Appendix to

"Flexible Average Inflation Targeting and Inflation Expectations: A Look at the Reaction by Professional Forecasters." 2020. Kristoph Naggert, Robert Rich, and Joseph Tracy. Federal Reserve Bank of Cleveland, *Economic Commentary*, 2021-09.

In this appendix, we provide details on the decomposition of the change in mean long-term inflation expectations between two surveys.

Define the mean long-term inflation expectations at time t to be:

$$\overline{\pi}_t^e = \frac{1}{N_t}\sum_i \pi_{it}^e$$

Let S denote the set of respondents who participate in both surveys, L the respondents who participate in period t but not t+1, and J the respondents who do not participate in period t but do participate in period t+1. Similarly, let N_t be the total number of respondents participating in period t, N_S the number who participate in both surveys, N_{Lt} the number who participate in period t but not t+1, and N_{Jt+1} the number who do not participate in period t but do participate in period t+1. The change in long-term inflation expectations between two adjacent surveys is given by:

$$\begin{aligned}
\Delta\overline{\pi}_{t+1,t}^e &= \overline{\pi}_{t+1}^e - \overline{\pi}_t^e \\
&= \left[\frac{1}{N_{t+1}}\left(\sum_{i\in S}\pi_{it+1}^e + \sum_{k\in J}\pi_{kt+1}^e\right)\right] - \left[\frac{1}{N_t}\left(\sum_{i\in S}\pi_{it}^e + \sum_{j\in L}\pi_{jt}^e\right)\right] \\
&= \left[\frac{1}{N_{t+1}}\sum_{i\in S}\left(\pi_{it+1}^e - \pi_{it}^e + \pi_{it}^e\right) - \frac{1}{N_t}\sum_{i\in S}\pi_{it}^e\right] + \left[\frac{1}{N_{t+1}}\sum_{k\in J}\pi_{kt+1}^e - \frac{1}{N_t}\sum_{j\in L}\pi_{jt}^e\right] \\
&= \left(\frac{N_S}{N_{t+1}}\right)\frac{1}{N_S}\sum_{i\in S}\left(\pi_{it+1}^e - \pi_{it}^e\right) + \left(\frac{N_S}{N_{t+1}} - \frac{N_S}{N_t}\right)\frac{1}{N_S}\sum_{i\in S}\pi_{it}^e + \left[\left(\frac{N_{Jt+1}}{N_{t+1}}\right)\frac{1}{N_{Jt+1}}\sum_{k\in J}\pi_{kt+1}^e - \left(\frac{N_{Lt}}{N_t}\right)\frac{1}{N_{Lt}}\sum_{j\in L}\pi_{jt}^e\right] \\
&= \left(\frac{N_S}{N_{t+1}}\right)\left[\left({}_s\overline{\pi}_{t+1}^e - {}_s\overline{\pi}_t^e\right) + \left(1 - \frac{N_{t+1}}{N_t}\right){}_s\overline{\pi}_t^e\right] + \left(\frac{N_{Jt+1}}{N_{t+1}}\right)\overline{\pi}_{Jt+1}^e - \left(\frac{N_{Lt}}{N_t}\right)\overline{\pi}_{Lt}^e
\end{aligned}$$

Consider the special case where the number of leavers equals the number of joiners. In this case, $N_t = N_{t+1}$, $N_{Lt} = N_{Jt+1}$. Our decomposition simplifies to

$$\Delta\overline{\pi}_{t+1,t}^e = \left(\frac{N_s}{N}\right)\left[{}_s\overline{\pi}_{t+1}^e - {}_s\overline{\pi}_t^e\right] + \left(1 - \frac{N_s}{N}\right)\left[{}_J\overline{\pi}_{t+1}^e - {}_L\overline{\pi}_t^e\right].$$

That is, the change in the mean long-term inflation expectation is a share-weighted average of the average revisions for those that participate in both surveys and the difference in average long-term inflation expectations between joiners and leavers.

References

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