Comment on “Inflation Strikes Back: The Role of Import Competition and the Labor Market by M. Amiti, S. Heise, F. Karahan, and A. Şahin”

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July 4, 2023

1 Introduction

Amiti, Heise, Karahan and Şahin (2023, AHKS) seek to answer a very topical and important research question: how much did supply side disruptions and the tight labor market contribute to the recent surge in inflation? The answer provided by the authors is: about two percentage points. To arrive at their answer, the authors use a calibrated two sector New Keynesian model in which they utilize three correlated shocks in a perfect storm type setting. The paper also has an interesting empirical part which provides empirical evidence that the channels emphasized in the theoretical model are at work in the data.

AHKS have written a fine paper with interesting and intriguing analysis and results. There is a lot to like about the paper and it provides lots of food for thought for possible extensions of the model and the analysis in future work.

My discussion consists of two parts. The first part summarizes the model, intuition and key results of the paper. The second part offers remarks and comments. My comments are based on the April 1, 2023 version of the AHKS paper which I discussed at the 38th NBER Macroeconomics Annual conference on April 21, 2023. The slides of my discussion are available on my website. AHKS have subsequently revised their paper taking on board parts of my comments.

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2 The AHKS (2023) paper

2.1 The model

The model is a calibrated two sector model. There is a goods sector and a services sector. There is multi-stage production with multiple input factors such as labor, domestic and foreign intermediate inputs. There is roundabout production and foreign competitors that compete in the domestic market. The model also features endogenous markups. Finally, the model contains sticky prices and sticky wages as well as a central bank that follows a Taylor rule.

The authors feed three correlated shocks into the model. The first shock is a run-up in imported intermediate inputs prices. The second shock is a decline in foreign competition in the domestic market. The third shock is a decline in the willingness to work in the labor market. After feeding these three shocks into the model simultaneously, the authors measure the effect on the rate of inflation in the U.S.

2.2 Key results

The three correlated shocks result in a rise in inflation by about two percentage points. Importantly, there is an amplification effect in the model when the three shocks are fed into the model jointly and occur at the same time. When the authors feed the shocks into the model separately, that is each shock a time, each of these shocks itself generates about one half percentage point of inflation. Thus, mechanically adding up the effect of each shock results in a rise of inflation by about 1.5 percentage points whereas when all shocks hit jointly at the same time, the total effects on inflation is amplified and raises inflation by about two percentage points.

What’s the reason for the amplification effect? In the model, firms can substitute various inputs. For example, firms can substitute between labor and intermediate inputs. In turn, intermediate inputs can be substituted between domestic inputs and foreign inputs. So, when shocks hit separately, the effect on firms’ marginal cost is relatively small because firms can use multiple margins to substitute across different input goods. By contrast, in a perfect storm setting, i.e. when all three shocks hit at the same time, the three input margins in the model are hit at the same time and thus the ability to substitute inputs is diminished which results in the amplification effect.

The authors also use their model to study the effects of monetary policy. Specifically, the authors show that the effects of more aggressive monetary policy depend on whether inflation is supply-side driven or demand-side driven. When inflation surges are driven by supply disruptions,
it is difficult for the central bank to combat inflation since a steep rise in interest rates implies sizeable costs in terms of economic activity. By contrast, when inflation surges are demand-driven, the central bank can combat inflation without triggering a recession.

Finally, the authors also provide empirical results based on aggregate and industry-level data. The authors show that when wages and input prices rise together, the pass-through of wages and input prices into product prices tends to accelerate. In other words, there is empirical support for the amplification effect suggested by the model.

3 Comments

3.1 Variable capital utilization

In their model, the authors have abstracted from capital services, i.e. physical capital coupled with variable capital utilization. How much does this matter for the resulting Post-Covid inflation dynamics? Capital services are a standard feature in estimated medium sized New Keynesian models such as e.g. Christiano, Eichenbaum and Evans (2005), Smets and Wouters (2007) and many more. Christiano, Eichenbaum and Evans (2005) have shown that variable capital utilization is a crucial model feature which is necessary so that the estimated model can account well for the observed dynamics of inflation.

In response to the adverse supply shocks considered by AHKS, variable capital utilization would constitute a further margin of adjustment that would allow firms to substitute toward in the wake of adverse supply shocks in other input markets. In this sense, one might consider the quantitative results of the AHKS paper as providing an upper bound for the effects on inflation. With variable capital utilization, the effects of adverse supply shocks could at least in principle be attenuated if firms had the opportunity to adjust their utilization of physical capital.

3.2 Implications for wage inflation

The model implications for wage inflation appear at odds with the data. In the model, wage inflation jumps by four percentage points while price inflation jumps by two percentage points in response to the supply shocks. In other words, wage inflation increases by more than price inflation after supply shocks. Likewise, when looking at the model implications for demand shocks, the same result obtains: wage inflation goes up by more than price inflation. So, the model predicts wage inflation to jump more than price inflation during the Post-Covid episode. In U.S. data, however,
the opposite is true: wage inflation increased by less than price inflation during the last two years. It would be useful to shed light on the reason(s) why the model struggles to come to terms with the data on the relative response of wage vs. price inflation. Is this due to the missing capital services/variable capital utilization channel, i.e. labor demand is driven up too much due to firms’ inability to substitute away from domestic labor toward capital services? Or are wages just too flexible relative to prices in the calibration of the model?

3.3 Model vs. data comparison

The paper would benefit from a more rigorous model-data comparison so as be able to assess the quantitative match between the model and the data. On page 24 of the draft, the authors state that U.S. CPI inflation stood at 1.8% in 2019, 4.7% in 2021 and 8% in 2022. So, the change in inflation between 2019 and 2021 is 2.9 percentage points while the change in inflation between 2019 and 2022 is 6.2 percentage points. Unfortunately, the authors do not take a stand on whether they view 2.9 or 6.2 percentage points as a target to assess the model performance against. On page 24, the authors write “Our calculations suggest that supply chain disruptions and labor supply constraints can account for one third [of 6.2pp] to two thirds [of 2.9pp] of the rise in inflation depending on the time period we consider.” (square brackets added).

Importantly, the shocks are calibrated using 2021–2022 data. With this in mind, 6.2 percentage points seems to be the right target number for the inflation surge to be explained by the model.

In addition, the paper focuses entirely on explaining the surge in inflation during the Post-Covid episode. What about quantities? How well does the model match GDP, consumption, labor etc in the data? Ideally, the model should not only account for the surge in inflation but also account for the dynamics of quantities in the Post-Covid data. Christiano, Eichenbaum and Trabandt (2015) compare Great Recession data with the predictions of a New Keynesian model and show that their model can account well for inflation and quantities. It would be very interesting to see a similar comparison based on the AHKS model for the Post-Covid episode.

Finally, it would be useful to provide a quantitative comparison between the empirical analysis based on aggregate and industry-level data and the theoretical model. So far, the comparison between the regression analysis and the theoretical model is qualitative. Does the model imply the same quantitative regression results as in the data? Ideally one would like to simulate data from the theoretical model and re-run the regression analysis on the simulated model data. Are the regression coefficients similar to those when using actual data?
3.4 Monetary policy

In U.S. data, inflation went up by six percentage points in the last two years. According to the authors’ analysis, adverse supply shocks account for two percentage points and demand shocks account for another two percentage points. What accounts for the missing two percentage points? There is a possibility that monetary policy has played a crucial role to account for the missing two percentage points. Let me expand. In the model, supply and demand shocks together drive up the nominal interest rate by about 4.5 percentage points. In the data, the Federal Funds rate also increased by about 4.5 percentage points in the last two years. That said, the timing of monetary tightening is of essence. Most of the tightening in the model occurs very front loaded during the first four quarters after the shocks occur. By contrast, in the data, the Federal Funds rate was kept unchanged for about two years before tightening started. Put differently, the model suggests much more up-front tightening than had occurred in the data. So, a natural question to ask is how much did monetary policy contribute to the run up in U.S. inflation by keeping the interest rate unchanged for about two years? To shed light on this question, I suggest to conduct a counterfactual simulation with the model in which the nominal interest rate is kept unchanged for one or two years in the wake of the adverse supply and expansionary demand shocks. Does this explain the missing two percentage points run up in inflation?

3.5 Relation to literature on optimal monetary policy

The authors emphasize that the nature of the shock matters for the benefits and costs of aggressive monetary policy. If inflation is demand-driven, aggressive monetary policy can contain inflation without inducing a recession. By contrast, if inflation is driven by cost-push type shocks (e.g. supply chain disruptions), then aggressive monetary policy toward inflation leads to negative effects on the labor market and the economy. It would be useful if the authors would relate their results to the literature on optimal monetary policy in the New Keynesian model. E.g. Clarida, Gali and Gertler (1999) report that in the standard New Keynesian model, the central bank faces no trade-off between inflation and output when the economy is hit by demand shocks. By contrast, after adverse cost-push shocks, the central bank does face a trade-off and inflation and output outcomes depend on the preferences of the central bank. It would be useful if the authors could relate their findings to this literature.
3.6 Labor market model

The labor market is at center stage in the analysis. The authors have chosen a labor market setup developed in Erceg, Henderson and Levin (2000) and used in e.g. Christiano, Eichenbaum and Evans (2005), Smets and Wouters (2007) and many others. One fruitful avenue for further research would be to consider an alternative labor market setup. Specifically, a labor market search and matching framework along the lines of Diamond (1982), Mortensen (1982), and Pissarides (1985) which has been used in medium-sized New Keynesian models, see e.g. Christiano, Eichenbaum and Trabandt (2016) and others. That labor market framework has been shown to work well in New Keynesian models. In addition, that labor market framework would allow the authors to make contact with a rich set of labor market data such as e.g. unemployment, employment, job finding rates, labor market tightness etc. Finally, a search and matching labor market framework would allow the authors to make contact with an ongoing debate about the tightness of the labor market and the effects thereof on inflation. It would be particularly interesting to revisit and contribute to the recent debate about the Beveridge curve between Waller (2022), Figura and Waller (2022) and Blanchard, Domash and Summers (2022a, 2022b) by using a quantitative medium-sized New Keynesian model with search and matching labor market frictions that is subject to adverse supply shocks and expansionary demand shocks.

3.7 Autocorrelation of shocks

The authors calibrate their model including the size of the exogenous shocks carefully. That said, the authors assume an AR(1) coefficient of 0.9 for all three shocks. It would be useful to elaborate about this common choice for the persistence of the three exogenous shocks that drive all model results.

3.8 Model estimation and filtering of shocks

Is the AHKS model useful to study the 2021 – 2022 episode only or does it also fit pre-2021 (post-war) data? It would be very interesting to estimate the model on pre-2021 (post-war) data like e.g. Christiano, Eichenbaum and Evans (2005) or Smets and Wouters (2007). Does the AHKS model offer new insights about post-war data?

Given an estimated version of the model, one could then measure the shocks by Kalman-filtering the data with the model. This would allow the authors to study historical decompositions of the Post-Covid period, i.e. examining the contributions of shocks to the run-up in inflation through
the lens of the estimated model.

Relatedly, when using a standard Christiano, Eichenbaum and Evans (2005) or Smets and Wouters (2007) model that abstracts from the various features in AHKS, what would these models tell us about the Post-Covid inflation drivers? Would these models provide radically different answers/insights than the AHKS model?

3.9 Solution method

The authors use a third-order Taylor series approximation to solve their model. How much does the solution method matter for the results? How do the results look like had the authors used a first- or second order approximation? What about solving the fully nonlinear model using the two-point boundary value solution method proposed by Fair and Taylor (1983) which is available in standard computational software such as Dynare? And finally, what are the implications when solving the model with global methods for the resulting conclusions of the paper?

3.10 Concluding remarks

All told, this is a very nice paper with interesting and intriguing analysis and results. There is a lot to like about the paper and it provides lots of food for thought for possible extensions of the model and the analysis in future work.

References


