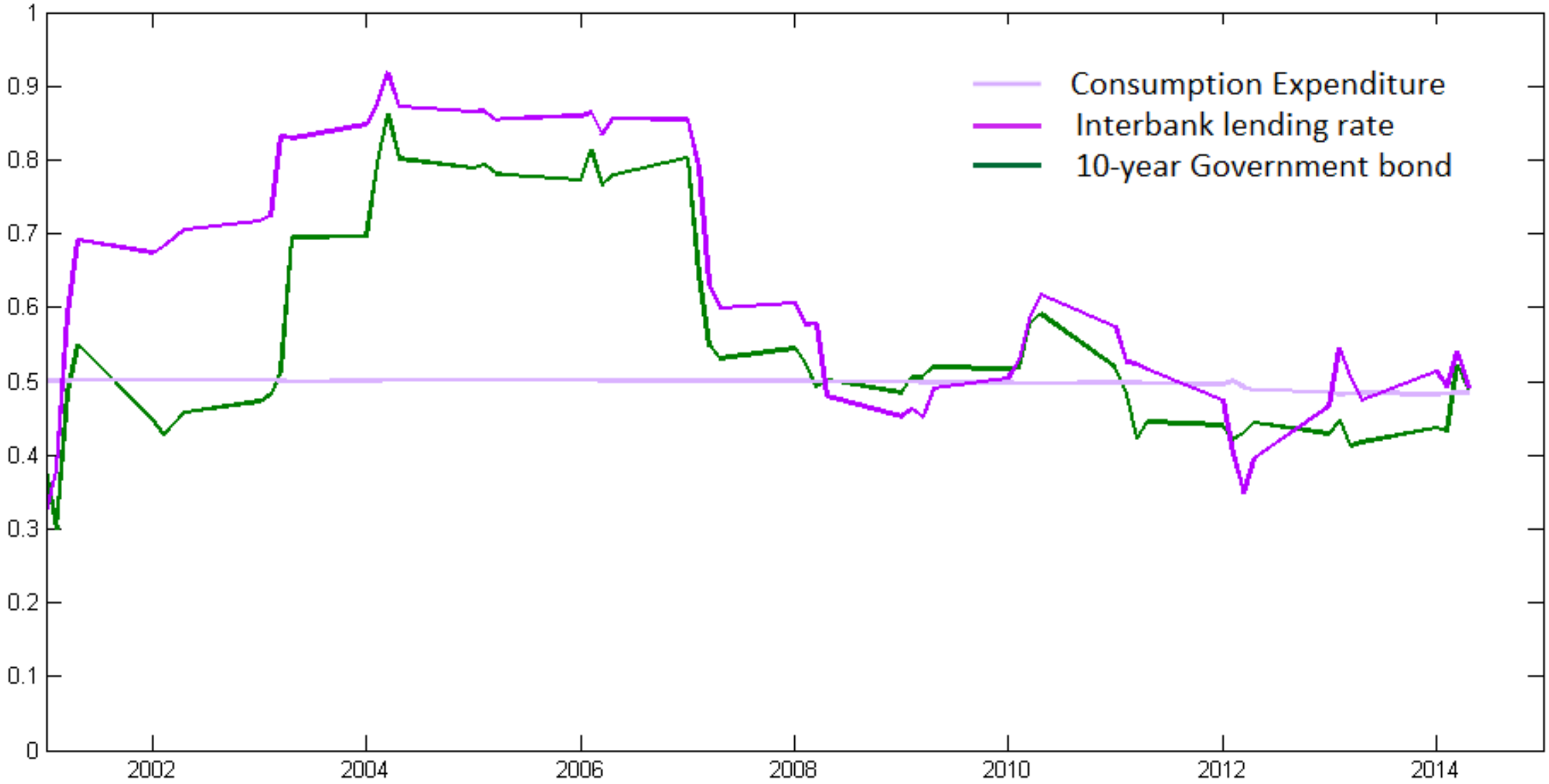
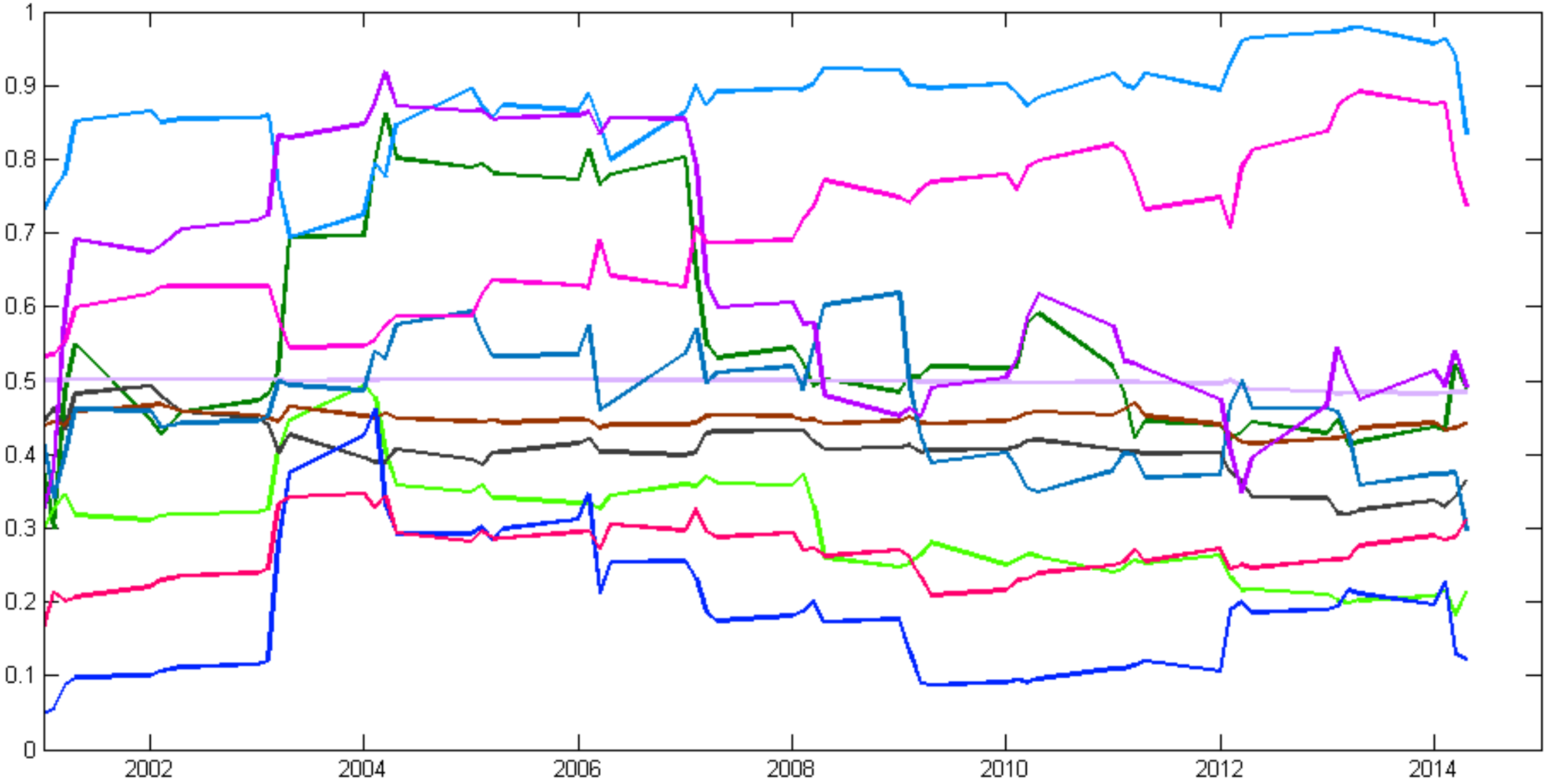
2012
2014


1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
2002
2004
2006
2008
2010
2012
2014
Consumption Expenditure
Private fixed investment
Corporate inventories


Consumption Expenditure
Interbank lending rate
10-year Government bond
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
2002
2004
2006
2008
2010
2012
2014


1
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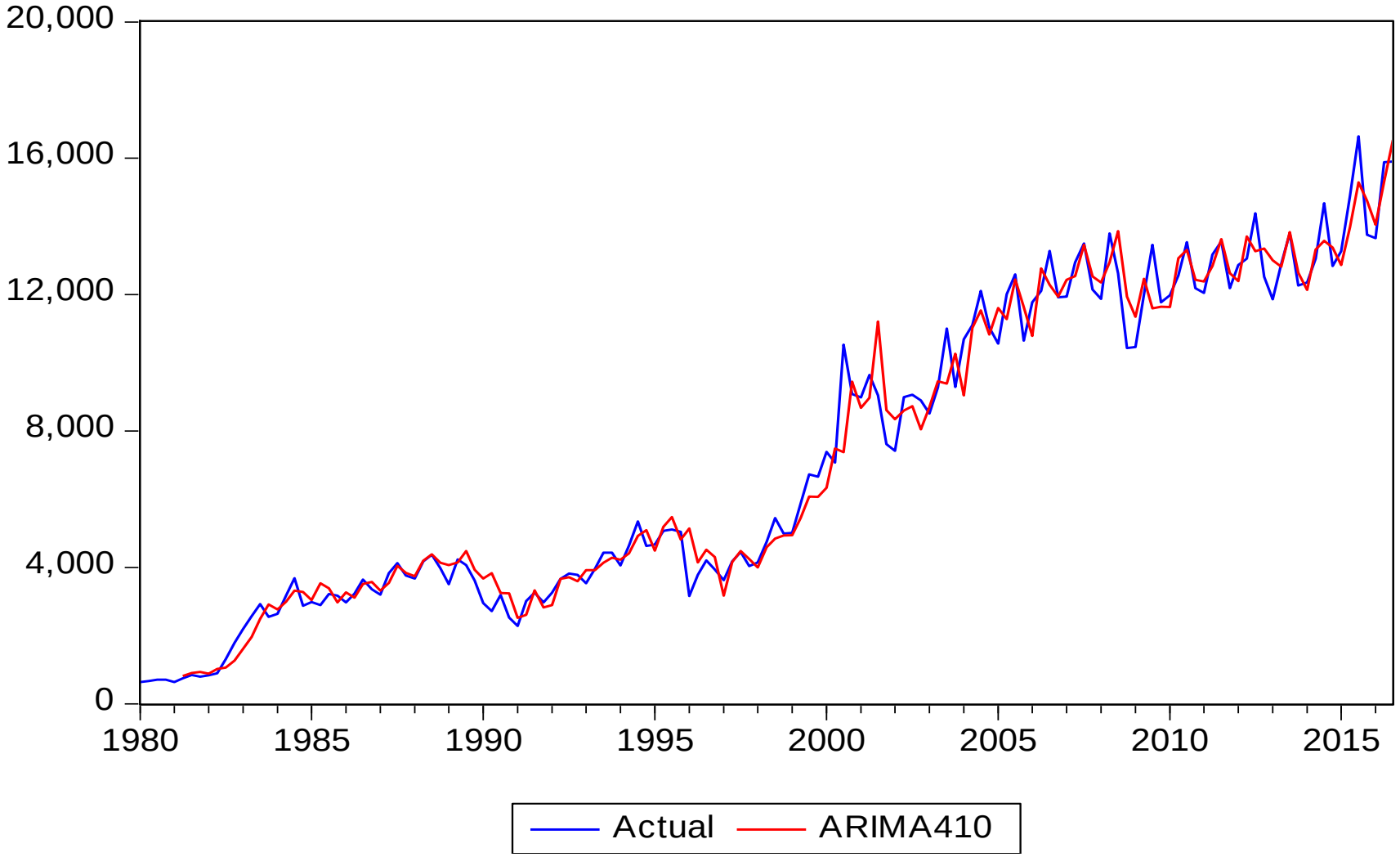
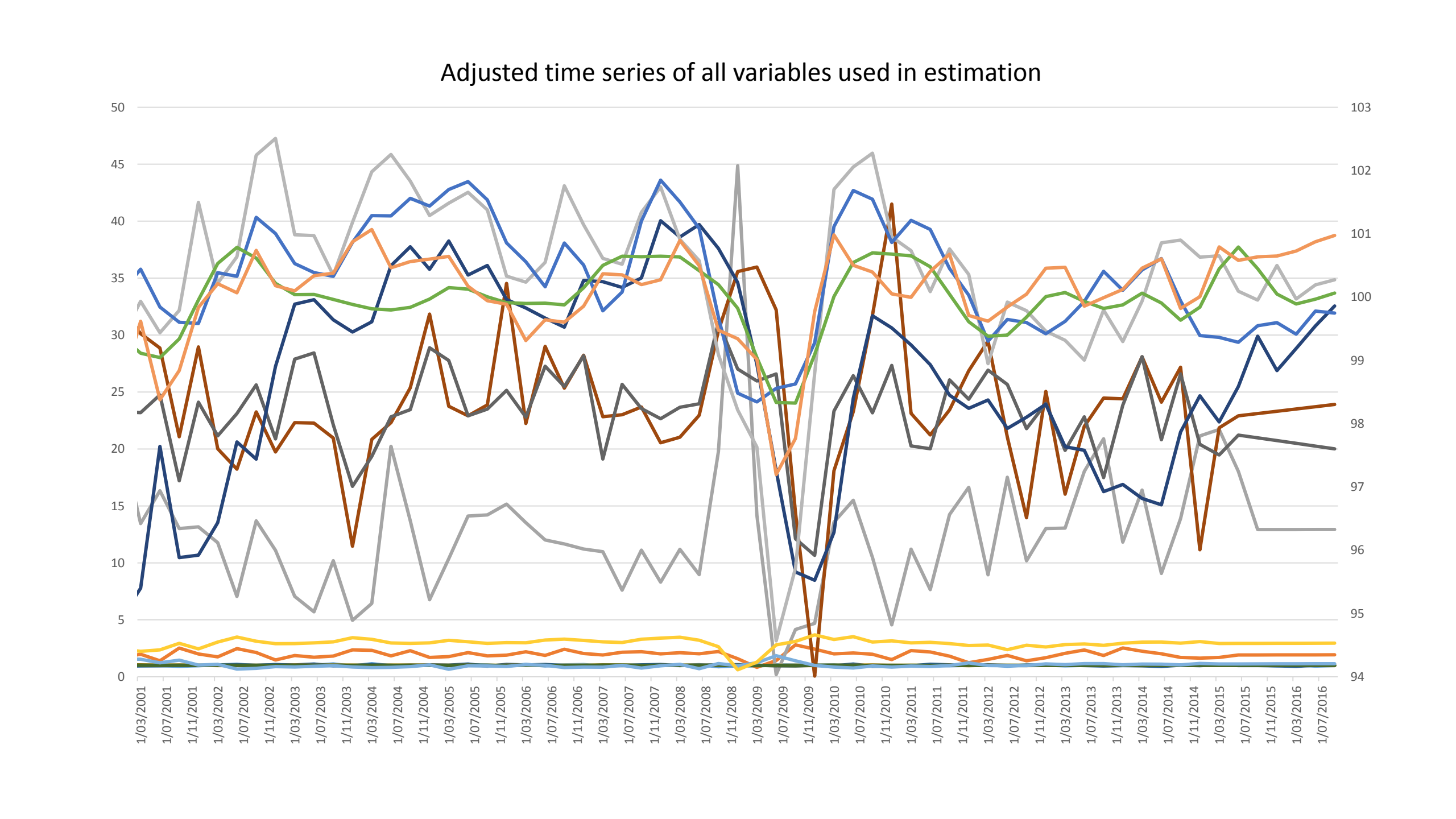
0.6
0.5
0.4
0.3
0.2
0.1
0
2002
2004
2006
2008
2010
2012
2014

Conclusions

- Trade mark applications can be reliably forecast with a univariate model
  - Despite being integrated with a range of economic phenomena!
- There is macro-level evidence to support the supposition that trade marks are, like other forms of IP, an investment
- Supports the potential value of an atheoretical ‘big-data’ approach to IP economics
- Research into the macro-predictive value of TM applications is underway

Australian Trade Mark applications - forecast




Adjusted time series of all variables used in estimation
50
45
40
35
30
25
20
15
10
5
0
103
102
101
100
99
98
97
96
95
94
1/03/2001
1/07/2001
1/11/2001
1/03/2002
1/07/2002
1/11/2002
1/03/2003
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1/07/2016