Materials 5b - Revisiting the timing

Laura Gáti

October 15, 2019

Define some objects:

$$f_t = \hat{\mathbb{E}}_t(z_{t+1}) \quad \text{one-period-ahead forecast formed at time } t \tag{1}$$

$$FE_t = z_{t+1} - f_t \quad \text{one-period-ahead forecast realized at time } t+1 \tag{2}$$

$$= ALM(t+1) - PLM(t+1) \tag{3}$$

$$\theta_t = \hat{\mathbb{E}}_{t-1}(z_t) - \mathbb{E}_{t-1}(z_t) \quad \text{CEMP's criterion} \tag{4}$$

$$= PLM(t) - \mathbb{E}_{t-1}\, ALM(t) \tag{5}$$

$PLM : \hat{\mathbb{E}}_t z_{t+1} = \bar{z}_{t-1} + bs_t$

Morning: morning of time t available: $\mathcal{I}_t^m = \{\bar{z}_{t-1}, s_t, k_{t-1}, FE_{t-2}\}$

1. Form all future expectations using $PLM_1 \to z_t$ realized
2. Form $\theta_t \to k_t$ realized, $\to FE_{t-1}$ realized
3. **Evening**: Update $\bar{z}_t = \bar{z}_{t-1} + k_t^{-1}(FE_{t-1})$

   where $FE_{t-1} = z_t - f_{t-1} = z_t - (\bar{z}_{t-2} + bs_{t-1})$, so:

   $\bar{z}_t = \bar{z}_{t-1} + k_t^{-1}(z_t - (\bar{z}_{t-2} + bs_{t-1}))$

   $\to$ evening of time t available: $\mathcal{I}_t^e = \{\bar{z}_t, s_t, k_t, FE_{t-1}\}$

Issue # 1: Updating of $\bar{z}$ is a function of last period's $\bar{z}$, $\bar{z}_{t-2}$, (i.e. not the one available to use this morning). The formulation I've had so far, updating based on $\bar{z}_{t-1} + bs_{t-1}$ is what I've called an "assessment forecast": it combines the $\bar{z}_{t-1}$ you used this morning with s_{t-1} you used yesterday morning. Is that legitimate?

The second issue will be about the criterion. Recall:

$$\begin{aligned}\theta_t &= \hat{\mathbb{E}}_{t-1}(z_t) - \mathbb{E}_{t-1}(z_t) \\ &= PLM(t) - \mathbb{E}_{t-1}\, ALM(t)\end{aligned}$$

Recall: $PLM : \hat{\mathbb{E}}_t z_{t+1} = \bar{z}_{t-1} + bs_t$

$$ALM_t = \text{stuff} \times \bar{z}_{t-1} + \text{stuff} \times s_t$$

$$\theta_t = \bar{z}_{t-2} + bs_{t-1} - \mathbb{E}_{t-1}(\text{stuff} \times \bar{z}_{t-1} + \text{stuff} \times s_t)$$

Issue #2: I had this issue before, but it's not clear what the RE of $\bar{z}$ is. In particular, I don't know what the index of $\mathbb{E}_{t-1}$ refers to: the morning of $t-1$ or the evening?

- If it's the morning, then $\mathbb{E}_{t-1}(\bar{z}_{t-1}) = \bar{z}_{t-2}$

  $\rightarrow \theta_t = \mathcal{F}(\bar{z}_{t-2}, s_{t-1})$ where $\mathcal{F}$ denotes "function"

- If it's the evening, then $\mathbb{E}_{t-1}(\bar{z}_{t-1}) = \bar{z}_{t-1}$

  $\rightarrow \theta_t = \mathcal{F}(\bar{z}_{t-2}, \bar{z}_{t-1}, s_{t-1})$

The "evening" assumption isn't cool because the criterion depends on the intercept at several time periods, the "morning" assumption isn't cool because just like in Issue #1, we need access to yesterday morning's estimate of the intercept.