Reading Between the Lines: Estimating the ECB's Loss Function Using Text Analysis

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ECB's definition of price stability

- In 1998, the ECB Governing Council defined price stability as a
  - *'year-on year increase in the Harmonised Index of Consumer Prices (HICP) for the euro area of below 2% '*
- In 2003, the GC clarified that
  - *'in the pursuit of price stability it aims to maintain inflation rates below, but close to, 2% over the medium term'.*
- In July 2021, the GC adopted a new definition of price stability
  - *'[GC] considers that price stability is best maintained by aiming for a 2% inflation target over the medium term. This target is symmetric, meaning negative and positive deviations of inflation from the target are equally undesirable. '*

This paper: 'Symmetric 2%' vs. 'Close but below 2%'

- We try to assess to what extent the ECB's new definition of price stability is likely to change the ECB's policy preferences.
- New definition of price stability implies that from now onwards the ECB's loss function will be
  - symmetric
  - with a bliss point at 2.0%
- The now 'old' definition was less clear, and open to interpretation.
  - One cannot infer the ECB's loss function based on the 'old' definition of price stability only.

Key questions

- We estimate the ECB's loss function under the old definition of price stability.
- Key questions:
  1. Was the loss function symmetric or asymmetric with respect to inflation?
  2. Was the bliss point 2.0%? If not, how much did it differ from 2.0%?
- Addressing these questions allows us to compare the ECB's old and new definitions of price stability.

Reading between the lines

- What does qualitative communication reveal about the ECB GC's preferences?
- How semantic content of ECB's introductory statements and the Eurosystem/ECB staff macroeconomic projections are related?
- Shapiro and Wilson (RES, forthcoming) approach
  - Apply text mining techniques (language processing) to introductory statements in order to infer the ECB's preferences directly
  - Construct net negativity index (tone) which measures the sentiment (positive, negative) in the introductory statements
    - Use it as a proxy for the loss in order to estimate parameters of the loss function

Net negativity index (tone)

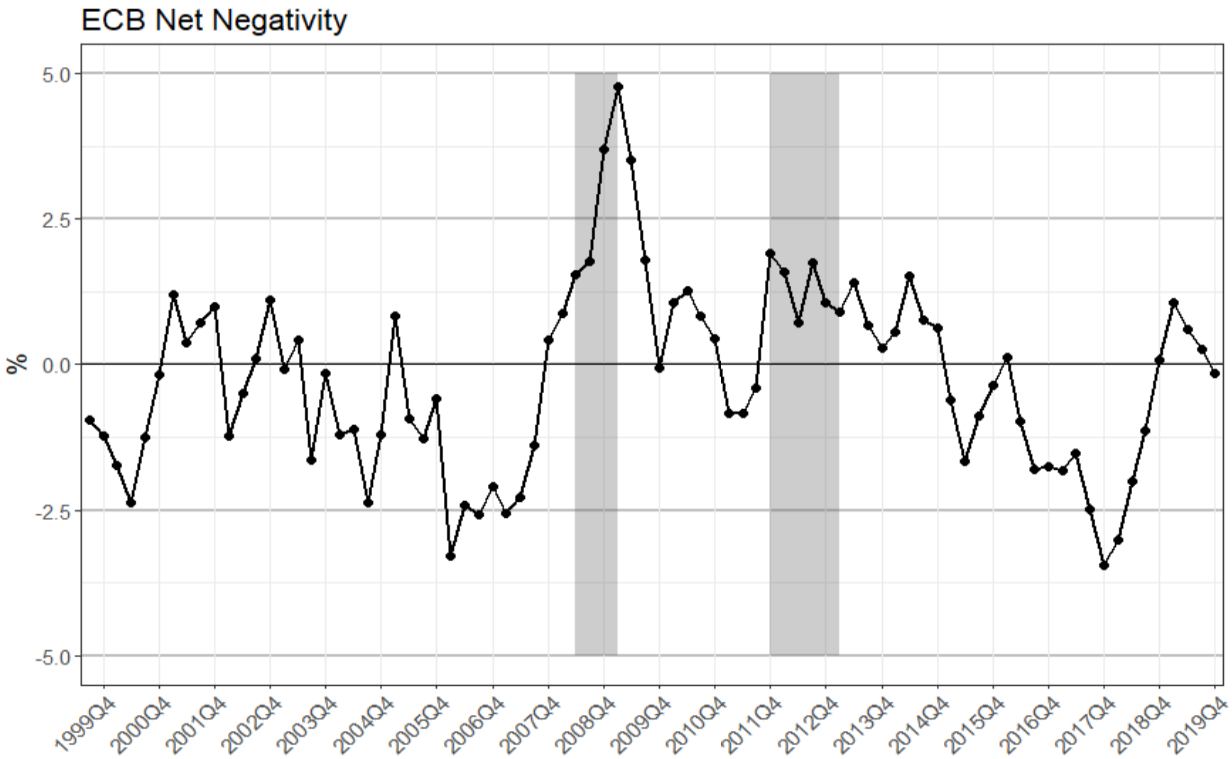
- Use Loughran & McDonald (2011) finance-specific dictionary
- Calculate the difference of the number of negative and positive words, normalized with the total number of words in the ECB introductory statement:

$$N_t = \frac{\#Neg - \#Pos}{\#Tot}$$

Example: Positive, Negative
'The risks surrounding the economic outlook for the euro area continue to be on the downside. In particular, the weakening in the euro area's growth momentum, alongside heightened geopolitical risks, could dampen confidence and, in particular, private investment. In addition, insufficient progress in structural reforms in euro area countries constitutes a key downward risk to the economic outlook.'

- Handling negations: e.g. *insufficient progress*

Figure 1: Tone (net negativity)



- Decreasing before the financial crisis
- After the peak in the middle of the financial crisis, a gradual fall (increasingly more positive) until the end of 2017
- European debt crisis also associated with increased net negativity

Figure 2: Tone and Inflation: Averages in 0.2 pp Buckets

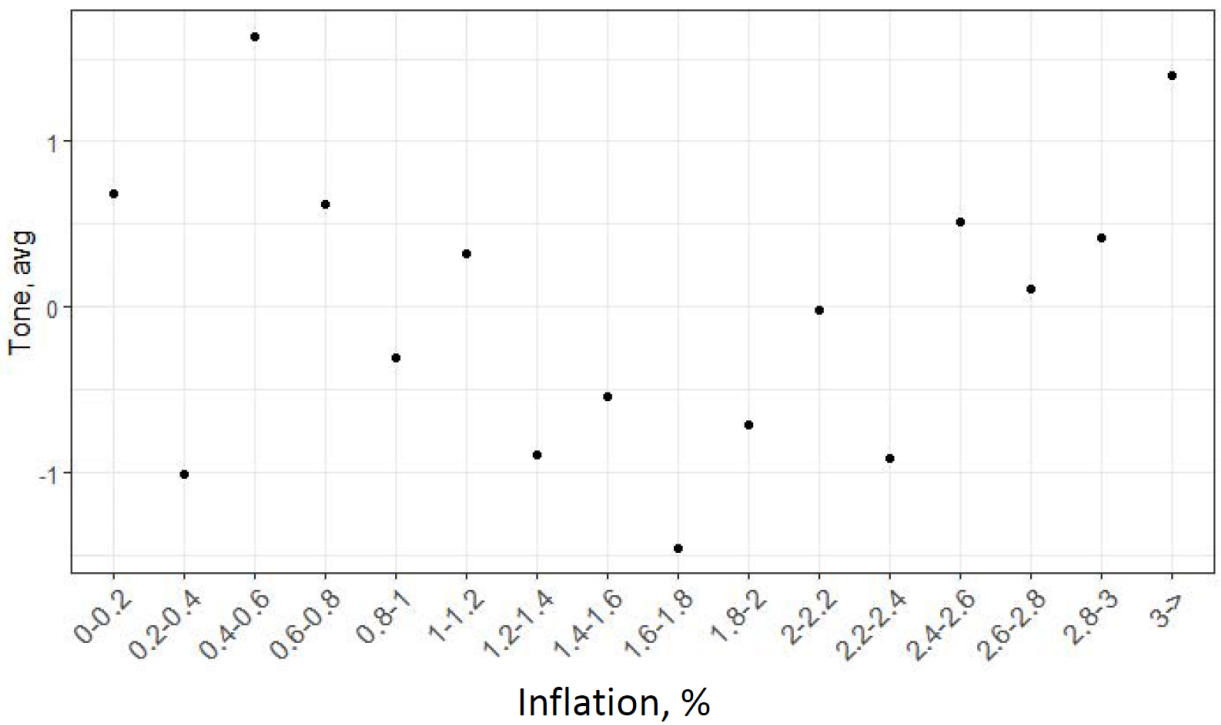
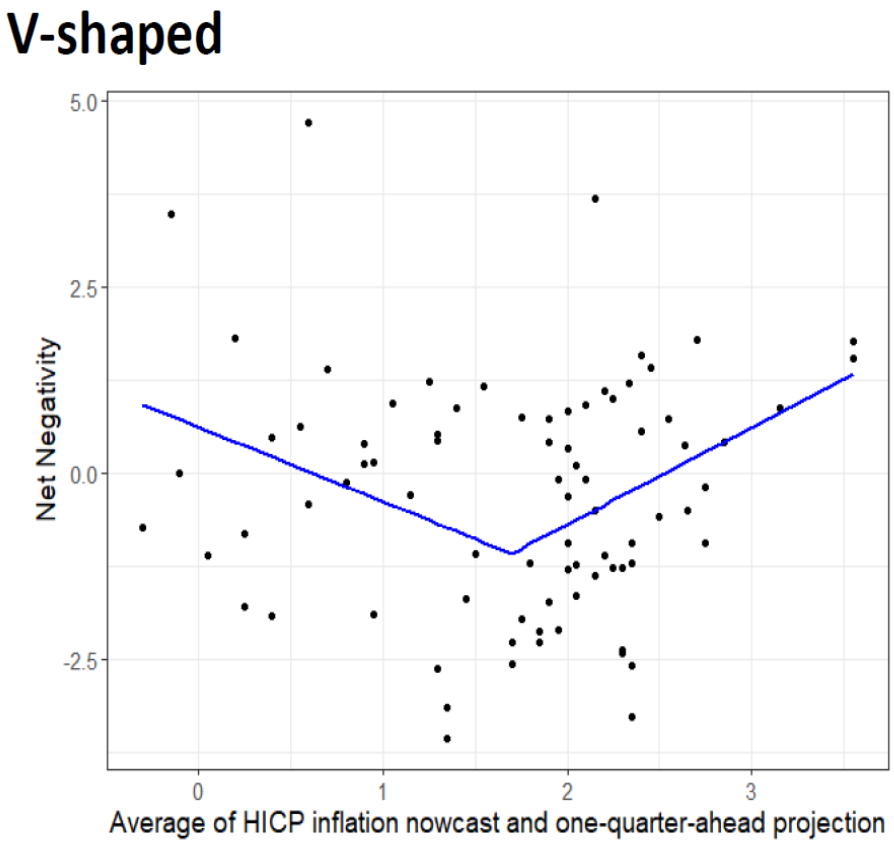


Figure 3: Estimated Loss Functions



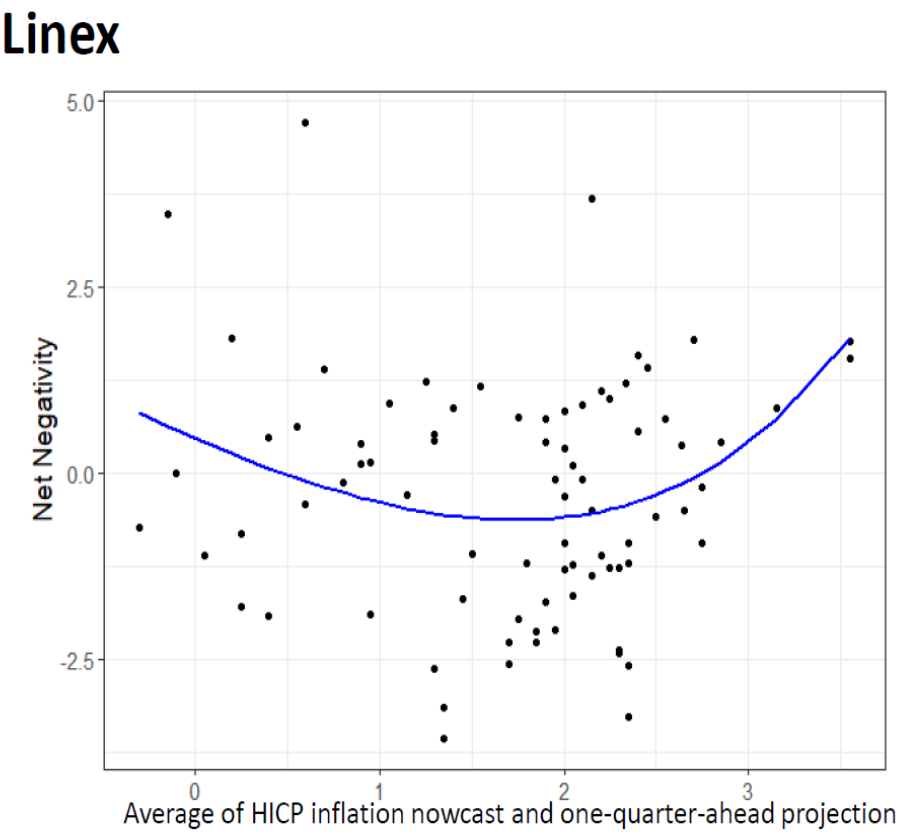
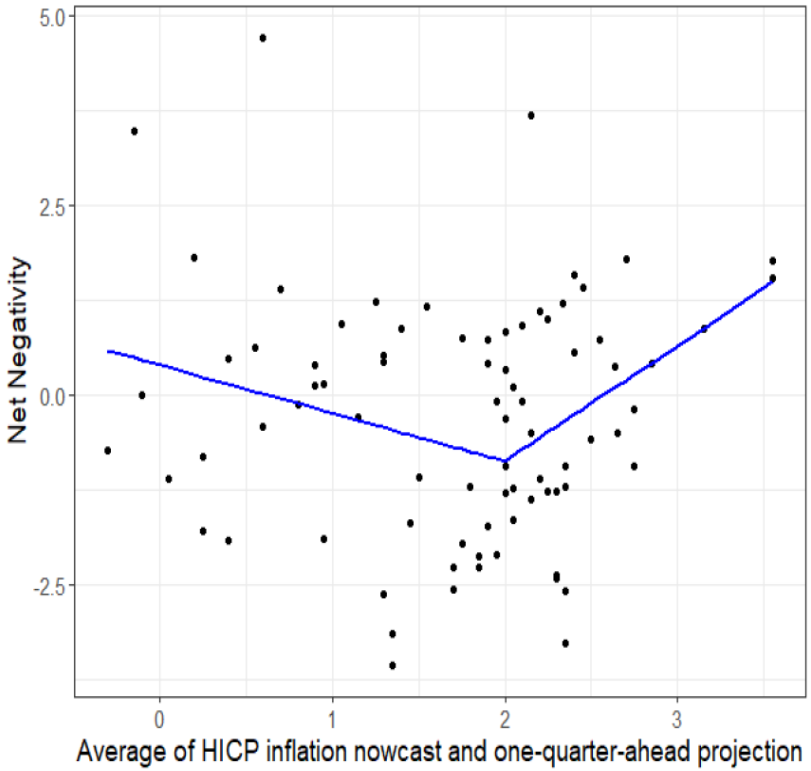
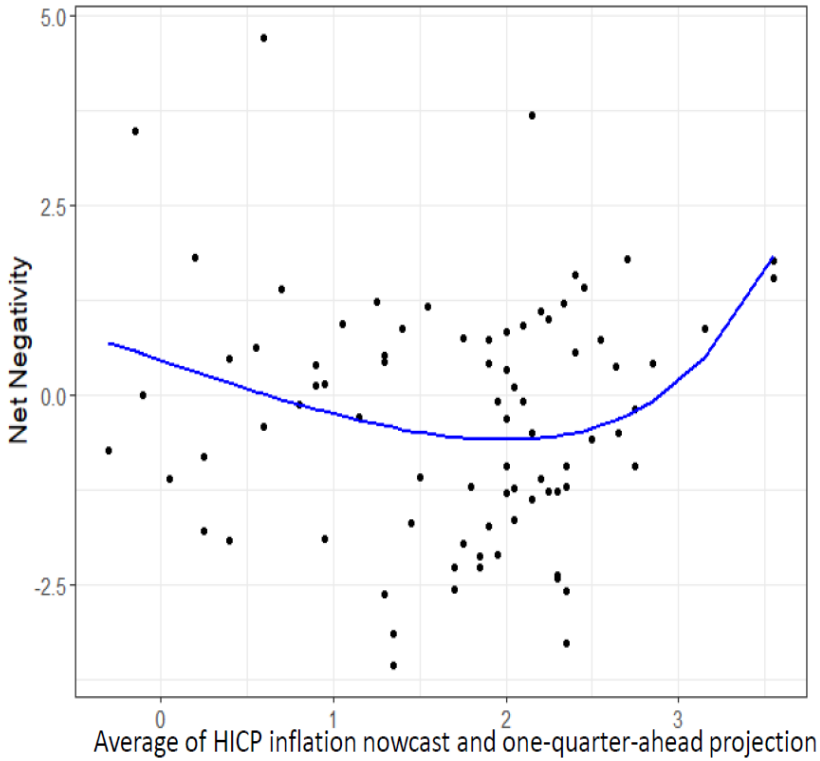


Figure 4: Estimated Loss Functions: *De Facto* Inflation Target Set to 2.0%

V-shaped



Linex



Conclusions

- The ECB's new definition of price stability (adopted in July 2021) implies a **symmetric** loss function with a bliss point **at 2.0%**
- Under the now old definition of price stability the ECB's loss function was
  - **asymmetric**
  - and/or the bliss point was considerably **below 2.0%**
- These results are robust to
  - the tone measure (general / inflation specific)
  - the functional form of the loss function (piecewise linear / Linex)
  - frequency of observations (quarterly / monthly)
  - inclusion / exclusion of output gap terms in the loss function