Appendix to "The Anchoring of US Inflation Expectations Since 2012"

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Given a sample of point forecasts of inflation, we measure the degree of anchoring as the average distance (using the squared distance norm) of the individual inflation expectations from the central bank's inflation target, π^*. Note that this definition treats inflation expectations above and below the target in a symmetric manner.

$$Degree\ of\ anchoring_t = \frac{1}{N_t}\sum_i \left(\pi^e_{i,t+h|t} - \pi^*_t\right)^2$$

As we show below, this measure of anchoring of inflation expectations consists of two components: (1) the squared deviation of the consensus forecast from the central bank's inflation target and (2) the extent of disagreement across forecasters over inflation as given by the average squared deviation of inflation expectations from the consensus mean:

$$Degree\ of\ anchoring_t = \left(\bar{\pi}^e_t - \pi^*_t\right)^2 + \frac{1}{N_t}\sum_i \left(\pi^e_{i,t+h|t} - \bar{\pi}^e_t\right)^2$$

The derivation is as follows:

$$\frac{1}{N_t}\sum_i \left(\pi^e_{i,t+h|t} - \pi^*_t\right)^2 = \frac{1}{N_t}\sum_i \left[\left(\pi^e_{i,t+h|t} - \bar{\pi}^e_t\right) + \left(\bar{\pi}^e_t - \pi^*_t\right)\right]^2$$

$$= \frac{1}{N_t}\sum_i \left(\pi^e_{i,t+h|t} - \bar{\pi}^e_t\right)^2 + \frac{1}{N_t}\sum_i \left[\left(\bar{\pi}^e_t\right)^2 + \left(\pi^*_t\right)^2 - 2\left(\bar{\pi}^e_t\right)\left(\pi^*_t\right) + 2\left(\pi^e_{i,t+h|t}\right)\left(\bar{\pi}^e_t\right) - 2\left(\pi^e_{i,t+h|t}\right)\left(\pi^*_t\right) - 2\left(\bar{\pi}^e_t\right)^2 + 2\left(\bar{\pi}^e_t\right)\left(\pi^*_t\right)\right]$$

$$= \frac{1}{N_t}\sum_i \left(\pi^e_{i,t+h|t} - \bar{\pi}^e_t\right)^2 + \left(\bar{\pi}^e_t\right)^2 + \left(\pi^*_t\right)^2 - 2\left(\bar{\pi}^e_t\right)\left(\pi^*_t\right) + 2\left(\bar{\pi}^e_t\right)^2 - 2\left(\bar{\pi}^e_t\right)\left(\pi^*_t\right) - 2\left(\bar{\pi}^e_t\right)^2 + 2\left(\bar{\pi}^e_t\right)\left(\pi^*_t\right)$$

$$= \frac{1}{N_t}\sum_i \left(\pi^e_{i,t+h|t} - \bar{\pi}^e_t\right)^2 + \left(\bar{\pi}^e_t\right)^2 + \left(\pi^*_t\right)^2 - 2\left(\bar{\pi}^e_t\right)\left(\pi^*_t\right)$$

$$= \frac{1}{N_t}\sum_i \left(\pi^e_{i,t+h|t} - \bar{\pi}^e_t\right)^2 + \left(\bar{\pi}^e_t - \pi^*_t\right)^2$$

$$= \left(\bar{\pi}^e_t - \pi^*_t\right)^2 + \frac{1}{N_t}\sum_i \left(\pi^e_{i,t+h|t} - \bar{\pi}^e_t\right)^2$$