Experiences in the use of forecasting and nowcasting methods for official statistics

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Outline

- Nowcasting – brief introduction
- Examples of the usage of the techniques
- Applicability of the techniques to SDGs

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Nowcasting – brief introduction

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Nowcasting – brief introduction

- Nowcasting:
  - Predicting the present, the near future and sometimes the very recent past of a indicator, using auxiliary information and statistical/data science techniques
- Why:
  - Ordinary official statistics needed for policy decisions are often less timely and less frequent than would be desirable
  - It would be costly and burdensome to increase the timeliness and frequency of ordinary official statistics
- How:
  - By using more timely data available from other sources (auxiliary data) to construct a predictor for the ordinary indicator

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Types of auxiliary information used for nowcasting

- More frequent and timely statistical surveys
  - Sales data to nowcast GDP
  - Consumer price index and consumer confidence surveys to nowcast unemployment

- IoT or other technical sensor big data
  - Traffic measurement loops monitoring heavy vehicles traffic to nowcast GDP

- Social media big data
  - Google search data (Google Trends) to improve nowcasting for the unemployment in Finland

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Statistical techniques for nowcasting

- See references, slide 14

- Tailored for each indicator, utilising various statistica/data science techniques, including ML

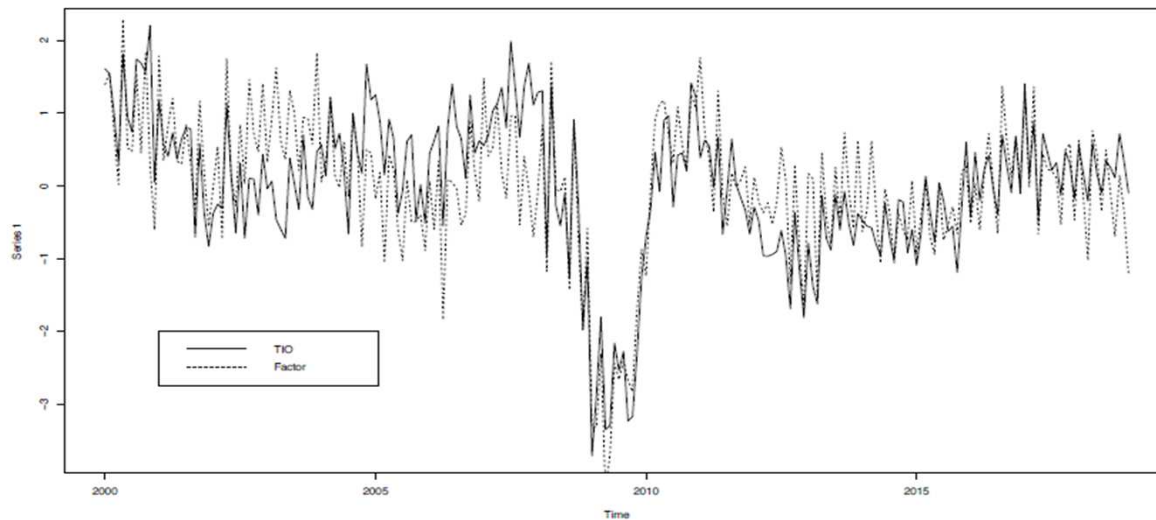Statistics Finland

Examples

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Case: Traffic sensor data

(a) TIO year-on-year growth and first principal component extracted from traffic data. Cor=0.80

- Heavy vehicle traffic correlates well with output, also during the Great Recession.
- This data can be used as predictor in a nowcasting model e.g for the GDP

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Case: Monthly GDP indicator

	Nowcast second month	Nowcast third month	Nowcasts 16 days after	StatFi Flash
ME	0.24	0.03	0.00	-0.04
MAE	0.82	0.66	0.50	0.50
RMSE	1.00	0.85	0.63	0.64
MaxE	2.13	1.86	1.15	1.45

Table: ME, MAE, RMSE and MaxE for the nowcast combination approach, evaluated using the first version of quarterly GDP year-on-year growth. The set of predictors is based on firms' sales.
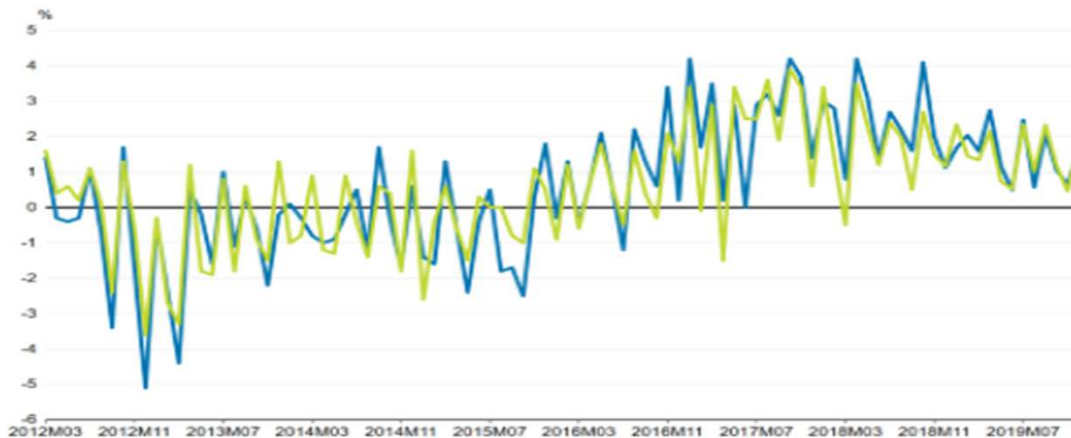
...gorous testing, T+16 ...already of similar quality than the official releases 1 month later

- In order to build trust: Errors are published regularly in order to monitor performance and promote transparency.

- We want to be careful, since these types of statistics are new to the users.

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Case: Short term business statistics

Industry	Nowcast			Before	
	T+16	T+30	T+40	t+45	t+75
Trade	1,04	0,62	0,55	0,66	0,29
Services	0,98	0,62	0,61	1,93	0,92
Manufacturing	2,05	0,53	0,41	0,45	0,39
Construction	2,24	1,79	1,71	2,58	1,51

- Revisions (MAE) implementing now to STS series at different publication schedules.

- Nowcast techniques were helpful because the source data is slow to accumulate.

- Statistics Finland is now able to produce more timely information of the different industries.

- Especially in service industries the improvement has been dramatic in both timeliness and accuracy.

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Case: Inbound tourism
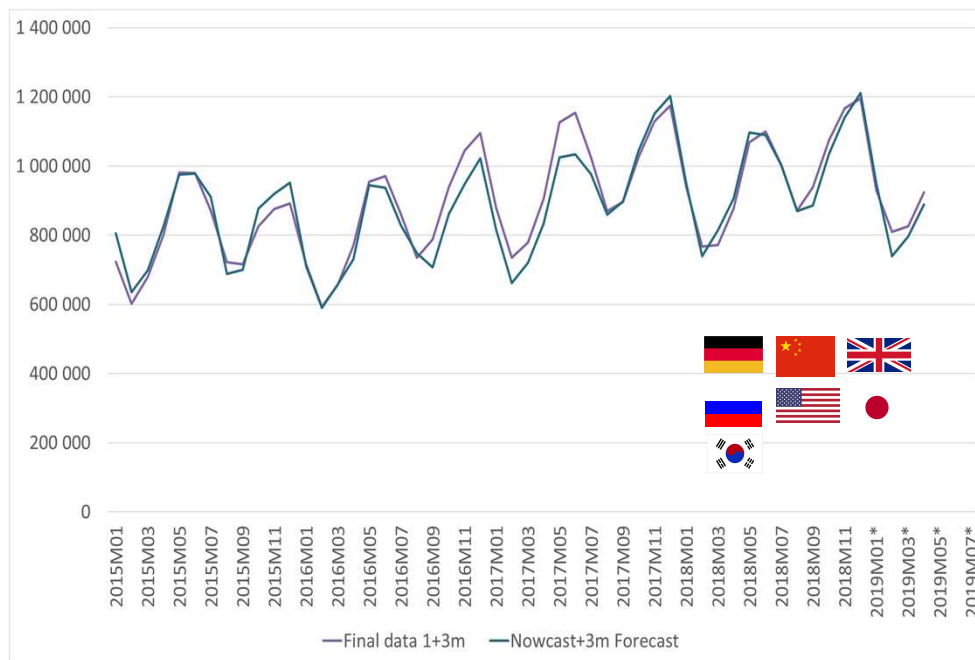
Final series vs. 3-month ahead forecast for main selected countries.
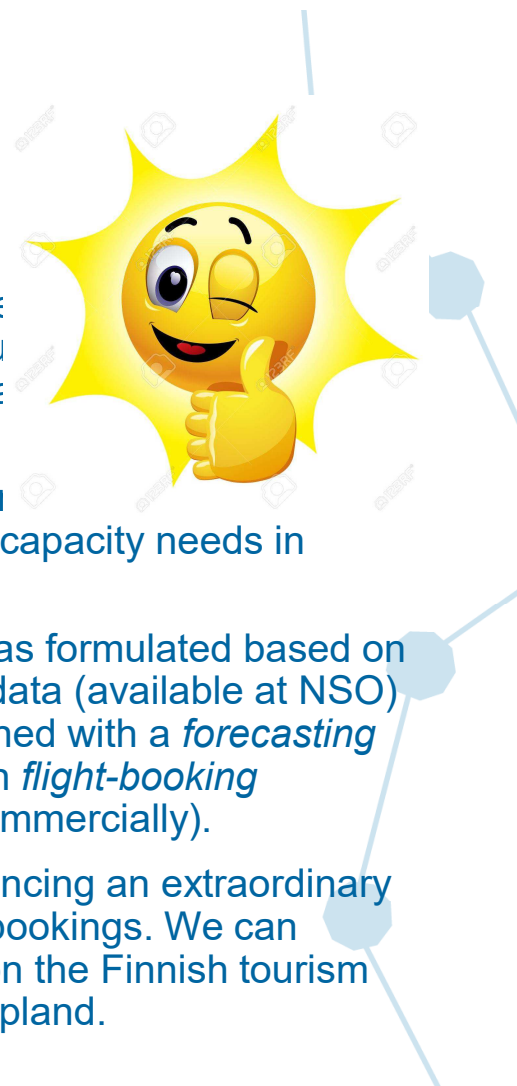
- Business Finland (a gove... charge of promoting indu... have more timely informa... different countries.

- In order to focus marketi... provide indication about capacity needs in certain areas.

- *Nowcasting* excercice was formulated based on micro-level *hotel nights* data (available at NSO) and nowcast was combined with a *forecasting* model that was based on *flight-booking* information (available commercially).

- We are currently experiencing an extraordinary canceling of flights and bookings. We can expect a strong impact on the Finnish tourism industry, especially in Lapland.

Case: EU unemployment rate
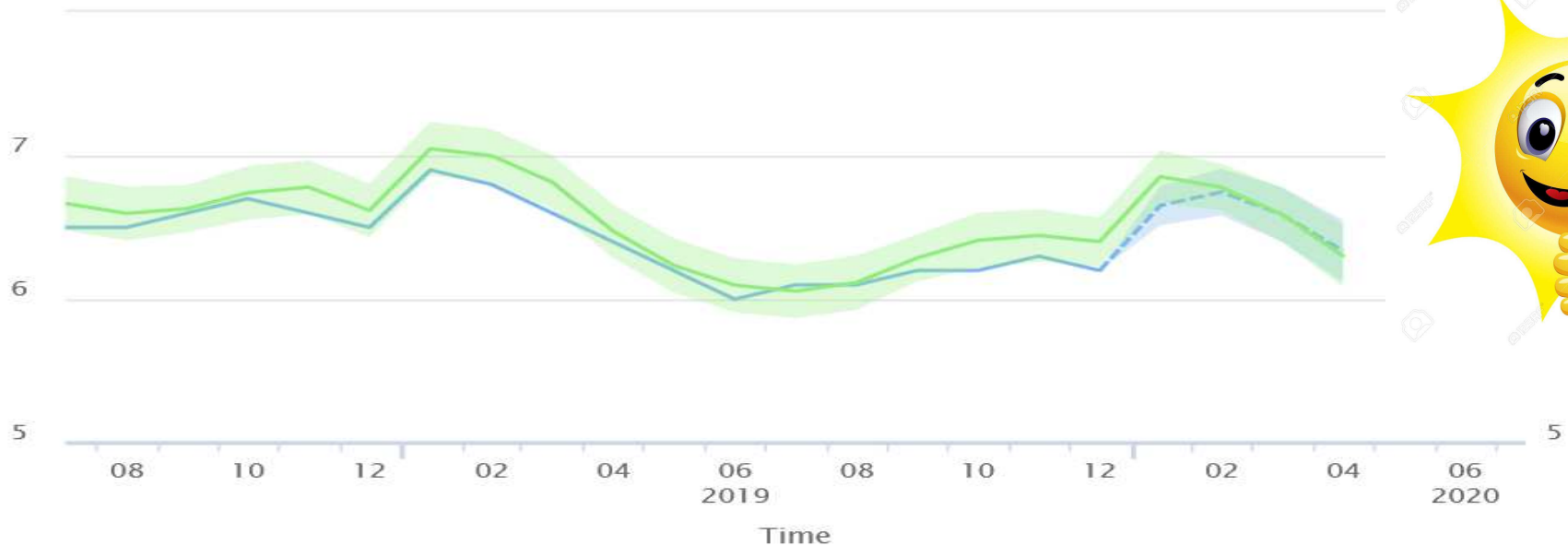
Applicability of the nowcasting techniques to SDGs

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Nowcasting and SDGs

- Success stories on the use of nowcasting concern mainly short term economic statistics
  - User demand for more timely short-term statitsics has been the main driver of the research agenda

- SDG indicators are mainly annual statistics
  - In principle, same type of methodologies as for short term statistics could be used for less frequent statistics as SDGs
  - Partly different challenges with regard to available auxiliary data and the persistence of correlation structures

- We need a research and piloting agenda for nowcasting SDG indicators
  - There may be some low hanging fruits available
  - The set of SDG indicators should be fairly stable before starting the research

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References and resources

- Anttonen, Jetro (2018). Nowcasting the Unemployment Rate in the EU with Seasonal BVAR and Google Search Data. ETLA Working Papers No 62. http://pub.etla.fi/ETLA-Working-Papers-62.pdf

- Fornaro, Paolo & Luomaranta, Henri. (2020). Nowcasting Finnish real economic activity: a machine learning approach. Empirical Economics. 58. 1-17. (article) (supplementary material and code)

- Fornaro, Paolo; Luomaranta, Henri; Saarinen, Lauri (2017) : Nowcasting Finnish Turnover Indexes Using Firm-Level Data, ETLA Working Papers, No. 46, The Research Institute of the Finnish Economy (ETLA), Helsinki (report)

- Luomaranta, H., Daas, P., Nowitzka, A., Nikic, B. (2016) Recommendations about IT tools for collection of data for purposes of Consumer Confidence Index and NowCasts of Turnover Indices. Deliverable 6.2, Workpackage 6 Early Estimates, ESSnet Big Data, Version 16 June 2016. (report).

- Luomaranta, H., Daas, P., Nowitzka, A., Nikic, B. (2016) Recommendations about methodology for processing the data for purposes of Consumer Confidence Index and NowCasts of Turnover Indices. Deliverable 6.3, Workpackage 6 Early Estimates, ESSnet Big Data, Version 16 June 2016. (report).

- EtlaNow (website)

- *Experimental statistics (*website)

- Tourism forecasting model report to be published by Business Finland 11.3.2020 (and we hope: experimental statistics soon to follow)

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Thank you!

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