



NOWCASTING SERVICES TRADE

HLG-MOS ML Project - virtual session

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Motivation and background

- Services trade data (as reported in monthly balance of payments) are published with a lag
- COVID-19 highlighted importance of timely measures of developments in services
- Services have often taken a backseat in nowcasting literature: focus on merchandise trade
- Nowcasting approaches covering services trade generally adopt global perspective: WTO services trade barometer, world trade-cycle index (Martínez-Martín and Rusticelli, 2020)

→ This pilot study combines a variety of soft, hard, financial and Google Trend data to develop a nowcasting model for country-specific aggregate services trade data

» Data sources and variable selection

1) Assigning potentially relevant predictors to 4 categories:

Category	Example
Google trend indicators	Advertising, banking, hotels, air travel
Hard	Goods exports, unemployment rate
Soft & financial	Business confidence, stock prices
Uncertainty	Economic policy uncertainty index, VIX

2) Selection of predictors:

- a) Regressions: keeping only predictors displaying link with services trade
- b) LASSO applied separately to each category: obtaining 4 category-specific lists
- c) LASSO applied to combination of category-specific selections:
eliminating redundancies across categories and testing relevance of lags

3) Identification of best models (RMSE)

4) Creation of bridges for variables with long reporting delays and nowcast

» Regularised regression: LASSO

- Least absolute shrinkage and selection operator, known as LASSO (Tibshirani, 1996), is a regularised regression method aimed at reducing model complexity
- Provides a systematic, data-driven approach to model selection
- Lasso imposes a penalty on absolute size of coefficient estimates (all variables having been mean-centred):

$$\hat{\beta}_{Lasso} = \arg \min \frac{1}{n} \sum_{i=1}^n (y_i - x'_i \beta)^2 + \frac{\lambda}{n} \sum_{j=1}^p \psi_j |\beta_j|$$

- As variables whose coefficients are equal to zero after penalisation get removed from the model, LASSO helps to address overfitting

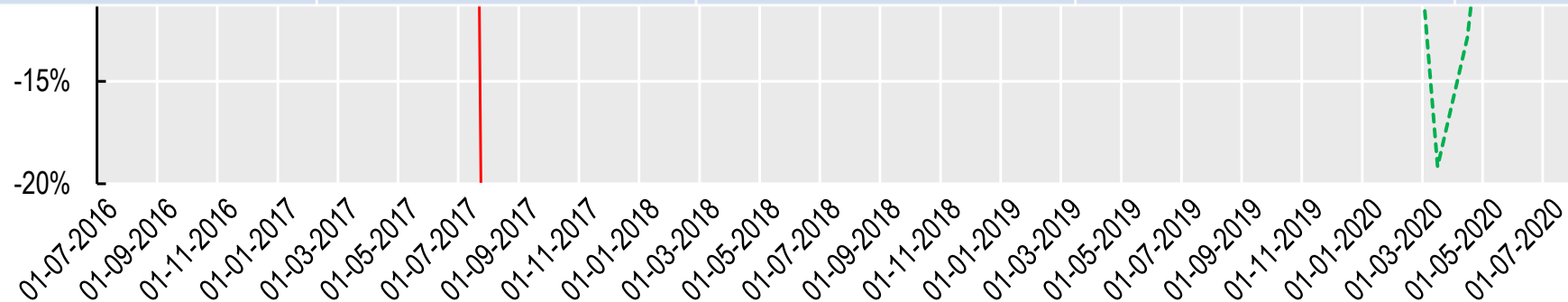
Variables included in best-performing model: exports

EXP-Model 1	
Hard	Effective exchange rate, goods imports, total goods exports of other OECD countries and key partners, unemployment rate, car registrations, manufacturing order books
Soft and Financial	Share price index
Uncertainty	Economic policy uncertainty index
Google	Business news, bus and rail, judicial liquidation
Lags of dependent variable	2nd lag, 4th lag

Results: services exports

Aggregate services exports of the United States as reported in the balance of payments: month-on-month percentage change

Model	RMSE as ratio of AR(4) RMSE	Forecast directional accuracy	Number of variables	Category
EXP-Model 1	0.885	74%	13	Mixed
EXP-Model 2	0.894	74%	5	Hard
EXP-Model 3	0.895	74%	10	Hard
EXP-Model 4	0.898	74%	7	Hard
EXP-Model 5	0.901	74%	11	Mixed



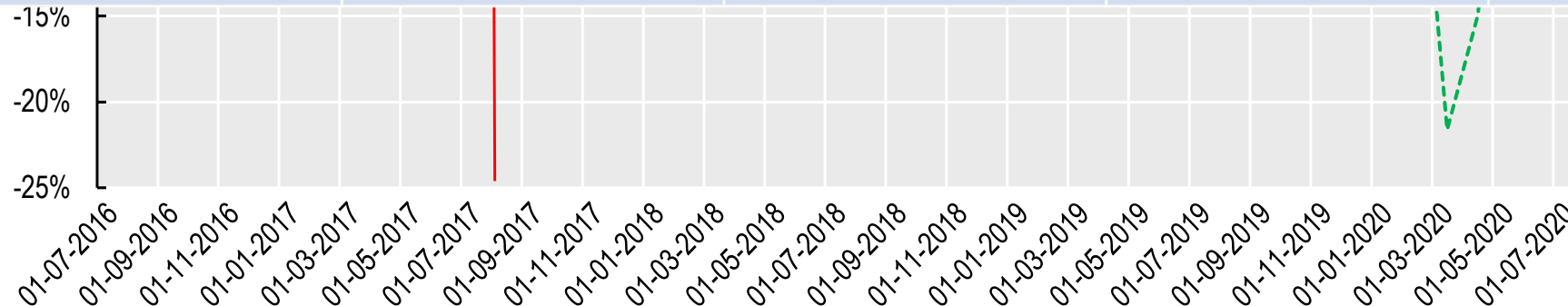
Variables included in best-performing model: imports

IMP-Model 1	
Hard	Goods imports, goods exports
Soft and Financial	Business confidence index
Uncertainty	Economic policy uncertainty index
Google	Air travel, sports
Lags of dependent variable	(none)

Results: services imports

Aggregate services imports of the United States as reported in the balance of payments: month-on-month percentage change

Model	RMSE as ratio of AR(4) RMSE	Directional accuracy	Number of variables	Category
IMP-Model 1	0.66	61%	9	Mixed
IMP-Model 2	0.67	63%	6	Mixed
IMP-Model 3	0.69	61%	5	Mixed
IMP-Model 4	0.7	61%	6	Mixed
IMP-Model 5	0.7	63%	7	Mixed



THANK YOU

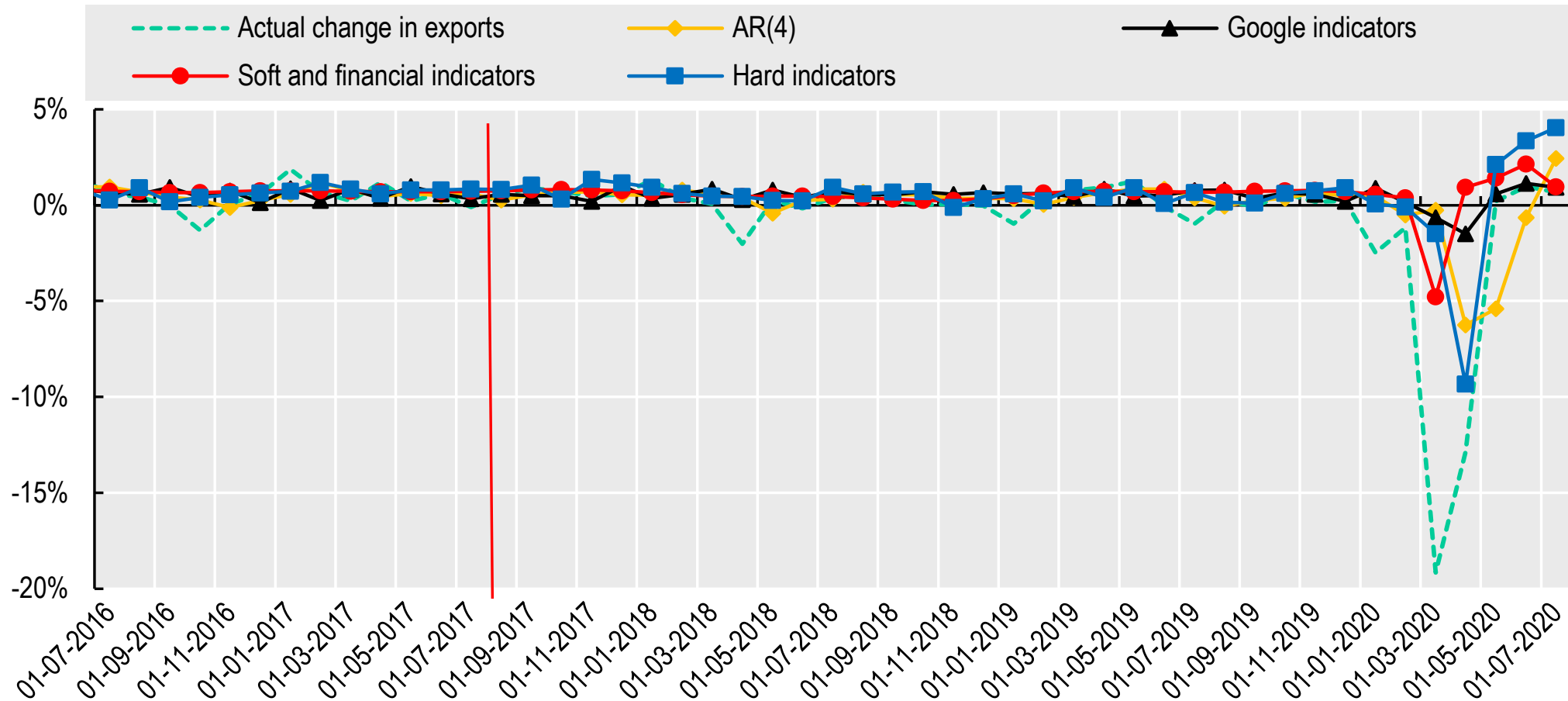
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APPENDIX

Google Trends Services Trade Indicators

Indicator	Components
Transport	Automotive Industry, Air Travel, Bus & Rail, Transportation & Logistics
Travel and tourism	Car Rental & Taxi Services, Cruises & Charters, Hotels & Accommodations, Luggage & Travel Accessories, Tourist destinations, Travel agencies & Services
Leisure	Book Retailers, Events & Listings, Games, Hobbies & Leisure, Sports
Construction	Commercial & Investment Real Estate, Property Development, Construction & Maintenance
Shop and online sales	Grocery & Food Retailers, Food Service, Mass Merchants & Department Stores, Shopping Portals & Search Engines, E-Commerce Services
Internet and Telecom	CAD & CAM, Computer Hardware, Computer Security, Enterprise Technology, Programming, Software, Internet & Telecom
Digital	Teleconferencing, Voice & Video Chat, Search Engine Optimization & Marketing, Telemarketing, Mail & Package Delivery, VPN & Remote Access, Computer Servers, Distributed & Parallel Computing, Educational Software, Web Apps & Online Tools, Web Stats & Analytics
Other services	Advertising & Marketing ; Business Finance ; Business Services ; Professional & Trade Associations; Pharmaceuticals & Biotech ; Accounting & Auditing ; Banking ; Insurance ; Investing ; Medical Facilities & Services ; Business News ; Newspapers ; Politics ; World News
Selected topics	Judicial liquidation, Recession, Bankruptcy, Unemployment benefit, Foreclosure

Category-specific models: exports



Category-specific models: imports

