1) If we assume the question is talking about the September CPI data because October hasn't come out yet (scheduled for November 10th):

- Overall inflation: Consumer prices rose 3.7% over the 12 months through September up from 3.4% in August
- Core inflation: Core CPI rose 2.6% over the same period, up from 2.4% in August

The primary difference between core and overall inflation is that overall measures the price change of the full CPU base of consumer goods and services, also including food and energy, while core inflation uses the same base but without food and energy. Economists focus more on core because it filters out volatile prices, as food and energy prices can swing and change sharply because of world events. If we remove food and energy, it essentially removes the noise from the graph and allows us to see a trend more clearly. An additional reason why economists look at the core is because interest rates affect the economy with a lag and does not create instantaneous changes, so looking at core lets us understand if inflation is persistent and spreading across the economy.

U.S. Bureau of Labor Statistics. "Consumer Price Index." *Bls.Gov*, U.S. Bureau of Labor Statistics, 2025, www.bls.gov/cpi/. Accessed 4 Nov. 2026.

Congress.Gov, 2025, www.congress.gov/crs_external_products/IF/HTML/IF10477.web.html. Accessed 4 Nov. 2026.

2)

Component	Weight	Sept 2025 index	Sept 2026 index	12-month inflation	Contribution to core
Shelter	.45	418.598	432.092	3.22%	1.45
Everything else	.55	282.146	287.899	2.04%	1.12
Core CPI	1.00				2.57%

Our result from doing it by hand with the given equations was 2.57%, and our answer in question one was 2.6%, so our results round to our answer from one. This result can most likely be attributed to the fact that 45% and 55% weights probably are also being rounded.

Bureau of Labor Statistics. *Consumer Price Index - January 2017*. 2024, www.bls.gov/news.release/pdf/cpi.pdf. Accessed 4 Nov. 2026.

U.S. Bureau of Labor Statistics. "Consumer Price Index." *Bls.Gov*, U.S. Bureau of Labor Statistics, 2025, www.bls.gov/cpi/. Accessed 4 Nov. 2026.

3)

OER is an estimate of what it would cost to rent an owner-occupied home in the current market. BLS uses this in order to measure owner-occupied units, and then it measures how owners' utilities are separate. Essentially a house is partially an investment and partly a source of housing services, and the CPI is trying to measure the cost of these services. There is no one actually paying the rent, so it is an imputed price and not actually a measured value. OER's effect is a large part of CPI because of its market size, making up 25.9% of the overall CPI and rising 3.3% over the year to September 2026. OLRs are almost one-third of the core basket. The main concern that economists are having is that OER and rent respond slowly to changes in the housing market. Market rent measures reflect only new tenets, while CPI shelter includes both new and existing. It takes time for leases to reset.

Fox, Justin. "Have We Been Measuring Housing Inflation All Wrong?" *Fa-Mag.Com*, FA Mag, 21 Nov. 2022, www.fa-mag.com/news/have-we-been-measuring-housing-inflation-all-wrong-70737.html. Accessed 4 Nov. 2026.

"How Does the Consumer Price Index Account for the Cost of Housing?" *Brookings*, www.brookings.edu/articles/how-does-the-consumer-price-index-account-for-the-cost-of-housing/. Accessed 4 Nov. 2026.

"Owners' Equivalent Rent (OER): Definition and Relationship to CPI." *Investopedia*, www.investopedia.com/terms/o/owners-equivalent-rent.asp. Accessed 4 Nov. 2026.

4)

Messure	Shelter inflation	Shelter's contribution	Everything else's contribution	Core inflation
BLS	3.22%	1.45	1.12	2.57%
Zillow	1.20%	.54	1.12	1.66%

If we used the Zillow estimate, core inflation would be 1.66%, a significant difference from 2.57%. In class we talked about the Fed's goal for inflation to be at about 2%. The fed has been leaning against inflation, and in order to do this, they raised rates by a quarter point in September and then held them steady this month. Essentially, if the real inflation rate was 1.66% or about 1.7%, it would weaken the case for further hikes. If shelter inflation is truly reflecting old leases and lags on the current market, then part of today's core inflation is delayed rather than current price pressure. We know that rate changes also affect the economy with a lag, so if we are raising rates for a problem that is an echo of what was happening, not what is happening, it will slow the economy down a significant amount, now we can see why economists think this is so important.

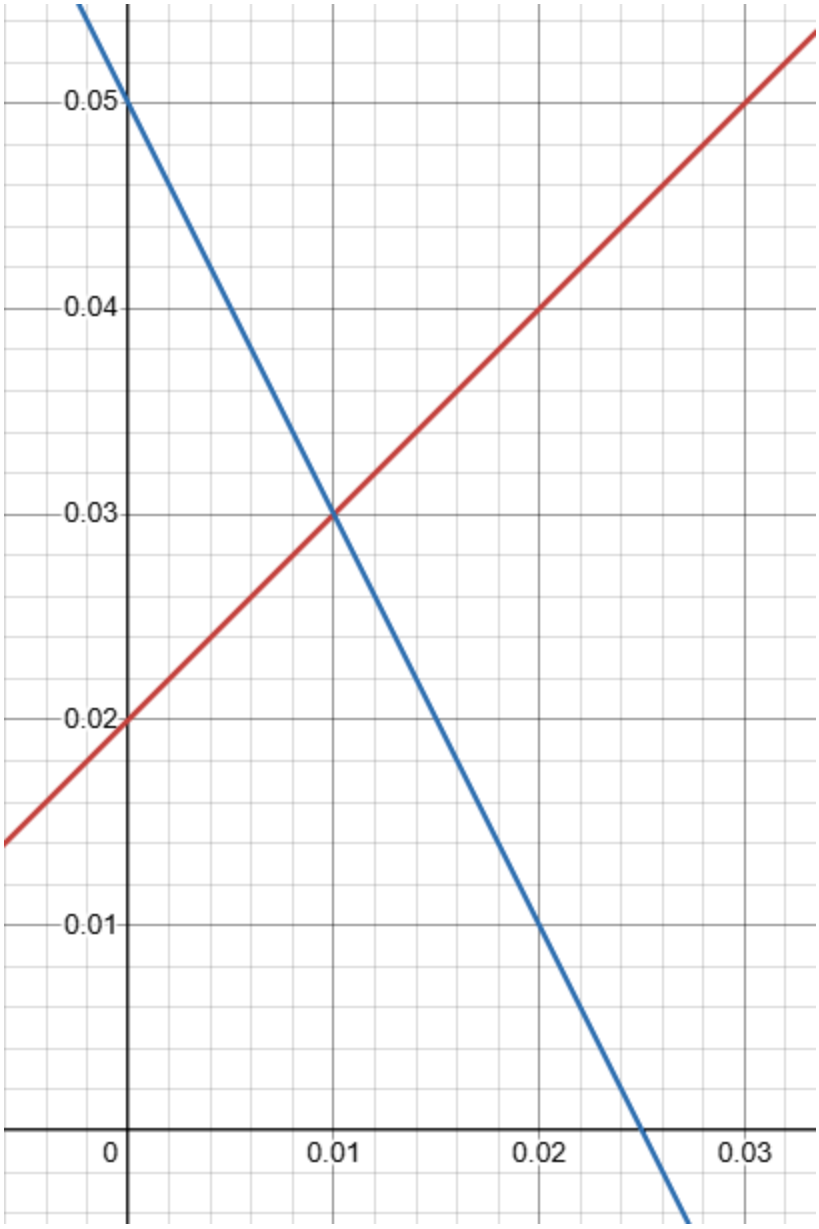
Bureau of Labor Statistics. *Consumer Price Index - January 2017*. 2024, www.bls.gov/news.release/pdf/cpi.pdf. Accessed 4 Nov. 2026.

U.S. Bureau of Labor Statistics. "Consumer Price Index." *Bls.Gov*, U.S. Bureau of Labor Statistics, 2025, www.bls.gov/cpi/. Accessed 4 Nov. 2026.

Zillow. "Zillow: Real Estate, Apartments, Mortgages & Home Values." *Zillow*, 2025, www.zillow.com/. Accessed 4 Nov. 2026.

5)

The interest rate as of October 20, 2026, was 3.88%. In order to change the AD curve, 3.88% = .0388 plug in for i in the equation



Federal Reserve Bank of New York. "Effective Federal Funds Rate." *FRED, Federal Reserve Bank of St. Louis*, 3 July 2000, fred.stlouisfed.org/series/EFFR. Accessed 4 Nov. 2026.

6)

This is how we solved for quantity and price; we must set the equations equal to each other. So let's do this

$$.02 + x = .1276 - 2x - 2(.0388)$$

Note that I replaced inflation with y, as it is on the y-axis, and I replaced the output gap with x.

We have to isolate the x term. And move it to one side.

$$x + 2x = .1276 - 2(.0388) - .02$$

Now we can add what needs to be added and subtract what needs to be subtracted

$$3x = 0.03$$

Divide by 3

$$x = 0.01$$

This would be our equilibrium output gap; we must plug in to any one of the original equations to get inflation. Let's choose this one.

$$y = .02 + x$$

$$y = .02 + .01$$

$$= 0.03$$

This gives us the value for inflation .03, or 3% inflation

7)

If the Fed raised the interest rate by 1%, the 3.88% would become 4.88%, or .0488, for the interest rate used in the AD equation.

$\pi = 0.1276 - 2\tilde{y} - 2(0.0488)$

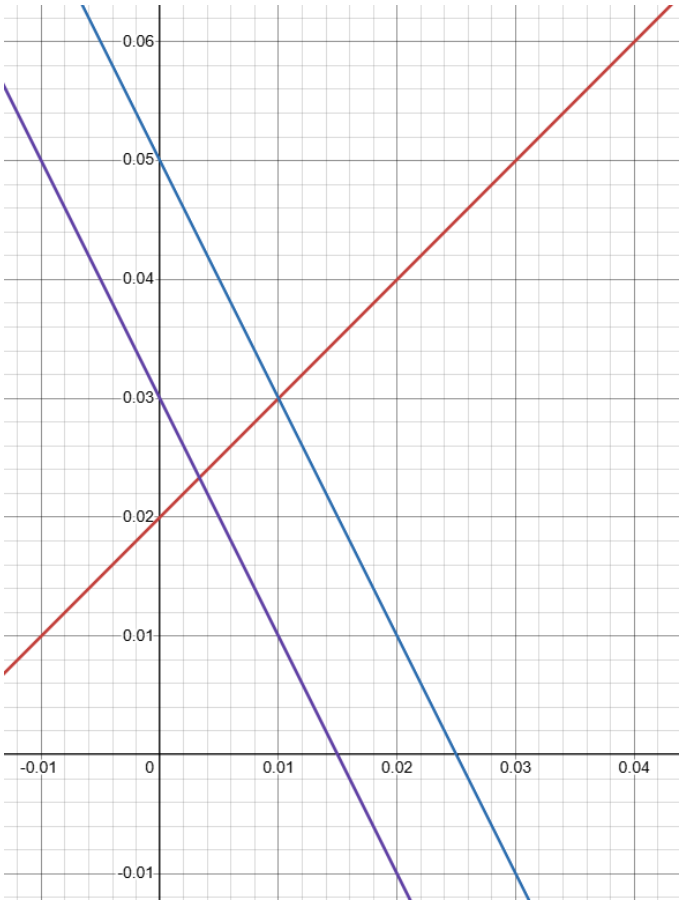
And if we set this equal to the AS curve, we get the new equilibrium.

$0.1276 - 2\tilde{y} - 2(0.0488) = 0.03 - 2\tilde{y}$

$0.02 + \tilde{y} = 0.03 - 2\tilde{y}$

$3\tilde{y} = 0.01$

$\tilde{y} \approx 0.0033$ and $\pi \approx 0.0233$



Note the blue line is the original AD curve, and the purple line is the new one. The higher interest rate shifts the AD curve left. This is called contractionary monetary policy. Inflation falls from 3% to about 2.33%, and the output gap falls from 1% to about .33%. We would not expect these variables to change immediately. Monetary policy works with a lag because many loans have fixed rates, firms have already planned projects, and many of the prices and resets are only adjusted periodically. Therefore, the full effect on output and inflation would take time.

8)

When internet rates increase, borrowing becomes more expensive and saving becomes more rewarding. Households are scared, and they save more and borrow less; they also stop buying so much, so C falls. Firms also invest less because financing new projects costs more so

I fall as well. Since Y=C+I+G+N-X, lower C and I reduce Y, and the output gap decreases. This is consistent with our assumption of utility maximization because households choose between consuming today and consuming in the future to get the highest total utility. A higher interest rate makes consuming today more expensive compared with saving and consuming later, so shifting some consumption to the future makes sense. This is also consistent with profit-maximizing firms. Because firms only invest when a project's expected return is at least as high as the cost of financing. A higher interest rate raises that cost, so some projects are no longer profitable, and firms don't pursue or cancel them.

9)

A leading indicator changes before the overall economy does, so it can signal where the economy is going to go. Some examples of this are building permits, new orders, stock prices, and the yield curve. A lagging indicator is the opposite; these tend to change after the overall economy has already shifted, so it helps confirm what has already happened. Some examples include the unemployment rate and CPI shelter inflation. Leading indicators are generally more useful for predicting the economy over the next year because they move ahead of the economy. After the trend, lagging indicators are better because they confirm it. And of course, leading indicators are not always perfect.

Potters, Charles. "Lagging Indicator." *Investopedia*, 2019,

www.investopedia.com/terms/l/laggingindicator.asp. Accessed 4 Nov. 2026.

Reiff, Nathan. "Leading Indicator." *Investopedia*, 15 Feb. 2023,

www.investopedia.com/terms/l/leadingindicator.asp. Accessed 4 Nov. 2026.

10)

Housing is usually considered a leading indicator. Mesures like building permits housing starts and home sales often weaken before a recession and recover before the broader economy does. A potential reason is that buying or building a home is a large, long-term decision that depends heavily on expectations about the future. Most buyers take out a mortgage for up to 30 years, so they need to feel confident about their future income and job security. If people start to worry about the economy as mentioned earlier, they will just put off buying a home. Builders also think in the same way. A new home takes a long time to build, and they want strong demand for that home and acceptable financing costs by the time it's built. If they expect weaker demand, they just simply won't build that home. As a result, people and builders tend to become less likely to buy or build before the economy gets worse, not only once it does. This is what causes housing activity to fall early.

Perry, Brian. “4 Key Indicators That Move the Markets.” *Investopedia*, 2019, www.investopedia.com/articles/fundamental-analysis/10/indicators-that-move-the-market.asp. Accessed 4 Nov. 2026.

Potters, Charles. “Lagging Indicator.” *Investopedia*, 2019, www.investopedia.com/terms/l/laggingindicator.asp. Accessed 4 Nov. 2026.

Reiff, Nathan. “Leading Indicator.” *Investopedia*, 15 Feb. 2023, www.investopedia.com/terms/l/leadingindicator.asp. Accessed 4 Nov. 2026.

11)

Unemployment is a lagging indicator mainly because layoffs tend to be a firm's last response to weaker demand, not first. Obviously hiring and training workers is expensive, and laying them off can bring severance costs and lower morale in the workplace. If a firm lets experienced workers go and demands quickly recover, they have to spend massive amounts to get a worker to them at the same level as the one they just laid off. Since a firm can't be sure at first whether a slowdown is temporary, it has a reason to keep its workers and wait. Firms therefore usually try cheaper adjustments first, like cutting OT, reducing hours, freezing hiring, or letting temporary workers go. They turn to layoffs only once they believe the weak demand will last and that keeping those workers would hurt profits more than letting them go. And by then the economy has already weakened. It also lags in the opposite direction, staying high after it begins. Firms may first increase the hours of the current staff and wait until they are confident demand will last before hiring.

Investopedia Staff. “What Are Leading, Lagging, and Coincident Indicators?” *Investopedia*, 1 Jan. 2021, www.investopedia.com/ask/answers/what-are-leading-lagging-and-coincident-indicators/. Accessed 4 Nov. 2026.

Perry, Brian. “4 Key Indicators That Move the Markets.” *Investopedia*, 2019, www.investopedia.com/articles/fundamental-analysis/10/indicators-that-move-the-market.asp. Accessed 4 Nov. 2026.

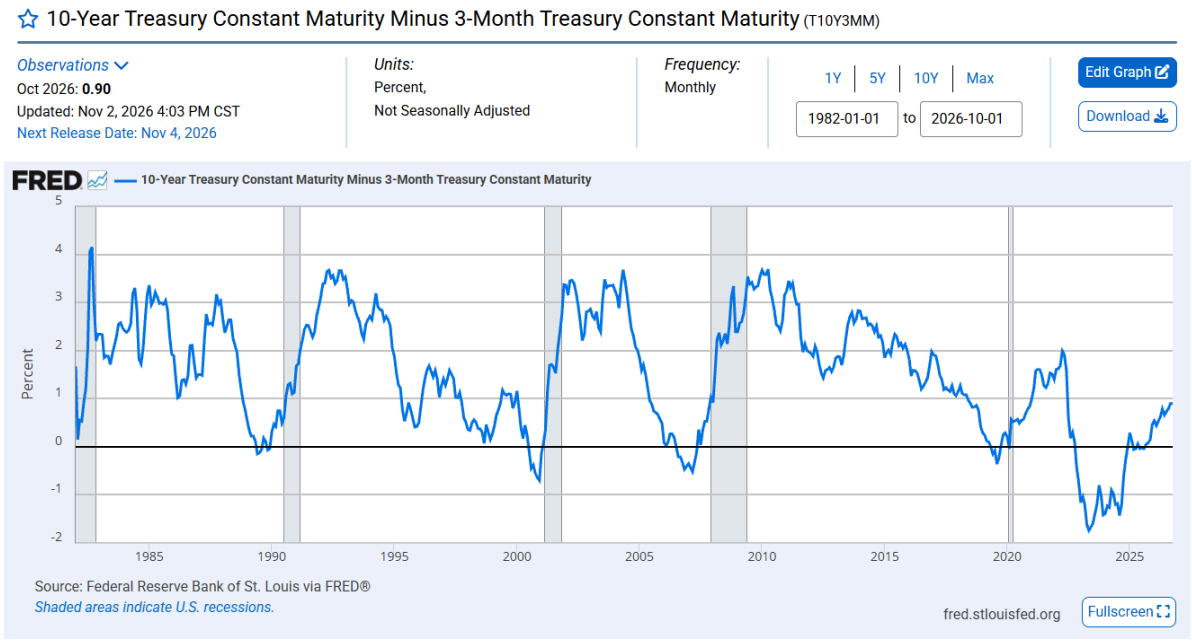
Potters, Charles. “Lagging Indicator.” *Investopedia*, 2019, www.investopedia.com/terms/l/laggingindicator.asp. Accessed 4 Nov. 2026.

Reiff, Nathan. “Leading Indicator.” *Investopedia*, 15 Feb. 2023, www.investopedia.com/terms/l/leadingindicator.asp. Accessed 4 Nov. 2026.

U.S. Bureau of Labor Statistics. “Civilian Unemployment Rate.” *Bls.Gov*, U.S. Bureau of Labor Statistics, 2025, www.bls.gov/charts/employment-situation/civilian-unemployment-rate.htm. Accessed 4 Nov. 2026.

12)

I think another leading indicator is the yield curve, in this example from FRED, measured as the 10-year Treasury yield minus the 3-month Treasury yield. The curve is negative or inverted when the spread falls below zero, meaning the short-term rates are higher then long term rates.



I think that it will predict upcoming economic conditions for a couple of reasons. It reflects expectations; long-term yields partly reflect where investors expect short-term rates to go. If they expect a slowdown, they also expect the Fed to cut rates eventually, which pulls long-term yields below short-term yields. We also know that short-term rates are closely tied to the Fed's policy rate. An inversion can signal that the Fed has raised rates enough to slow borrowing and spending, and these effects we also know take some time to reach the economy. It can also reduce lending; banks borrow short-term and lend long-term. An inverted curve shrinks that profit margin, which can make them less willing to lend. Also, it doesn't prove it, of course, but look at the graph; the spread turned negative before each of the last four recessions. Predicting 1990, 2001, 2007, 2020 with an advance of 8 to 16 months. Obviously there is no perfect indicator, and you can see that in the graph as well. We know the 2020 recession was caused by COVID, which the yield curve couldn't have predicted. The curve also inverted deeply from late 2022 through 2024, but no “recession” has followed so far.

"10-Year Treasury Constant Maturity Minus 3-Month Treasury Constant Maturity." *Stlouisfed.Org*, 2026, fred.stlouisfed.org/series/T10Y3MM. Accessed 4 Nov. 2026.

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