

The Dominant Role of Expectations and Broad Based Supply Shocks in Driving Inflation

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Jón Steinsson opened the discussion by observing that, so far, there had been no real mention of monetary policy in a discussion about inflation in this session. He asked whether we can think about inflation without considering monetary policy. The initial Phillips curve system presented in the paper assumes AR(1) processes for both the employment gap and the supply shock. This system fails to account for the joint dynamics of inflation and inflation expectations, thereby motivating the rest of the paper. Steinsson noted that the employment gap equation governs demand in this economy and, thus, must also implicitly contain monetary policy. Consequently, he expressed concerns that this system fails to accurately capture monetary policy. To illustrate the point, he considered a slight adjustment to the system with β set equal one, yielding a vertical long run Phillips curve. Under this system, if the central bank were to change the inflation target—a long run change in monetary policy—it would never affect the employment gap or enter the system. He continued that, with β less than one, a change to the inflation target would mean a permanent change to the employment gap, but this cannot be captured by the system's AR(1) specification. Overall, he concluded that while he was sympathetic to the overall story of the paper, he felt that the system was not doing justice to the impact of monetary policy, especially with respect to persistent changes in monetary policy.

Following up on the previous comment, Ricardo Reis noted that a search of the paper produced only four results for the word “monetary”—all in titles in references or in one footnote. This was odd in a paper about inflation. Further, the paper proposed a reduced-form model linking expected inflation to existing variability in sectoral prices. Changes in monetary policy should affect how agents interpret the signals of sectoral price changes to form their inflation expectations, and so change this reduced-form map. Finally, Reis responded to the discussion on the correct measure of inflation expectations in empirical Phillips curves, stating that the Survey of Professional Forecasters (SPF) was not right for the recent. He explained that the SPF mimics the central bank's forecast, so whenever the central bank gets things wrong—as it did in 2021—the SPF also gets it wrong. Households are more skeptical and their expectations (say measured in the Michigan Survey of Consumers) are more useful to study large movements in inflation, not the SPF. The recent experience confirms this.

Johannes Wieland further endorsed Steinsson's concerns over the lack of monetary policy. He explained that the Phillips curve shifted out in the 1970s and 1980s, and inflation resulted because the monetary authority decided to accommodate that shift. He continued that, similarly, in the current episode, one can think about what would have happened if the Fed had raised interest rates to ten percent in April 2021. Had this been the case, he stated, there probably would not have been eight percent inflation. He clarified that he is not necessarily saying the Fed chose wrong in this instance but that it is hard not to talk about what monetary policy did or did not do when considering the path of inflation.

Paul Beaudry thanked everyone for the discussion and responded to the recurring comments on the lack of monetary policy in the paper's framework. He agreed that monetary policy is certainly relevant

to a discussion of inflation. However, he explained that they had adopted the simplifying assumption that the economy remained in a stable regime for most of the studied period, assuming long run inflationary expectations remained relatively flat. He noted that they initially had set up the model to be relative to long run expectations, allowing for a clearer consideration of monetary policy. However, they found this was not making much of a difference and made the setup less tractable. He reinforced that he thinks monetary policy matters and that the way they wrote the model was just a simplification, adding that they should perhaps be clearer about the simplifying assumptions. Addressing comments on the different measures of inflation expectations, he noted that when inflation spikes, it seems like the consumers—rather than the professionals—get it right. He explained that this is not because consumers are better at predicting inflation but because they cause high inflation when they expect it.

Frederic Mishkin commenced by noting that he took issue with how much of the literature treats estimated Phillips curves as structural. He explained that a key issue is the endogeneity of monetary policy: If monetary policy is done well, then estimates of the Phillips curve will be biased towards supporting a flat Phillips curve. Furthering the point, he added that, under the theorem of optimal control, if monetary policy is optimal, there will be zero correlation with the policy. Thus, good policy directly leads to a flat Phillips curve. Overall, he stated that he found the story of supply shocks leading to an increase in expected inflation very interesting but found the exclusion of monetary policy troubling. He expressed concern that the Federal Reserve made a significant error in how long they waited to raise rates in the recent inflationary episode because they believed in a flat Phillips curve. He warned that assuming a flat Phillips curve in setting policy, rather than understanding that good monetary policy itself creates a flat Phillips curve, is a policy mistake.

James Stock opened his comments by noting his appreciation for the paper and the discussion. He stated that there are a few interesting regularities surrounding the current inflationary episode. For one, a Phillips curve estimated through 2020 using all straightforward variables—including the unemployment gap and expected inflation from the household survey—fits well through the entire episode. He noted that he liked the authors' explanation of this fact but added that prior research has established that inflation expectations from the Michigan survey seem to track the level of gasoline prices. Consequently, he suggested that the current inflationary episode was heavily driven by energy shocks rather than broad based supply shocks. He added that the second regularity around this episode is that a Phillips curve estimated using SPF expectations, the unemployment gap, and PCE energy inflation from 1968 to 1983 also fits well over the current period. He noted concern over this fact.

Martin Eichenbaum continued the discussion by expressing the need for future research on the correct theory of expectations. He suggested regressing inflation expectations on some measure of the cross-sectional dispersion of price increases might provide some insight into whether salience or some other theory prevails. He explained that, in the paper's theory of expectation formation, there are two things an agent learns: The first is about an exogenous process, but the other is about endogenous variables. He added that, typically, rational expectations serve as the benchmark for monetary policy, so learning about endogenous variables raises the question of the rate of convergence. He assumed that there would be a very slow rate of convergence in the paper's model, meaning that a Bayesian agent would not change their mind very quickly. He stated that this might mean rational expectations policy design is

terrible as an approximation for real world policy analysis—a possibility that has only recently started to be explored.

Lawrence Christiano commented that a student of his wrote a paper about a non-linear Phillips curve. That paper, he noted, was finished in 2021 and written to explain the flattening of the Phillips curve. However, the same model predicted that inflation would take off precisely the way it did in the most recent episode because of an intersectoral shift in demand. The basic ingredient in that paper's model is that capital is ex-post difficult to adjust, leading agents to hold a bit extra. Thus, the Phillips curve got flatter because people held larger capital buffers due to markups growing over time. He explained that the intersectoral shift in demand—a result of demand shifting from services to goods during Covid—led to a shortage of physical capital, which provides an alternative story. Furthermore, he expressed discomfort with the idea in Beaudry et al.'s paper that expected inflation moves current inflation. He explained that, while this is true in some sense, it ignores the effect of the output gap. He stated that, per the work of Clarida, Galí, and Gertler, the reason for high inflation in the 1970s was that inflation expectations fed immediately into inflation, and the Federal Reserve did nothing to slow things down. The subsequent low inflation era resulted from anchored inflation expectations. He added that this means that when inflation expectations go up, inflation starts to rise, but when the central bank comes in and tightens policy, it forces the economy—and the output gap down—so that inflation is somewhat anchored. He concluded that it is worrying for policy that this channel is found to be very weak in the paper.

Jordi Galí offered a comment on the micro foundations of the paper. He noted that inflation results from some firms adjusting prices and that, in New Keynesian models, these pricing decisions are based on firms' expectations for discrepancies between markups and desired markups. He continued that, under auxiliary assumptions, the markup gap can be related to the output gap, and, more importantly, inflation is related to the sequence of discounted expectations of future output gaps. If the law of iterated expectations is satisfied, this discounted sum can be collapsed into the simple recursive formulation, but there is no separate channel for expected inflation aside from long-run inflation. As a result, he explained that the reason why expected inflation enters here, when considering the micro foundations, is because it is a sufficient statistic for the expected future output gap. He suggested it would be interesting to look at proxies for the expected future output gap to see if they have a separate influence on inflation and whether that influence is correlated with measures of expected inflation. He added that, if measures of subjective expectations are used because inflation is thought not to be rational, that specification should be questioned because it is derived under the assumption of rational expectations. In addition, he noted that the authors use the unemployment rate as a proxy for the output gap. As such, he recommended that they try looking at a Phillips curve specification with wage inflation because there are micro foundations that relate wage inflation to unemployment but not that relate price inflation to the unemployment rate. He concluded that it would be interesting to see if inflation expectations are just proxying lagged inflation.

Paul Beaudry closed the discussion by thanking everyone and acknowledging that he lacked sufficient time to respond to all the comments. He added that Chodorow-Reich's discussion covered the question of whether there is still evidence for a nonlinear Phillips curve well and added that if expectations did not move much, there is a lot of room for non-linearities.