

You are a staffer for U.S. Senator Jamey Lannister, who serves on the Banking Committee. Next week Fed Chair Ying Chen testifies before your boss’s Committee. She will comment, in part in reaction to the news about a meteor careening toward Earth. NASA explains that two meteors are barreling toward Earth. The very good news is that it is 75% probable that they will crash into each other, in five months, some 4 million miles from Earth, and do no harm. If they fail to collide however, one is on a clear path to smash into Saudi Arabia, in six months, devastating Mid-East oil production for at least a year—note, the Middle East provides the world with 33% of its oil.

Senator Lannister, in preparation for the testimony, wants you to model possible outcomes. He gives you some guidelines. He wants to know how the economy will perform, in 2031, absent a meteor hit, assuming recent trends continue. He asks you to provide two views, one without Fed policy adjustments, and one with Fed actions in reaction to unfolding data. He explains to you that he expects Fed policy actions taken in 2031 to affect the economy with a one-year lag. He also wants some sense of what will transpire if the meteor does hit. More precisely, he asks that you provide him with rough forecasts for four possible scenarios. To create your forecasts, use the summary data provided below:

(Tables 1 and 2 provide information on the U.S. economy for 2029 and 2030, as well as key parameters for important forecasting equations)

TABLE 1	2029	2030	2031
Real GDP, Y	96.8	100	
%ΔY		3.3%	
Labor Productivity	98.5	100	
%ΔLP		1.5%	
U3 rate		3.5%	

TABLE 2	
r* value	0%
U3* ESTIMATE	3.5%
π* estimate	2%
α, Phillips curve	0.75
α, Taylor rule	0.5

TABLE 3		2029	2030	2031
16 to 64:	Population	200	200	
16 to 64:	LFPR	73.5%	74%	
16 to 64:	LF	147	148	
65 and up:	Population	48	49	
65 and up:	LFPR	20%	20%	
65 and up:	LF	9.6	9.8	

TABLE 4		2029	2030	2031
	CPI index	98	100	
	%ΔCPI		2%	
	Fed funds rate		2%	

Scenarios I and II

Assumptions:

- The meteors collide in space, having no effect on planet earth.
- Economic trends continue, private sector economic players ignore the meteor risk.
- The Federal Reserve does not take any policy actions, SI, and does in SII.

- Start your effort by offering a 2031 real GDP growth forecast. Briefly explain how you come to that forecast, stating the inputs that led you to your forecast. **7 PTS.**

Absent policy efforts, exogenous shocks, or cyclical turning point dynamics, assume $\% \Delta Y$ will continue its recent pattern (tomorrow is like yesterday)

$$\% \Delta Y_{2031} = \% \Delta Y_{2030} = 3.3\%$$

Since $\% \Delta Y_{2030} = \% \Delta E_{2030} + \% \Delta LP_{2030}$ and $\% \Delta LP_{2030} = 1.5\%$, then $\% \Delta E_{2030} = 3.3\% - 1.5\% = 1.8\%$.

Also, because economic trends continue, assume $\% \Delta LP_{2031} = \% \Delta LP_{2030} = 1.5\%$.

- You now need to forecast the U3 unemployment rate, for year-end 2031. Start the process by using the information provided in tables 1 and 3, on page 1, to calculate and fill in the 2029 and 2030 values in the table below: **7 PTS.**

		2029	2030	2031
16 to 64:	Pop	200	200	200
16 to 64:	LFPR	73.50%	74%	74.5%
16 to 64:	LF	147	148	149
65 and up:	Pop	48	49	50
65 and up:	LFPR	20%	20%	20%
65 and up:	LF	9.6	9.8	10
	Pop	248	249	250
	LFPR	63.1%	63.4%	63.6%
	LF	156.6	157.8	159
	U3 rate		3.50%	2.52%
	Employment., E		152.3	155.0
	$\% \Delta E$		1.8%	1.8%

- Refer to the values you calculated for question 2. Assuming trend trajectories for population and participation continue, *by age cohort*, and in light of your forecast for real GDP, calculate the U3 jobless rate for year-end 2031. To do so, start by calculating and then filling in the 2031 values for the table above, associated with question 2. **7 PTS.**

$$E_{2030} = 157.8 * (1 - 0.035) = 152.3$$

$$E_{2031} = E_{2030} * (1 + \% \Delta E_{2030}) = 152.3 * 1.018 = 155$$

$$U3 \text{ rate}_{2031} = (1 - 155/159) * 100 = 2.52\%$$

4. Now calculate the value for inflation, end-of-year 2031. **7 PTS.**

Use the Phillips curve:

$$\pi_{2031} = \pi_{2030} + \alpha^*(U3^* - U3_{2031}) = 2 + 0.75*(3.5 - 2.52) = 2.74\%$$

5. Given the absence of any policy action by the Fed, what problem do you foresee for the U.S. economy in 2031, and is the problem better or worse in 2032? **7 PTS.**

Since the unemployment rate in 2031 is below NAIRU, there is risk of accelerating inflation. The problem is likely to be worse in 2032.

6. Now consider, scenario II, the case in which the economy performs as it did in Scenario I, but the Fed reacts.
- a. What is the fed funds rate, end-of-year 2031? **7 PTS.**

Use the Taylor rule:

$$f_{2031} = \pi_{2031} + \alpha^*(\pi_{2031} - \pi^*) + (U3^* - U3_{2031}) + r^*$$

$$2.74 + 0.5*(2.74 - 2) + (3.5 - 2.52) + 0 = 4.09\%$$

- b. What is the real fed funds rate, end-of-year 2031? **7 PTS.**

Use the Fisher equation (subtract inflation to the nominal fed funds rate to get the real one):

$$r_{2031} = f_{2031} - \pi_{2031} = 4.09 - 2.74 = 1.35\% > r^*$$

- c. What formula can you invoke, that, in combination with your answer to 6b, leads you to comment on how 2032 activity might change? **7 PTS.**

IS curve: $y = A - a \cdot r$. Accordingly, output is affected by the level of real interest rates. An increase in real interest rates in 2031, other things equal, will reduce output in 2032.

- d. Use the quadrant below, label the axes, and depict the relationship described by the equation you identified in question 6c, and label the curve that you draw. **7 PTS.**



- e. Describe, directionally, how the formula used in 6c and 6d leads you to expect different 2032 values for Y , U , and π , relative to the 2032 expectations you would have given in Scenario I. **7 PTS.**

As a consequence of the Fed raising the real interest rate, growth in real GDP ($\% \Delta Y$) will decrease (lower than 3.3%), U3 rate will increase (larger than 2.52%), π will decrease (lower than 2.74%).

Scenarios III and IV:

Assumptions:

- a. The economic trends brutally change, mid-year, with oil shortages driving global GDP sharply lower.
 - b. Although oil prices spike, second half 2030, all prices plunge amid deep global recession, in 2031.
 - c. In Scenario III, the economy and the Fed incorrectly assume the more likely event will transpire—no meteor collision—and react only to emerging economic news, until the meteor hits. They then change course. Assume the Fed takes half the steps you forecast in Scenario II, before they recalibrate, in light of the shock.
 - d. In Scenario IV, the economy and the Fed both react, before the event occurs.
1. The Fed, of course, does not know, for sure, what will happen to the meteors. Explain the logic for the Fed's Scenario III policy strategy—hint, you might compare outcomes in scenario I and II. **8 PTS.**

Anticipating an increase in inflation (see below), the Fed wagers that the most likely event will occur and hikes by moderately increasing the policy rate, taking into account the lag with which Fed actions affect the economy. As a consequence, $\% \Delta Y$ will decrease moderately, U3 rate will increase moderately, π will decrease moderately.

They reason that if the 75% likely outcome is correct, they will have delivered the right policy. If they do nothing, and the 75% event occurs, they will have allowed above trend growth to continue, without leaning against it for an extra six months.

2. In Scenario IV, private sector economic players—businesses, consumers—respond ahead of hard knowledge of how things will turn out. Briefly describe how they may respond. **7 PTS.**

In anticipation of oil supply shortages due to the meteor hit, producers will ramp up output, and oil inventories will soar. Consumers will rush to buy as many provisions as possible and businesses will increase their production to the limit. Activity will jump, unemployment will decline, and inflation will increase.

3. If these private sector players react aggressively, ahead of any clarity on the meteor question, how might this mitigate the shock, when the meteor hits? **7 PTS.**

If economic agents react aggressively, the jump for oil inventories will cushion, somewhat, the blow from the lost Middle East output. Thus, the supply shock will have less of an effect on the global economy.

4. The Fed can ignore the meteor risk, and respond to the data. Alternatively, it can include the risk in its calculation. Describe the pluses and minuses of each strategy. Which one would you pursue and why? (Note: thoughtful observations get you points, confused commentary costs you points. Be sure you are saying something you think matters) **8 PTS.**

Two things to take into account. Fed policy must be forward looking. Fed must design policy based upon both their guess of the most likely outcome, and their sense of ‘tail risks’.

If the Fed only responds to the data and ignore the meteor risk, it will increase the policy rate once it sees inflationary pressures in the first half and recalibrates depending on whether the meteor risk materializes or not.

By tightening ahead of the meteor event, the Fed ensures that the ideal policy is delivered in the 75% case. But the 25% disaster scenario, which will devastate U.S. real GDP, will be made worse, if they tighten first half 2031.

Waiting to see what happens to the meteor, or even easing, first half 2031, will lessen the blow of the meteor if it hits. That likely is a better strategy. They can simply tighten more quickly, second half 2031, if the meteor misses.