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INSTITUTE FOR  
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NATIONAL RESEARCH  
UNIVERSITY

# Getting a New Angle on Rationality of SPF Individual Forecasters

Victoria Petrenko

# Overview

- ❑ Rationality of individual forecasters
- ❑ Loss function parameter varies over forecast horizons
- ❑ Its distribution over forecasters
- ❑ Interconnection between forecast accuracy and rationality

# Plan

- ❑ Framework
- ❑ Notion of rationality
- ❑ Estimation
- ❑ Results

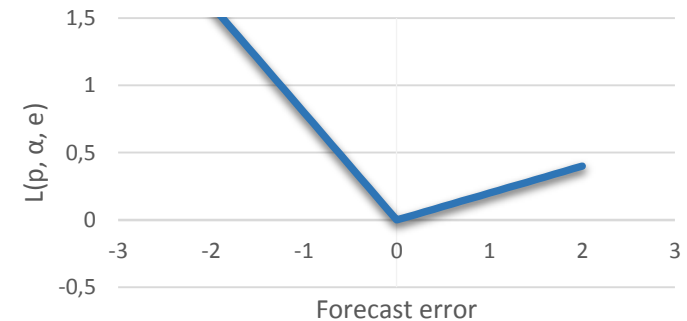
# Framework

- Loss function minimization
- Elliott, Komunjer and Timmermann (2005)

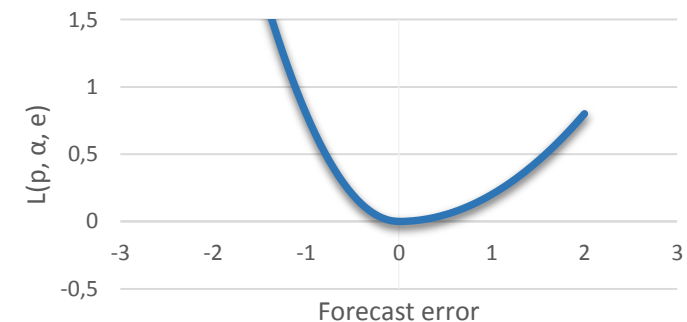
$$L(p, \alpha, e_{t+1}) = (\alpha + (1 - 2\alpha)1_{e_{t+1} < 0})|e_{t+1}|^p$$

- Asymmetry parameter ( $\alpha$ ) varies over forecast horizons

Loss function ( $p=1, \alpha=0.2$ )



Loss function ( $p=2, \alpha=0.2$ )



# Rationality

Conditions for the derivative of the loss function:

1. Conditional expectation is equal to zero
2. Conditional covariance of the forecast error and any variable from the information set is equal to zero
3. Conditional autocorrelation of order larger than forecast horizon is equal to zero

# Estimation

- GMM estimation ( $\alpha$ )
- Set of instruments:
  1. Constant
  2. Lag of median SPF forecast error
  3. Lag of the forecast error
  
- $p$  is chosen exogenously

# Data

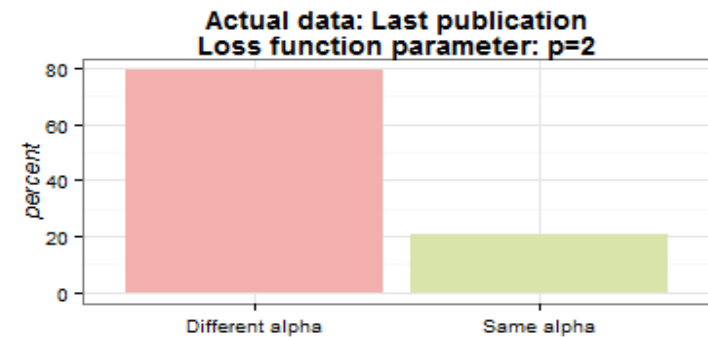
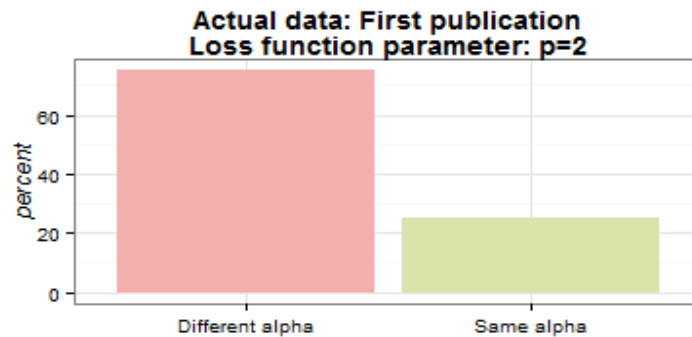
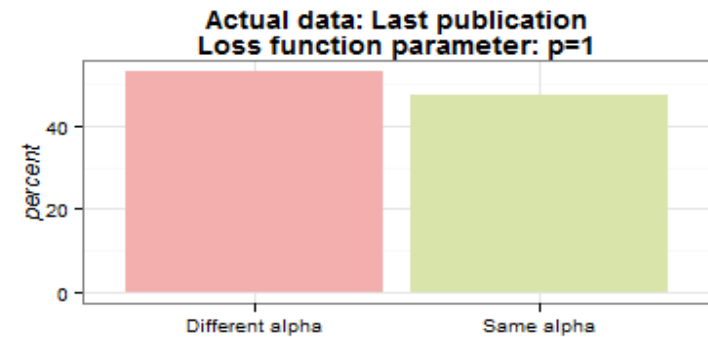
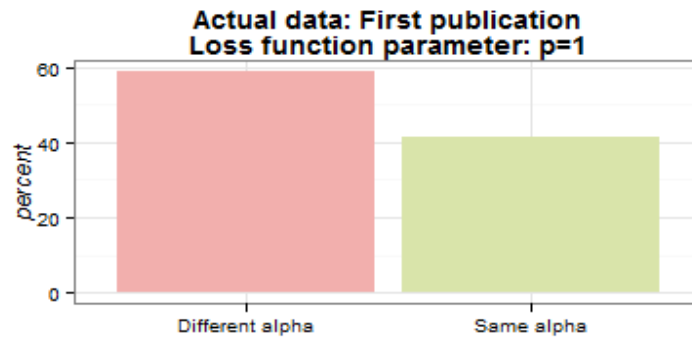
- ❑ CPI inflation rate
- ❑ US Survey of Professional Forecasters (SPF)
- ❑ Period: 1981 – 2014
- ❑ 50 Individual forecasters
- ❑ Forecasts for current quarter and 1-4 quarters ahead
- ❑ 2 types of data vintages

# Results

- ❑ Does asymmetry parameter depend on forecast horizon?
- ❑ Asymmetry parameter distribution
- ❑ Accuracy comparison



# Is asymmetry parameter same for all forecast horizons?



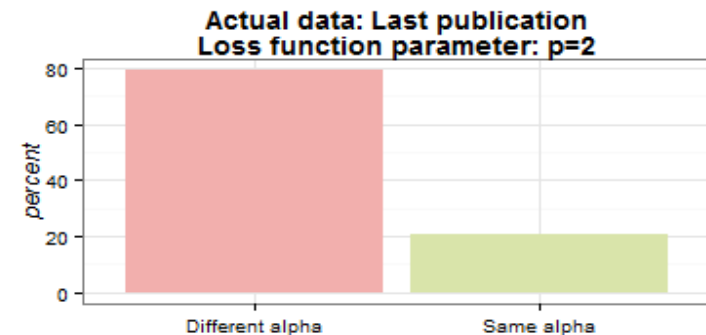
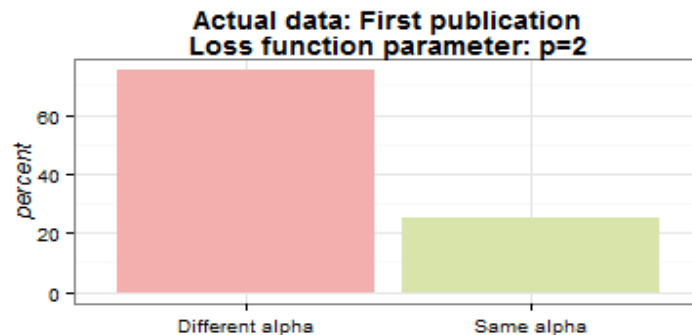
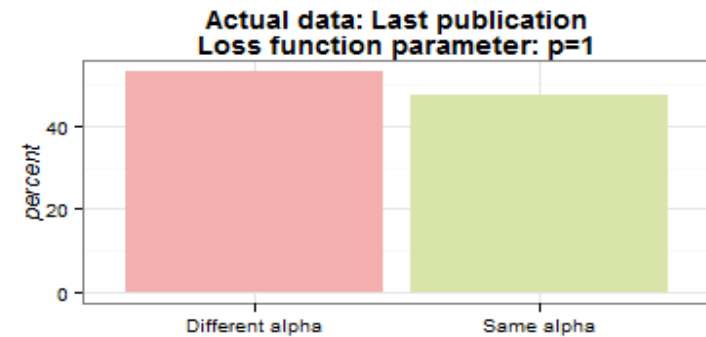
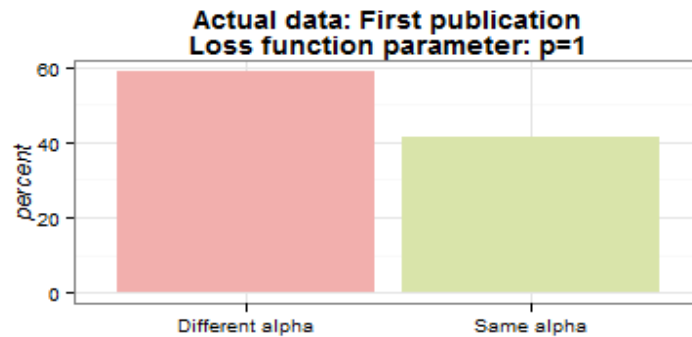
Testing the hypothesis that alphas are same across all forecast horizons

■ Ho is rejected at 10%    ■ Ho is not rejected at 10%



# Is asymmetry parameter same for all forecast horizons?

## Data vintage



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# Is asymmetry parameter same for all forecast horizons?

Data vintage

First publication

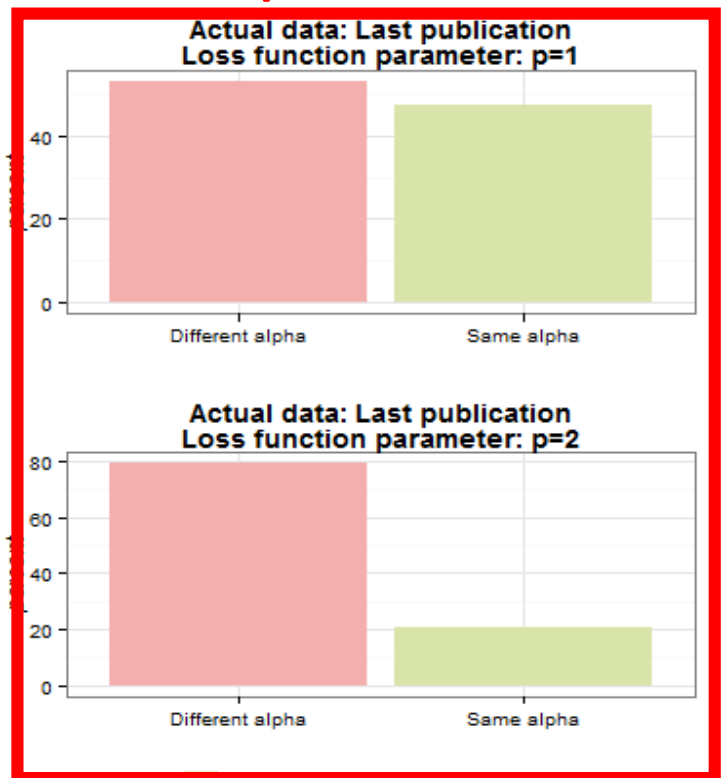
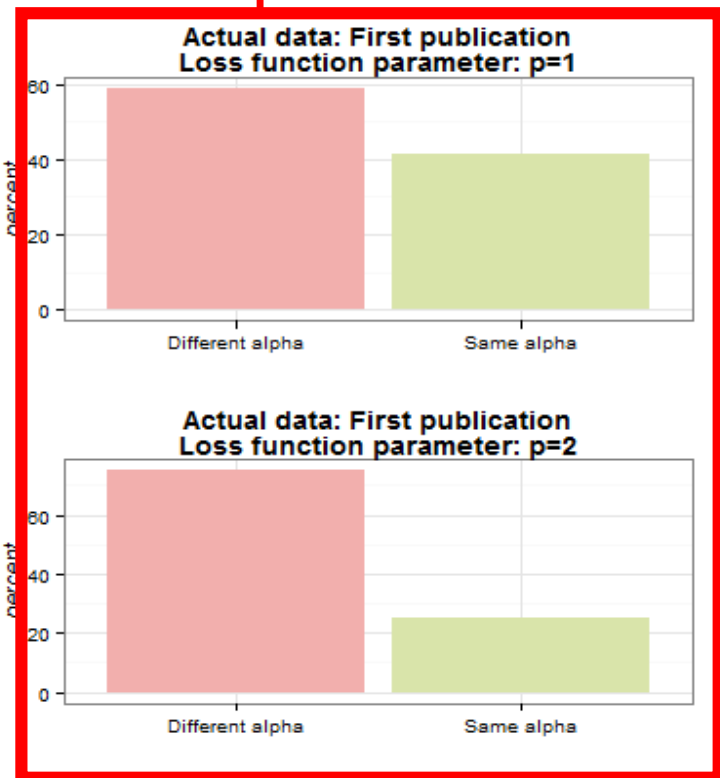


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Data vintage

First publication

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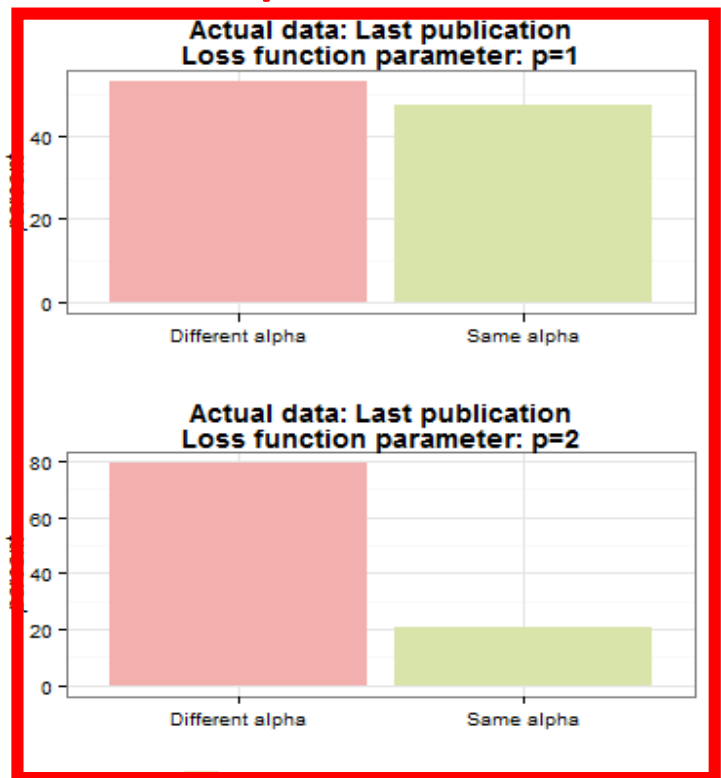
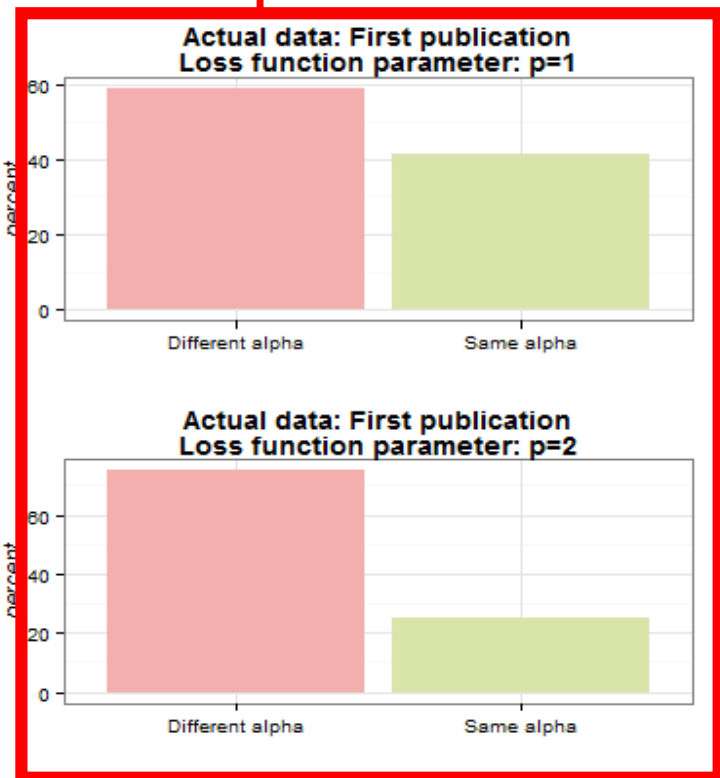


# Is asymmetry parameter same for all forecast horizons?

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Loss function parameter



# Is asymmetry parameter same for all forecast horizons?

Data vintage

First publication

Last publication

Loss function parameter

$p=1$



# Is asymmetry parameter same for all forecast horizons?

Data vintage

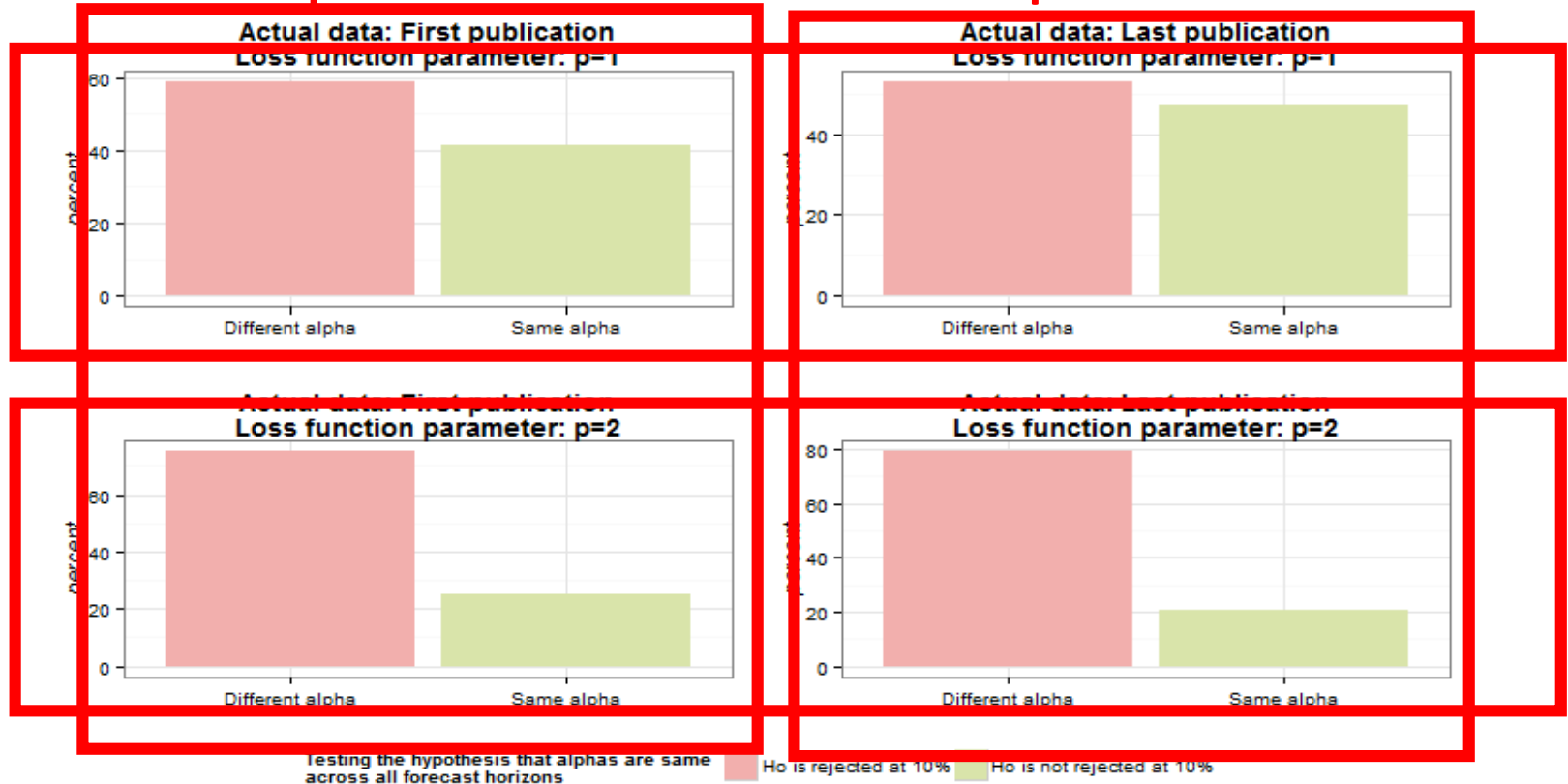
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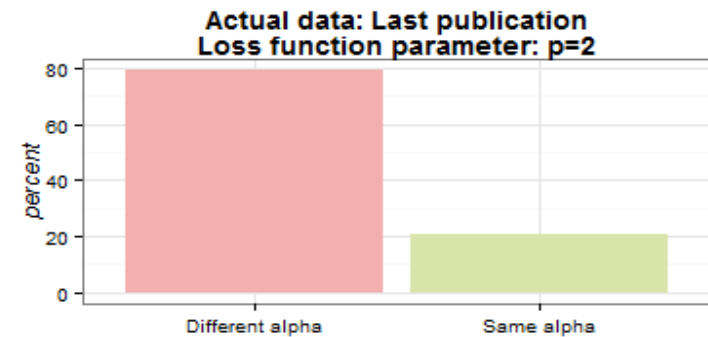
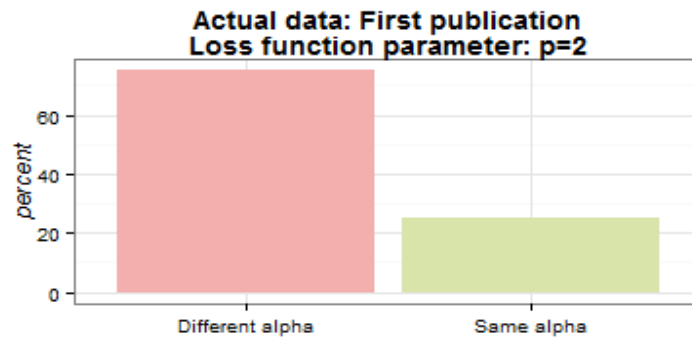
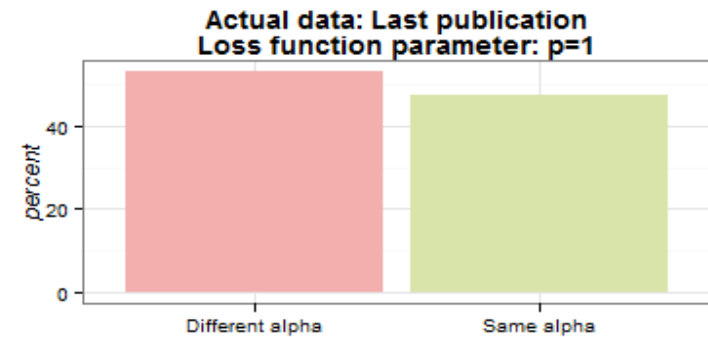
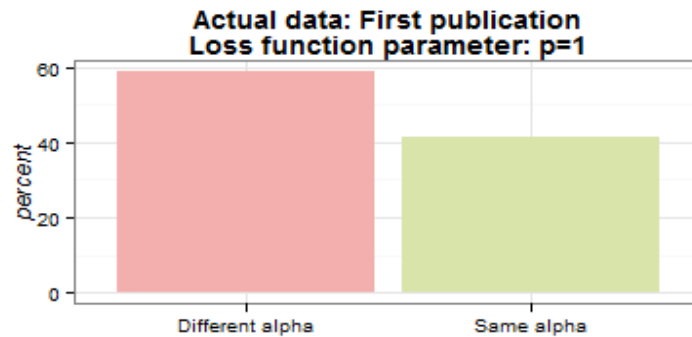
Loss function parameter

$p=1$

$p=2$



# Is asymmetry parameter same for all forecast horizons?

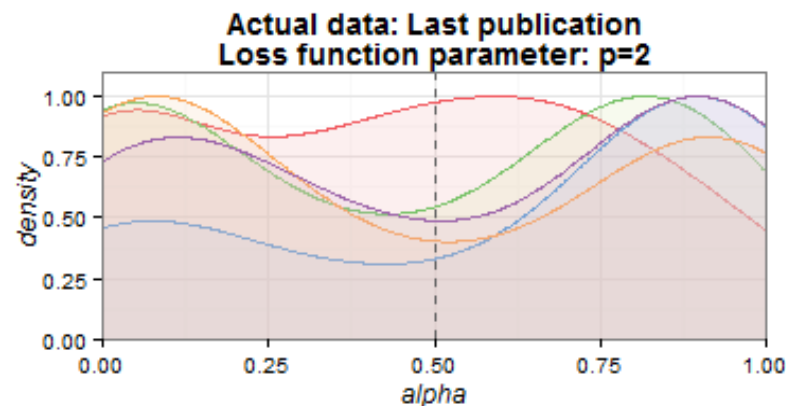
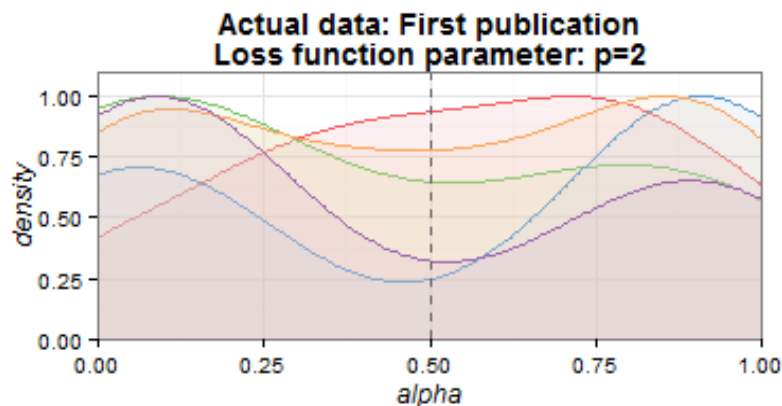
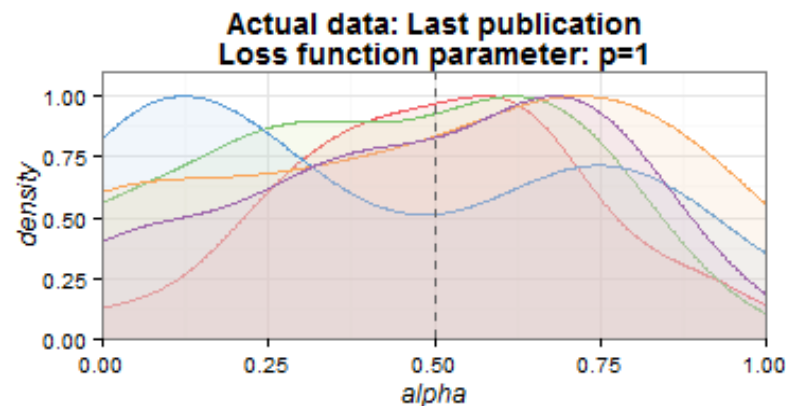
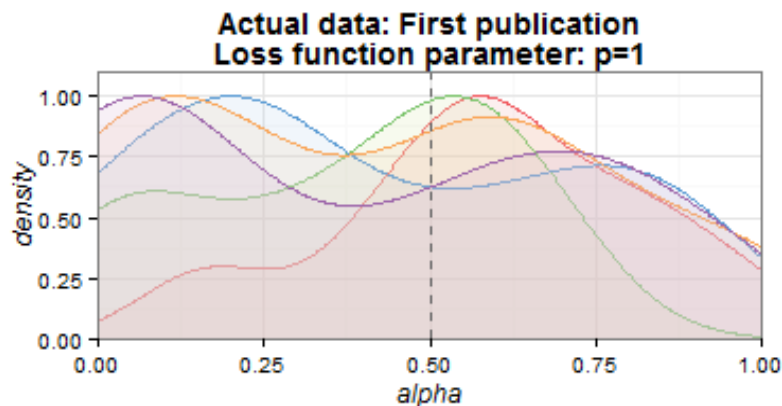


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# Asymmetry parameter distribution



Forecast horizon 1 2 3 4 5

# Asymmetry parameter distribution and forecast accuracy

Individual projection VS Median forecast

# Asymmetry parameter distribution and forecast accuracy

Individual projection VS Median forecast



DM statistics

# Asymmetry parameter distribution and forecast accuracy

Individual projection VS Median forecast



DM statistics



Projections more accurate than median

# Asymmetry parameter distribution and forecast accuracy

Individual projection VS Median forecast



DM statistics



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Individual projection VS Median forecast



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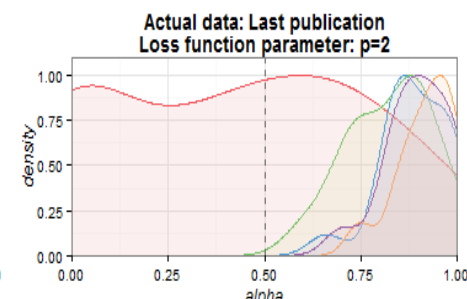
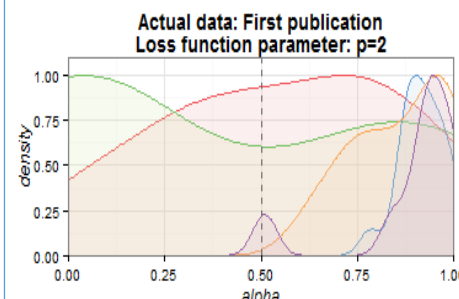
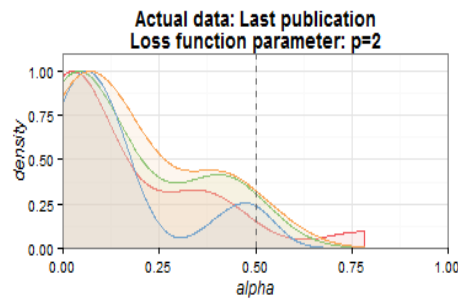
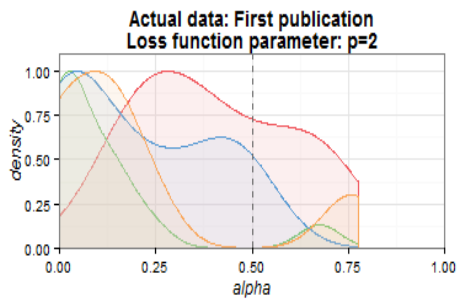
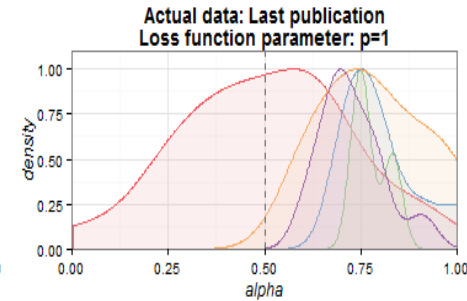
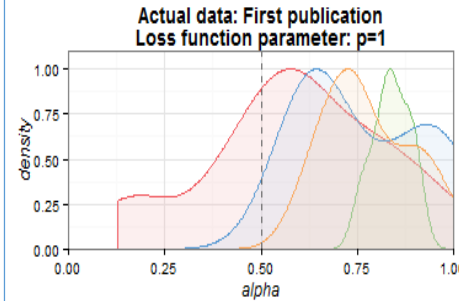
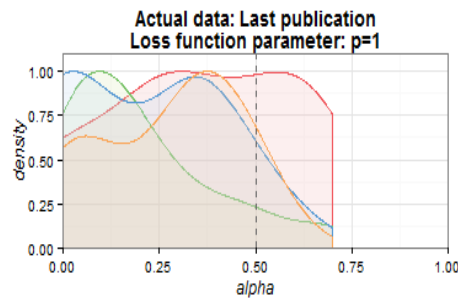
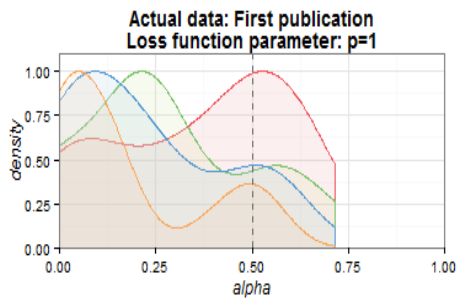


Distribution 1



Distribution 2

# Asymmetry parameter distribution and forecast accuracy



Projections more accurate than median

Projections less accurate than median

# Conclusion

- ❑ Asymmetry parameter depends on forecast horizon
- ❑ Asymmetry parameter distribution
- ❑ The fear of overprediction tends to result in more accurate forecasts





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**Thank you for attention!**