

Discussion of the paper: "On the Evolution of the United Kingdom Price Distributions"

Discussion by Fabrizio Venditti

ECB

10th ECB Workshop on Forecasting Techniques: Economic Forecasting with Large Datasets,

Roadmap of the Discussion

- The "Little Prince" introduction
- Functional Principal Components for dummies (mainly me)
- Why do we care about distributions
- Do we need shrinkage for distributions?
- The "Little Prince" conclusion
- The actual conclusion

The Little Prince introduction



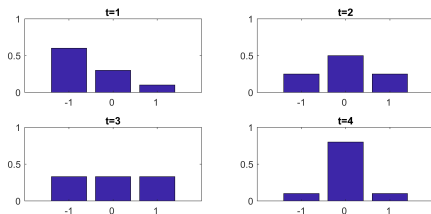
This is not a hat

Functional Principal Components for dummies (i.e. myself)

- We observe T cross section of prices/price changes
- At each point in time, t , we have an estimated *density*
- We have T estimated densities
- I can represent each of these densities as a mixture of r densities ($r < T$)
- The loadings are t specific.

Example: observe price distributions in four periods

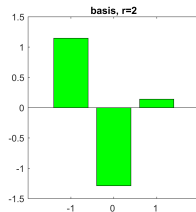
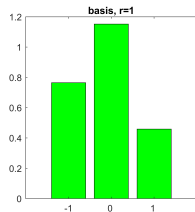
ΔP_t	t=1	t=2	t=3	t=4
-1	0.6	0.25	0.33	0.1
0	0.3	0.5	0.33	0.8
1	0.1	0.25	0.33	0.1



From these compute a 4×4 covariance matrix, eigenvalues and eigenvectors and use them to estimate "bases". I set $r=2$.

Estimated bases

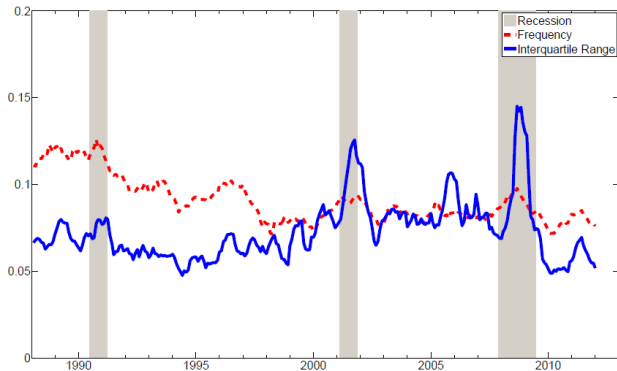
- From $T=4$ I reduced the problem to $r=2$
- At each t , I can think of the observed distribution as a linear combination of the bases
- NB: here loadings change over time, "factors" are fixed



Do we care?

- Quite a lot, especially if you are a central banker
- Vavra (2014): *greater volatility leads to greater aggregate price flexibility so that nominal stimulus generates mostly inflation rather than real output growth. In addition, volatility is strongly countercyclical. This in turn leads to a reduction in the ability of monetary policy to stimulate the real economy during recessions.*

Figure 1: Price Changes Across Time

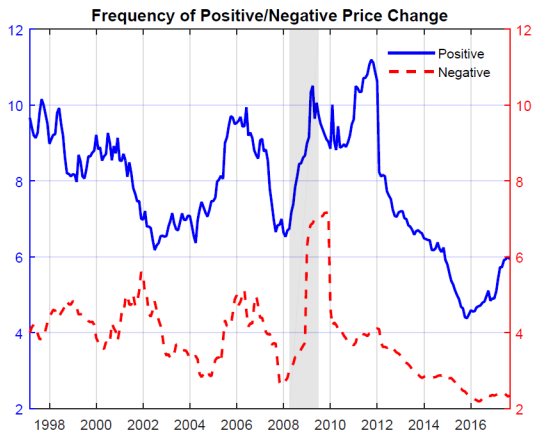


Data is seasonally adjusted using 12 monthly dummies and smoothed with a 6 month moving average.
Frequency is the Median Frequency of Adjustment.

Do we care?

- Quite a lot, especially if you are a central banker
- Petrella, Santoro, de la Porte Simonsen (2018):
- After the Great Recession the dispersion of price changes has increased and the frequency of adjustment has dropped
- Rationalize with an sS model
- Increased *inaction region* implies lower ability to stimulate inflation with monetary policy

Petrella, Santoro, de la Porte Simonsen (2018)



Why do we do shrinkage?

Typical reasons for data reduction for econometricians

- Want to estimate an underlying unobserved common component
- Want to reduce estimation error for prediction

As economists do we need density shrinkage?

In the context of "economic analysis"

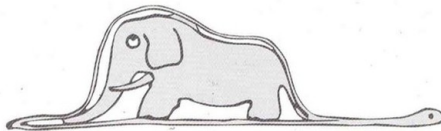
- Want do I gain by shrinkage?
- Commonality seems to be very low, so maybe we *need* to look at individual densities
- People typically look at how densities change in some states of the world (recession/debt overhang)
- What do I learn from the bases and the loadings that I do not learn from individual densities?

As forecasters do we need density shrinkage?

In the context of density forecasting

- Want do I gain by shrinkage?
- Density forecasting looks ok, but do I have a benchmark?
- Loadings seem very persistent over time, maybe RW density forecast is sufficient?

The Little Prince Conclusion: it was not a hat!



The actual conclusion

- Congratulations for the publication!
- Very interesting work
- Valuable methodological extension for people working with surveys (wealth/income/consumption distributions can be robustly studied)
- Broader applications possible: Construction of portfolio returns?
- Need to think about how we can use these tools for selecting economic models