

HW3 – Part 1 Solutions

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Problem 1: Interpreting Fed Funds Futures Prices

The February 2026 Fed Funds Futures contract trades at 95.75.

(a) **Implied average Fed Funds rate**

$$\text{Implied rate} = 100 - 95.75 = 4.25\%.$$

(b) **Interpretation**

- 4.25% is the *average effective overnight Fed Funds rate* for February.
- It is a day-weighted monthly average, not a single-day target rate.
- If an FOMC meeting occurs, the rate reflects pre- and post-meeting expectations.

Problem 2: FOMC Timing and Averaging

Assume:

- FOMC meeting on February 18, 2026
- 28 days in February
- Pre-meeting rate = 4.00%
- Futures-implied average = 4.25%

(a) **Weighted-average equation**

- 17 days pre-meeting, 11 days post-meeting

$$4.25 = \frac{17}{28}(4.00) + \frac{11}{28}r_{\text{post}}.$$

(b) **Implied post-meeting rate**

$$r_{\text{post}} \approx 4.64\%.$$

Problem 3: Sequential Bootstrapping Across Meetings

You observe the following Fed Funds Futures prices:

Contract Month	Price
January 2026	96.00
February 2026	95.75
March 2026	95.40

Assume:

- No FOMC meeting in January
- FOMC meetings on February 18 and March 19
- March has 31 days, with the meeting on day 19

(a) **Implied January policy rate**

Fed Funds Futures are quoted as:

$$\bar{r} = 100 - \text{Price}.$$

For January 2026:

$$\bar{r}_{\text{Jan}} = 100 - 96.00 = 4.00\%.$$

Since there is no FOMC meeting in January, the policy (effective) rate is:

$$r_{\text{Jan}} = 4.00\%.$$

(b) **Post-February meeting rate**

The February implied average rate is:

$$\bar{r}_{\text{Feb}} = 100 - 95.75 = 4.25\%.$$

The FOMC meeting occurs on February 18. February has 28 days:

- Pre-meeting days: 17 (Feb 1–17)
- Post-meeting days: 11 (Feb 18–28)

Let $r_{\text{Feb,post}}$ denote the post-meeting rate. The weighted-average equation is:

$$4.25 = \frac{17}{28}(4.00) + \frac{11}{28}r_{\text{Feb,post}}.$$

Solving:

$$\begin{aligned} 4.25 \cdot 28 &= 17 \cdot 4.00 + 11r_{\text{Feb,post}}, \\ 119.0 &= 68.0 + 11r_{\text{Feb,post}}, \\ r_{\text{Feb,post}} &= \frac{51.0}{11} = 4.63636\% \approx 4.64\%. \end{aligned}$$

(c) **Post-March meeting rate**

The March implied average rate is:

$$\bar{r}_{\text{Mar}} = 100 - 95.40 = 4.60\%.$$

The March FOMC meeting occurs on day 19 of a 31-day month:

- Pre-meeting days: 18 (Mar 1–18)
- Post-meeting days: 13 (Mar 19–31)

The pre-meeting rate equals the post-February rate:

$$r_{\text{Mar,pre}} = r_{\text{Feb,post}} = 4.63636\%.$$

Let $r_{\text{Mar,post}}$ denote the post-meeting rate. The weighted-average equation is:

$$4.60 = \frac{18}{31}(4.63636) + \frac{13}{31}r_{\text{Mar,post}}.$$

Solving:

$$4.60 \cdot 31 = 18 \cdot 4.63636 + 13r_{\text{Mar,post}},$$

$$142.6 = 83.45448 + 13r_{\text{Mar,post}},$$

$$r_{\text{Mar,post}} = \frac{59.14552}{13} = 4.54965\% \approx 4.55\%.$$

Problem 4: Forward Overnight Curve

Period	Forward Rate
Jan – Feb 18	4.00%
Feb 19 – Mar 19	4.64%
Mar 20 onward	4.55%

(a) **Forward rate function**

$$f(t) = \begin{cases} 4.00\%, & t < \text{Feb 18}, \\ 4.64\%, & \text{Feb 19} \leq t \leq \text{Mar 19}, \\ 4.55\%, & t > \text{Mar 19}. \end{cases}$$

(b) **Why piecewise constant**

- Policy rates change only at FOMC meetings.
- Overnight rate assumed constant between meetings.
- Results in a stepwise forward curve.

Problem 5: Discount Factor Construction

Assume valuation date January 1, 2026.

(a) **One-day discount factor (ACT/360)**

$$DF(t, t+1) = \frac{1}{1 + r_t/360}.$$

(b) **Discount factor to March 31, 2026 (90 days)**

- 48 days @ 4.00%
- 29 days @ 4.64%
- 13 days @ 4.55%

$$DF \approx \exp\left(-\frac{48(0.0400) + 29(0.04636) + 13(0.04554)}{360}\right) \approx 0.9893.$$