Discussion: Sentiment and Uncertainty indexes for forecasting Italian economic activity

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Modelling with Big Data and Machine Learning: Measuring Economic

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Outline

Paper's goal

- Provide evidence for why text derived from newspaper carries important information to measure economic activity.
- Quantify sentiment using text data (Italian newspaper articles) covering different aspects and sectors of the economy.
- Create a new economic-oriented dictionary for Italy.
- Create and extent Baker's (2018) Economic Policy Uncertainty (EPU) for Italy.
- Use the derived indices to produce point and density forecasts and nowcasts for gdp growth (and components) at monthly and weekly frequency.

Why text?

Why text? Paper's approach

- Interview the firms in the sample of the Survey on Inflation and Growth of Bank of Italy.
- Outcome: Newspaper is the second among first ranked choice and third among the cited ones.

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- Interview the firms in the sample of the Survey on Inflation and Growth of Bank of Italy.
- Outcome: Newspaper is the second among first ranked choice and third among the cited ones.
- The evidence is survey-based - it comes along with known limitations and statistical bias.
    - Why not extend the survey and include consumers' as respondents which account for more than half of gdp?
    - Alternatively, looking solely on businesses' influence, perhaps extracting sentiment from companies earnings calls transcripts? see e.g. Soto (2020).

Italian Dictionary

Dictionary

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- Enriched with valence shifting terms (i.e. terms that affect the polarity term's sign and module).

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- Build an economic dictionary which includes polarity terms with positive and negative meaning.
- Enriched with valence shifting terms (i.e. terms that affect the polarity term's sign and module).
- The selection of words is heavily **subject to researcher's preferences.**
    - Interesting to see whether a more "data-driven" approach can be used to build a dictionary directly linked to economic activity.
    - Apply a Machine Learning method to introduce sparsity (e.g Lasso, Adaptive Lasso, Elastic net) directly to predict gdp and see which terms the model puts higher weights on (variable selection).

Sentiment and Uncertainty metric construction

Sentiment and Uncertainty construction I

- Dictionary based approach to create sentiment indicators by sector.
- Boolean method as in Baker, Bloom and Davis (2016) to create EPU indices for the Italian economy.

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- Boolean method as in Baker, Bloom and Davis (2016) to create EPU indices for the Italian economy.
- Topics are retrieved using Factiva's proprietary algorithm.
    - Why not use unsupervised machine learning to create the topics and let the data speak!
    - LDA is widely used for topic extraction (Thorsrud, 2018), or even better some of its variants which control for different topic characteristics (Structural/Dynamic/correlated topic models - computational cost can be problematic though).
    - The valence-shifting words seem to help a lot to capture the actual "depth" of the polarity. Does this call for a different feature engineering? Have you considered looking at higher moments of the metrics?

Sentiment and Uncertainty construction II

- Evidence of **heterogeneity in the sentiment** computed across different newspapers. What if you apply a different weighting scheme, e.g according to their level of circulation or topic coverage?
- What are the main differences between Baker's measure and your EPU measure? Is there uncertainty heterogeneity between newspapers, too?
- You find better track of sentiment with PMI rather than GDP. Would you consider to use sentiment to produce a flash estimate of PMI, then?

Now &**Fore - casting application**

Monthly Bayesian Moving Average model

- Nowcast and Forecast one step ahead the quartely gdp growth, value added service sector, household consumption and gross fixed investments.
- Point and density forecasts.
- Equal prior probabilities for all the models.
- Estimation period Jan-2001 to Dec-2010 (out-of sample 2010-2019).

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- Point and density forecasts.
- Equal prior probabilities for all the models.
- Estimation period Jan-2001 to Dec-2010 (out-of sample 2010-2019).
- More sizeable gains on **density forecasts and during turbulent periods**.
    - Have you tested on a different benchmark model commonly used for nowcasting (e.g MIDAS-type, bridge/factor models).
    - Are the estimates of posterior probability of inclusion for each text indices susceptible to the choice of the priors?
    - Have you tested the out of sample performance on the financial crisis 2008?

- **Weekly tracker**: Is it uncertainty or sentiment who tracks gdp? Perhaps extracting a principal component from uncertainty and from sentiment indices can provide an answer.
- Generally, all the models considered imply a linear relationship of the target and the text predictors. Would you consider to introduce some non-linearities like e.g neural nets, support vector regression?
- Looking forward to see how the trackers behave during the covid period!

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References

Baker, Scott R, Nicholas Bloom, and Steven J Davis. 2016. "Measuring economic policy uncertainty." *The Quarterly Journal of Economics*, 131(4): 1593–1636.

Soto, Paul E. 2020. "Breaking the Word Bank: Measurement and Effects of Bank Level Uncertainty." *Journal of Financial Services Research*, 1–45.

Thorsrud, Leif Anders. 2018. "Words are the New Numbers: A Newsy Coincident Index of the Business Cycle." *Journal of Business & Economic Statistics*, , (TBC): 1–35.

Appendix

(Very) Minor comments for your consideration

- It is not clear where your out-of-sample period stops. There are some mentions about end of 2010 and others about 2009.
- Correlation heatmaps are a bit confusing to read. Sometimes the depth of correlations are not straightforward. You may wish to put also some indicative numbers (or change the vivid of colors).
- Graphs on Page 38 : (b) Sentiment of Monetary Policy - Macro-topic and (c) 'Sentiment of Labor markets - Macro-topic' . The plots look exactly the same.