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ANTONELLO D'AGOSTINO
CATERINA MENDICINO
FEDERICO PUGLISI

Expectation-Driven Cycles and the Changing Dynamics of Unemployment

This paper provides new evidence on the role of expectations for the change in unemployment dynamics over time. We show that unanticipated changes in expectations display large and persistent effects on the unemployment rate in the 2007–09 downturn, contributing to maintain unemployment high well after the most recent recession. We also find that the changes in the autocorrelation of the unemployment rate and its correlation with inflation generated by unanticipated changes in unemployment expectations help to rationalize the pattern observed in the data in the post-1990 recessions.

JEL codes: C32, E24, E32
Keywords: Unemployment Expectations, Inflation dynamics, Time-varying Vector Autoregression

THE LAST TWO DECADES HAVE been characterized by remarkable changes in the dynamics of U.S. unemployment and inflation. In particular, several authors have highlighted that after the most recent recession the economy experienced a longer duration of high unemployment rates (see, e.g., Coibion, Gorodnichenko, and Koustas 2013) coupled with a decline in inflation that was small

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ANTONELLO D'AGOSTINO*is at Rokos Capital Management* (*E-mail*: antonello.dagostino@gmail.com). CATERINA MENDICINO*is at European Central Bank, Directorate General Research, Monetary Policy Research* (*E-mail*: caterina.mendicino1@ecb.europa.eu). FEDERICO PUGLISI*is at the Department of Economics, Northwestern University* (*E-mail*: federicopuglisi2022@u.northwestern.edu).

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in comparison with the large and persistent increase in unemployment (see, e.g., Borio and Filardo 2007, Stock and Watson 2010).

Figure 3 documents the differences in unemployment dynamics around episodes of economic downturns. The pattern of unemployment across the five most recent recessions suggests that the pre-1990s recessions featured a sharp increase in unemployment during the downturns and an immediate decline soon after the end of the recession. Indeed, during the recession of the early 1980s, the unemployment rate increased from slightly below 6% to about 7.6%, then started declining before the end of the recession. In the 1981–82 recession, unemployment increased by more than 2 percentage points and reached values above 10%. However, 1 year after the end of the recession, the rate returned to levels displayed in the prerecession period. In contrast, in the most recent recessions, unemployment displays a very slow recovery and a remarkable increase in its persistence. During the recession of the early 1990s and early 2000s, the unemployment rate stayed high even after the end of the recession and took several quarters to rebound to prerecession levels. It doubled since the beginning of the recession (dated in 2007 Q4) and reached about 9.8% by the end of 2009. After the end of the most recent recession, the unemployment rate continued increasing, suggesting a lagging and persistent dynamic. This rising trend continued well after the end of the recession and only rebounded in the beginning of 2010. The recent pattern of U.S. unemployment has been compared by many researchers to the 1980s European experience of high and persistent unemployment as described by Blanchard and Summers (1987) among others.

A variety of explanations have been proposed to rationalize the changes in inflation and unemployment over the last decades. Structural changes in the economy and improved monetary policy (Stock and Watson 2010), a flattening of the slope of the Phillips curve and downward wage rigidity (Ball and Mazumder 2011), globalization (Borio and Filardo 2007), and better "anchored" inflation expectations to central bank targets (Gambetti and Galí 2009, IMF 2013) could have played a role. However, recent papers argue that the traditional channels may have had a limited role in explaining changes in unemployment over the last decade. Contrary to the conventional wisdom, Coibion, Gorodnichenko, and Koustas (2013) find that financial shocks and wage stickiness do not contribute to the rising persistence of U.S. unemployment, whereas monetary and fiscal policies explain only part of the developments in unemployment during the most recent recession. Coibion and Gorodnichenko (2015) conclude that changes in consumer expectations are able to explain the missing disinflation.[1] Their results suggest that more attention should be paid to expectations.

1. Coibion, Gorodnichenko, and Koustas (2013) test a wide range of economic, demographic, and cultural factors that could have influenced the dynamics of unemployment. They also find that changes in U.S. labor mobility and demographic factors predict a decline in the persistence of unemployment, whereas the decline in "trust among Americans" has a statistically significant, although limited, impact on the persistence of unemployment. Coibion and Gorodnichenko (2015) consider three explanations of the missing disinflation during the most recent recession in the context of the Phillips curve: changes in the natural rate of unemployment, unusual wage dynamics and marginal costs, and changes in the slope of the Phillips curve. They conclude that none of these channels can fully account for the changes in the relationship between inflation and unemployment.

This paper wishes to propose an alternative explanation to the changing dynamics of unemployment in the United States by arguing that expectation shocks contributed to the increased persistence of the unemployment rate over time.

To capture the changing nature of unemployment in response to expectation shocks, our analysis uses unemployment expectations compiled by the Survey of Professional Forecasters (SPF), as in Leduc and Sill (2013), and a Time-Varying Coefficients VAR model with Stochastic Volatility (TV-VAR) as in Cogley and Sargent (2005) and Primiceri (2005).[2]

We detect significant changes in the evolution over time of the dynamic responses of the endogenous variables to shocks to expected future economic activity. In particular, the responses of the unemployment rate are increasingly large and persistent during the post-2000 period. Particularly, large and long-lived are the effects of expectation shocks on the unemployment rate during and after the 2007–09 economic downturn. Expectation shocks also account for an increasing fraction of the forecast error variance of the unemployment rate over time. The increase in the volatility of the unemployment rate over the second part of the sample can be largely explained by an increase in the variance share of expectation shocks. Overall, unanticipated changes in expectations imply a gradual increase in the persistence of the unemployment rate. In terms of the correlation between the unemployment and the inflation rate, our results point to a sizable decline in the correlation between inflation and unemployment conditional on expectation shocks, since early 2000s. This is explained by the different impact that the expectation shock has on the two variables over time.

Our findings capture the effects of shifts in expectations linked to the recent cycles in economic activity. In particular, with the exception of the 2000 boom, expectation shocks contributed to maintain the unemployment rate high during the most recent cycles. The "Dot-com" boom of the late 1990s is put forth by many as an example of expectation-driven cycles. Developments in the satellite industry and the booming of the IT economy generated expectations of prosperous future economic prospects (see, e.g., Beaudry and Portier 2014). Our findings confirm that optimistic expectations contributed to the boom in economic activity that preceded the 2001 recession.

In contrast, particularly marked is the contribution of pessimistic expectations to the evolution of the unemployment rate during and after the 2007–09 recession. The most recent recession differs from previous ones mainly due to the fact that it followed the incipit of the global financial crises. The occurrence of a deep financial crises and the resulting increase in uncertainty could have raised the risk of pessimism and, thus, larger upward changes in unemployment expectations. This could have originated

2. The U.S. economy experienced important changes over the last four decades and most macroeconomic variables exhibited marked time variation. Several authors have stressed the importance of relaxing the constant parameters assumptions in macro-economic models by allowing for time variation. The great moderation and its causes received a great deal of attention (Clarida, Galí, and Gertler 2000, Lubik and Schorfheide 2004, Cogley and Sargent 2005). A large literature explores the implications of changes in the conduct of monetary policy for macro-economic volatility (Stock and Watson 2003, Primiceri 2005, Boivin and Giannoni 2006, Canova and Gambetti 2009). Few papers also investigate the importance of time variations in the transmission of technology shocks (Gambetti and Galí 2009).

self-reinforcing feedback loops between unemployment expectations and economic activity that contributed to exacerbate the recession and further dampened the following recovery. In general, our results confirm that changes in the macro-economic performance of the U.S. economy cannot be fully accounted for by factors that are abstract from the role of changes in expectations.

There has historically been a great deal of emphasis on changes in expectations as sources of macro-economic fluctuations, beginning with Pigou (1927) and Keynes (1936). Yet it is only recently that the business cycle literature revived interest toward the importance of expectation-driven cycles. In an influential paper, Beaudry and Portier (2006) show that changes in expectations that are driven by news about future productivity growth are important sources of macro-economic fluctuations. Since their contribution, several authors explored the importance of news-driven cycles in the context of VAR models.[3]

Recently, changes in expectations of future developments in economic activity have been measured by directly introducing forward-looking survey data such as consumers' confidence (Barsky and Sims 2012) and unemployment expectations (Leduc and Sill 2013) into otherwise standard VAR models.[4] The advantage of using survey data is that the econometrician does not need to impose any modeling assumptions to back out the expectations of the economic agents. Furthermore, the timing of the surveys' construction, rather than sign and zero restrictions, can be used to identify unexpected changes in expectations.[5] We contribute to this strand of the business cycle literature by documenting the role of time variation in the effects of shocks to unemployment expectations and their contribution to shape the dynamics of the unemployment rate over time.

The transmission mechanism of expectations about future economic developments has also been extensively studied in structural models. Den Haan and Kaltenbrunner (2009) study the impact of positive news on future productivity that is expected to increase in 12 months, in a macro-economic model with labor market frictions. They document a very persistent effect of changes in expectations of future economic activity on both employment and labor force participation. Schmitt-Grohé and Uribe (2012) find that news shocks account for more than two-thirds of predicted aggregate fluctuations in postwar U.S. data, including hours worked. Our results, confirm the importance of changes in expectations for business cycle fluctuations. However, it is important to highlight that the analysis presented in this paper does not allow to

3. See Beaudry and Portier (2014) for a complete review of the theoretical and empirical literature on news-shocks-driven cycles.

4. A separate strand of the literature uses survey data to investigate the response of monetary policy to changes in inflation expectations, see, for example, Leduc, Sill, and Stark (2007) and Clark and Troy (2011).

5. Arias, Rubio-Ramírez, and Waggoner (2018) highlight the drawbacks of the structural vector autoregression (SVARs) identified with sign and zero restrictions commonly used to assess the importance of optimism shocks.

distinguish among different sources of changes in expectations, such as news shocks, noise, self-fulfilling fluctuations, or psychological factors.

The rest of the paper is organized as follows: Section 1 describes the data and the identification used. Section 2 analyzes the time-varying effects of changes in expectations. Section 3 explores the model's implication for the hanging persistence of the unemployment rate and the correlation between the unemployment and the inflation rate. Section 4 presents a counterfactual exercise. Section 5 concludes.

1. DATA AND IDENTIFICATION

Our baseline VAR model includes a measure of unemployment expectations (EX-UR), the realized unemployment rate (UR), the inflation rate (CPI), and the short-term interest rate (R), as in Leduc and Sill (2013). These variables have the advantage of not being revised over time with the exception of some minor revisions due to seasonal factors. The model is estimated using quarterly data over the sample 1968:Q4–2017:Q3.

Data. As a measure of the short-term interest rate, we use the 3-month Treasury bill. The unemployment rate is measured by the number of unemployed as a percent of the labor force. Inflation is measured by the annualized quarterly change in the consumer price index. Both the expected and realized unemployment rate are persistent and tend to spike during the recessions. Figure 2 reports the unemployment rate, the inflation rate, and the interest rate. The inflation rate displays pronounced stabilization between the mid-1980s and mid-2000s and larger volatility at the beginning and at the end of the sample. The interest rate shows a flat path at the end of the sample and it is close to the zero lower-bound. The changes in the dynamics of the unemployment and the inflation series as well as the lack of volatility of the interest rate at the end of the sample are fully accounted in the time-varying model, which is suitable to describe such situations.

Unemployment forecasts from the SPF are used to measure the expectation formation process of the private sector. The SPF collects predictions from professional forecasters of the unemployment rate (and other variables) since 1968, and it is conducted quarterly on about 40–50 participants. Figure 1 reports the one- to four-quarter-ahead unemployment expectations from the SPF. The expectations series forecast movements in the realized unemployment rate reasonably well at all horizons. However, expectations tend to lag movements in realized unemployment, particularly in the case of longer horizon forecasts. See also Leduc and Sill (2013), Leduc, Sill, and Stark (2007) for a discussion on inflation and unemployment forecasts.

Identification. SPF data are generally collected by the third week of the second month of the quarter, at which point survey respondents do not have information about the unemployment rate or the inflation rate of the same month. For example, for the survey collected between the second and third weeks of February, the forecast-

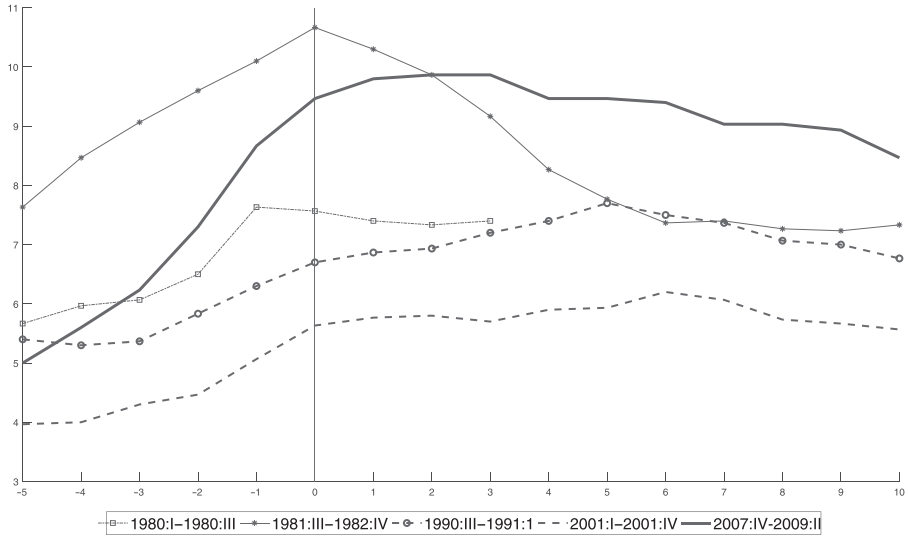

Fig 1. Unemployment Expectations and Realized Unemployment Rate.

NOTES: The unemployment expectations are the one, two, three, four quarters ahead expectations collected by the Survey of Professional Forecasters. Data are in percentage points.

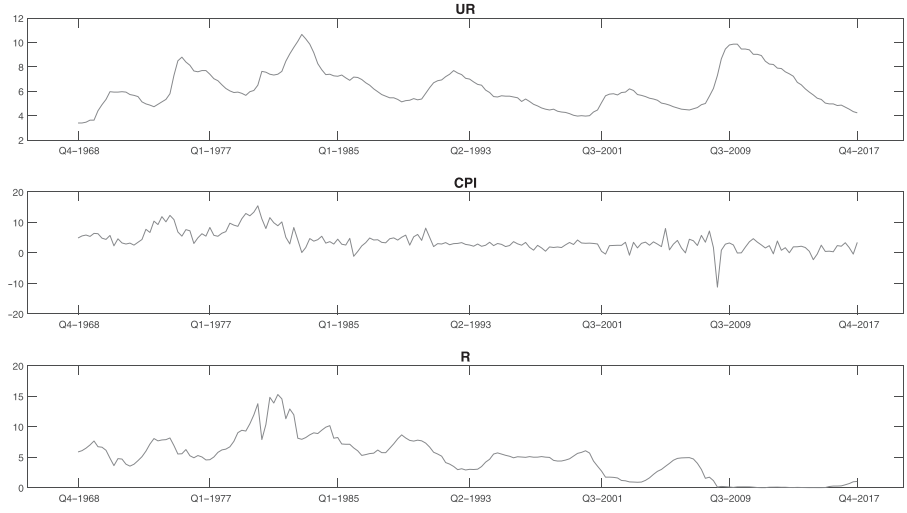

Fig 2. Data.

NOTES: Variables included in the VAR in addition to expected unemployment: Realized Unemployment (UR), CPI inflation (CPI) and the 3-month Treasury Bill Rate (IR).

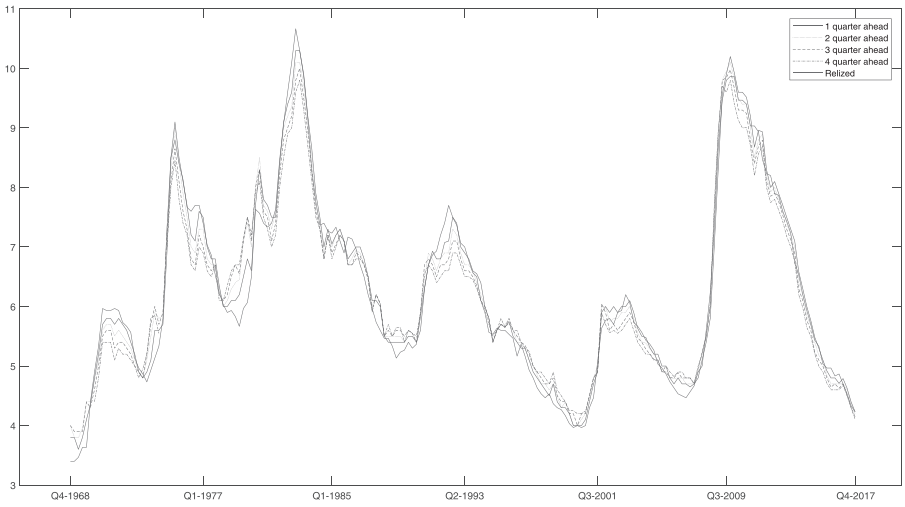

Fig 3. Unemployment Rate over Recessions.

NOTES: The figure shows the evolution of unemployment rate over recessions since the 1980s. The sample covers five quarters before the end of the recession (indicated by the vertical line crossing zero) to several quarters after the end of the recessions.

ers only know January's unemployment and inflation but not February's. However, the VAR also includes a short-term nominal interest rate that forecasters do observe when forecasting unemployment. Thus, in order to address this issue, we include the interest rate as an average up to the ninth of the month in which the SPF data are collected. This allows us to take into account the fact that the monetary policy stance is observed up to the day in which forecasters produce their forecast for unemployment. Taking into account the timing of the survey, we redefine the quarters such that the first quarter starts in February, the second in May, the third in August, and the fourth in November. The timing of the survey is consistent with the choice of ordering of the survey variable first in a recursive (i.e., Cholesky) identification scheme, followed by the unemployment rate, CPI inflation, and the interest rate as in Leduc and Sill (2013). Thus, innovations to other variables do not have a contemporaneous impact on the expected unemployment rate.[6]

Methodology. The main results of the paper come from a Time-Varying coefficient Vector Autoregression (TV-VAR) with stochastic volatility. The model allows both the autoregressive coefficients and the elements of the innovation covariance matrix to drift over time and it is estimated using Bayesian methods.[7] Given the changes

6. Given the inclusion of information regarding the interest rate up to the ninth of the first months of the quarter, innovations in unemployment forecasts do not depend on innovations in the nominal interest. The same timing is used for the VAR estimated with the addition of asset prices presented in Online Appendix 4.

7. Online Appendix 1 describes in detail the model and the estimation algorithm.

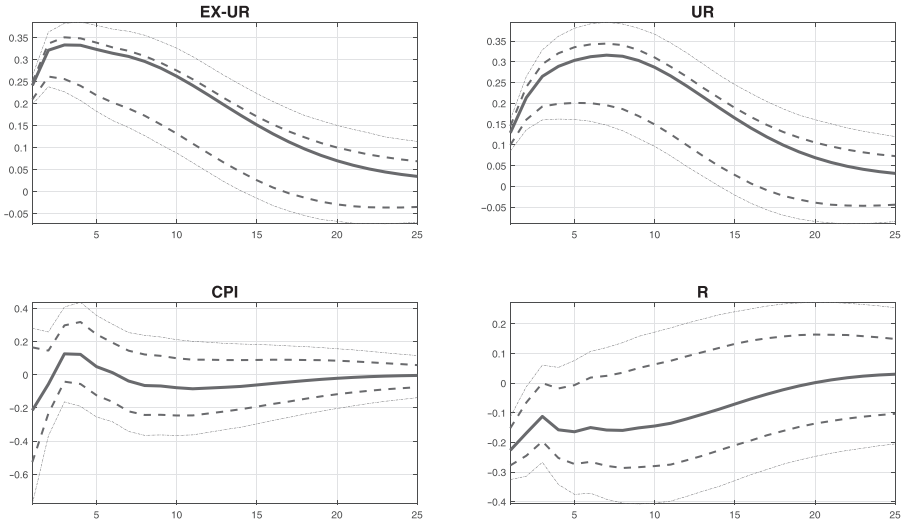

Fig 4. IRFs Expectation Shock—Constant Parameters VAR.

NOTES: Impulse-response function from a VAR model with constant coefficients. Shock: unexpected upward revision in unemployment expectations (12-month-ahead forecast). Confidence bands 68% (dash-dotted line) and 90% (dotted line).

in the unemployment rate dynamics over the last decades, allowing for time variation in quantifying the role of expectation shocks in shaping the dynamics of the unemployment rate seems a reasonable choice. In the baseline model, we use the 12-month-ahead forecast from the SPF.[8]

2. EXPECTATIONS SHOCK

Impulse Responses. In a constant parameters VAR, unanticipated upward revisions to expected unemployment (unanticipated increases in EX-UR) lead to an increase in the unemployment rate and a fall in inflation and in the short-term interest rate. As shown in Figure 4, pessimistic expectations on future economic developments lead to hump-shaped dynamics in the unemployment rate, with a peak in unemployment that occurs several quarters after the shock. The interest rate fall is consistent with loose monetary policy during periods of downturns. Thus, on average over the sample, monetary policy did not amplify expectation-driven fluctuations. The results from the constant VAR are in line with the findings in Leduc and Sill (2013).[9]

8. Online Appendix 4 provides results with the use of the one-quarter-ahead forecast.

9. For the comparison of the magnitude and significance of the economy response to unemployment expectation shock over a sample period similar to the one used in this paper (including the financial crisis), refer to Figure 7 of Leduc and Sill (2013).

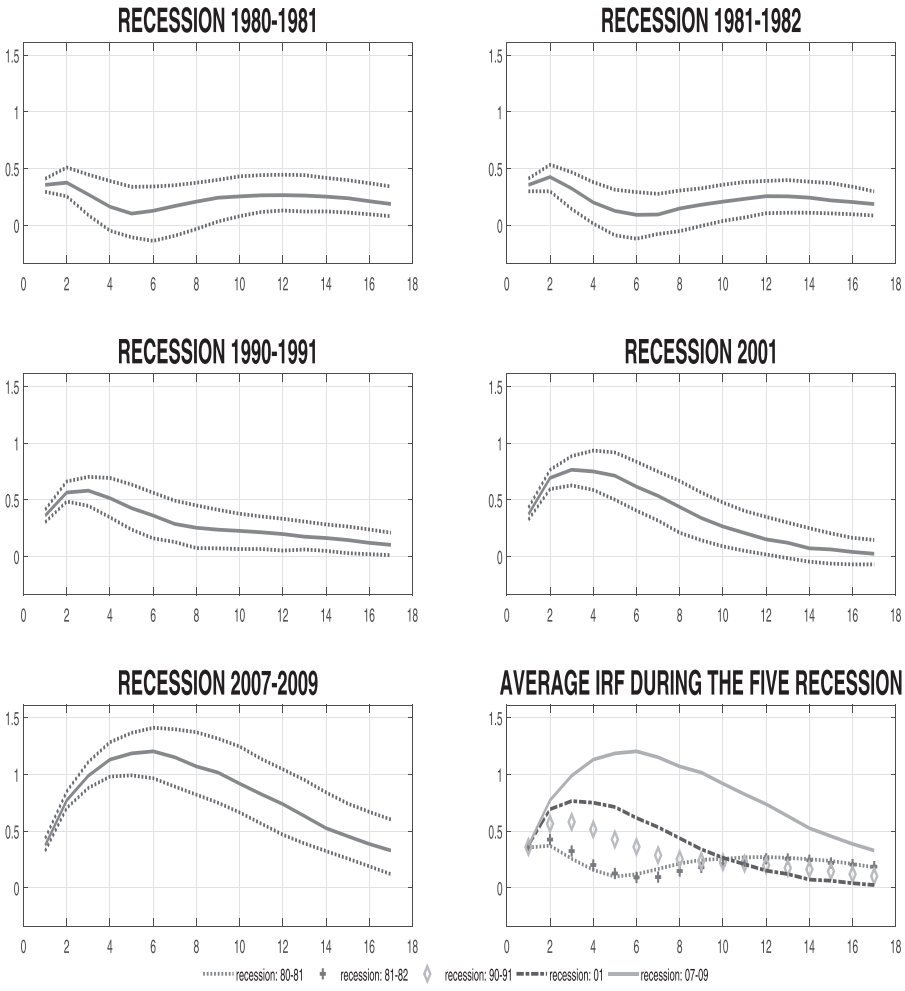

Fig 5. IRFs of Unemployment to Expectation Shock—Time Variation across Recessions.

NOTES: Impulse-response function from a VAR model with time-varying coefficients and stochastic volatility. Shock: unexpected upward revision in unemployment expectations (12-month-ahead forecast). Confidence bands: 16th and 84th percentile.

This section documents substantial time variation in the responses of the endogenous variables to expectations shocks. Figure 5 displays the response of the unemployment rate after an unanticipated increase in unemployment expectations around episodes of economic downturns.[10] It reports the average response of unemployment

10. For completeness, Online Appendix 2 reports the dynamic responses of the endogenous variables to an expectation shock over the entire sample period

over each recession period (solid line) and the 16th and 84th percentiles (dotted line).[11] No differences can be detected in the responses of the unemployment rate during the twin recessions of the early 1980s. In contrast, our findings suggest that expectation shocks generated stronger and longer-lived effects on unemployment in the post-1990 recessions. In particular, the response of unemployment are remarkably larger and more persistent during the 2007–09 period.

Inflation and the interest rate also exhibit time variation in response to the expectation shock. See Figure 6. Although it tends to be less persistent, the effect of the shock on inflation is stronger over time on impact. The interest rate reduction falls on impact and remains persistently low in the last two recessions.

Variance Decomposition. Table 2 reports how much of the forecast error variance of each variable can be explained by exogenous expectation shocks (posterior mean) at different horizons. Panel A reports the results over the all sample period. In addition, given remarkable differences in the impact and persistence of this shock starting from the early 2000 we also split the sample in the pre- (Panel B) and post-2000 (Panel C).

Overall, expectation shocks are important for economic fluctuations. Innovations to unemployment expectations account for an increasing fraction of the variance of unemployment over time. In the pre-2000 period, this shock contributed by 13% to the forecast error variance of the unemployment at the 2Q-horizon and by 8% at the 2-year horizon. In the post-2000 period, the same shock accounts for about 21% of the forecast error variance of the unemployment in the short run (2Q horizon) and about 27% after 2 years. The stronger and more persistent effect of the expectation shock on unemployment displayed by the impulse-response functions in the post-2000 is reflected in the rise of the contribution of expectation shocks to the variance of the unemployment rate over time, especially at longer forecast horizons.

Our results are broadly in line with previous finding presented in the VAR literature on the importance of news shocks and unemployment expectations for business cycle fluctuations. The persistent effect of changes in expectations of future economic activity is a common feature in structural models. In particular, Beaudry and Portier (2006) report that news on future productivity account for between 50% and 60% of the share of the forecast error variance of hours worked at a 2-year-horizon. The share slightly increases over longer forecast horizons. The results are robust to the identification of the shock in the VAR. Leduc and Sill (2013) estimate the importance of the unemployment expectation shock in a constant VAR model and report a contribution to the forecast error variance of unemployment between 48% and 17% at the 5-year horizon depending on the choice of the unemployment expectations series. Schmitt-Grohé and Uribe (2012) estimate a DSGE model with anticipated shocks and report

11. The impulse response function (IRFs) are constructed such that the initial shock has a size of one standard deviation at each point in time. However, for comparison, we divide the IRFs by the standard deviation of the shock. In any case, the model does not display substantial time variation in the standard deviations across the periods considered in the figure. See Online Appendix 3 for further details.

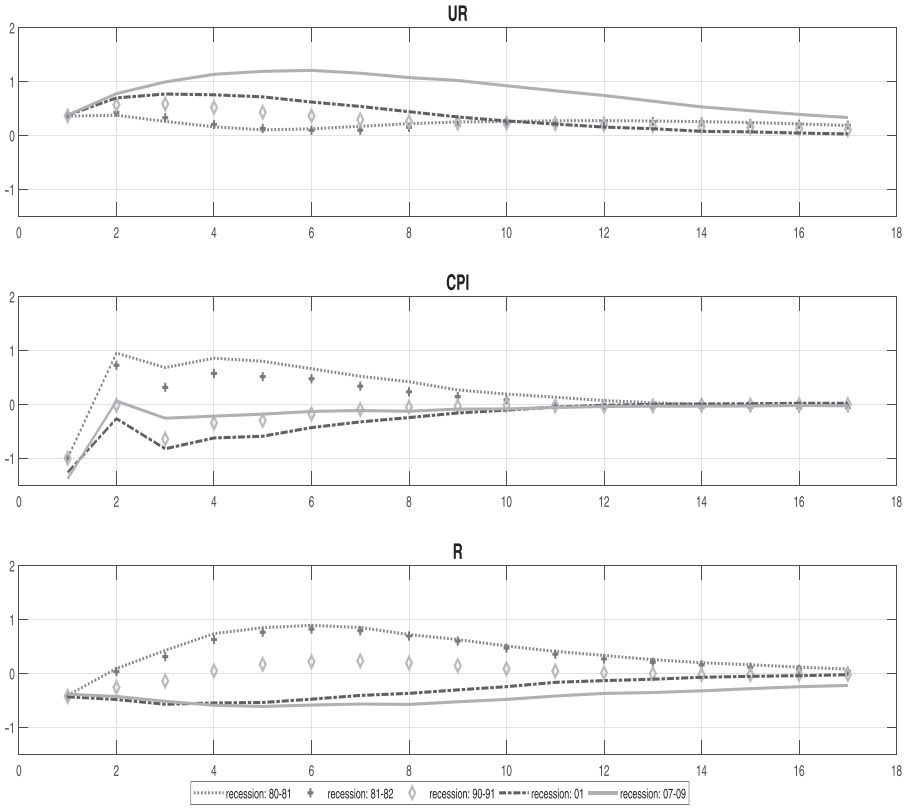

Fig 6. IRFs to Expectation Shock—Time Variation across Recessions.

NOTES: Impulse-response function from a VAR model with time-varying coefficients and stochastic volatility. Shock: unexpected upward revision in unemployment expectations (12-month-ahead forecast).

a share of unconditional variance of hours worked explained by anticipated shocks of about 70%.

As already suggested by the impulse response, the fraction of the forecast error variance of inflation and the of short-term policy rate due to expectation shocks is smaller than for the unemployment rate. While the contribution to the forecast error variance of inflation does not display remarkable changes over the two subperiods, innovations to unemployment expectations account for an increasing share of the forecast error variance of the interest rate over time.[12]

12. In Online Appendix 2, we present the time-varying variance share explained by the expectation shock over the all sample.

TABLE 1

CONTRIBUTION OF EXPECTATION SHOCKS TO THE FORECAST ERROR VARIANCE

Q ahead	(A) 1978Q4–2017Q3	(B) 1978Q4–1999Q4	(C) 2000Q1–2017Q3
UR			
2Q	16.69	13.05	21.04
4Q	16.98	10.25	25.05
8Q	16.94	8.31	27.28
20Q	16.72	9.03	25.92
CPI			
2Q	2.88	3.31	2.37
4Q	4.07	4.74	3.28
8Q	5.13	5.84	4.28
20Q	5.67	6.19	5.06
IR			
2Q	3.88	2.48	5.56
4Q	4.31	2.63	6.32
8Q	6.36	4.43	8.66
20Q	8.20	5.60	11.30

NOTE: The variables included in the VAR are: realized unemployment rate (UR), CPI inflation (CPI), and the short-term interest rate (IR). All entries are in percentages.

TABLE 2

CORRELATION OF UNEMPLOYMENT AND INFLATION AROUND RECESSIONS

Recessions	(A) Up to UR peak	(B) Up to 3 yr after end-recession
1980 Q1–1982 Q4	−0.8725	−0.6296
1990 Q3–1991 Q1	−0.5200	−0.5339
2001 Q1–2001 Q4	−0.5618	−0.3986
2007 Q4–2009 Q2	−0.1961	−0.1558

NOTE: NBER recession dates. The sample periods start three quarters before the beginning of the recession and end (A) in the quarter of the nearest unemployment peak within 6 years from the beginning of the recessions or (B) three years after the end of the recession. The two recessions of 1980:I–1980:III and 1981:III–1982:IV are considered as one double-dip recession. The sample periods are constructed as in Watson (2014).

3. MODEL-IMPLIED CONDITIONAL MOMENTS

As illustrated in Figure 3, the unemployment rate displays a remarkable increase in its persistence in the most recent recessions. In addition, the correlation between inflation and unemployment declines progressively during the U.S. recessions over time (see Table 1).

We now quantify the contribution of expectation shocks to explain the higher post-1990 persistence dynamics in the unemployment rate and lower correlations with inflation over time by computing the time-varying model-implied autocorrelation of unemployment and its correlation with inflation, conditional on the expectation shocks. The time-varying moments are computes as in Gambetti and Galí (2009).

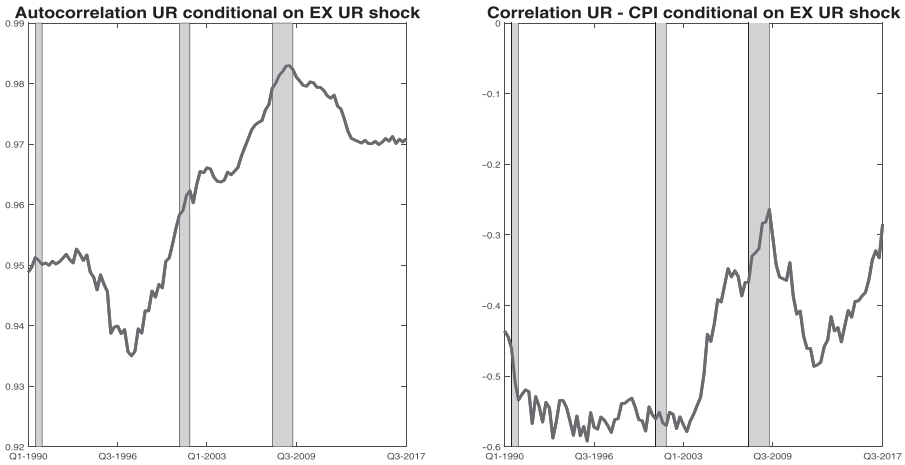

Fig 7. Conditional Moments: Autocorrelation and Correlation.

NOTES: Left panel: autocorrelation of UR conditional to the expectation shock. Right panel: correlation between UR and CPI inflation conditional to the expectation shock.

Overall, all moments display substantial changes over time. Figure 7 (left panel) plots the autocorrelation of the unemployment rate conditional on the shock to unemployment expectations since the 1990s.[13] Conditional on the expectation shock, the persistence of unemployment gradually increases to peak during the most recent recession. This result is in line with the evidence of higher unemployment persistence in the post-1990s recessions.

Figure 7 (right panel) displays the conditional correlation between the two variables. The conditional correlation between the inflation and the unemployment rate is high during the 1990s and remain stable until the early 2000s. It starts declining since mid-2000s and reaches a minimum during the most recent recession.[14] A similar pattern is observed in the conditional standard deviations of the two variables. Figure 8 displays the conditional standard deviation of unemployment rate (left panel), the conditional standard deviation of CPI inflation (mid panel), and the conditional covariance between the two variables (right panel). After an initial low volatil-

13. As in Gambetti and Galí (2009), we decompose the time-varying VAR as a time-varying distributed lag model but we introduce a new measure of conditional persistence, which can be interpreted as the persistence of unemployment implied by expectation shocks. Essentially, it is a measure of time-varying autocorrelation conditional to the shock on expectations. Online Appendix 2 provides the details of such computations. The measures of conditional correlation and conditional covariance are described in the Online Appendix 1, equations (16) and (12), respectively.

14. The implied correlation over recessions is not at odds with what presented in Table 1. Conditional on the shock to unemployment expectations, the correlation between inflation and unemployment during the 1990Q3–1991Q1 and 2001Q1–2001Q4 recessions is around −0.5. During the 2007Q4–2009Q2 recession, the same correlation falls to about −0.3.

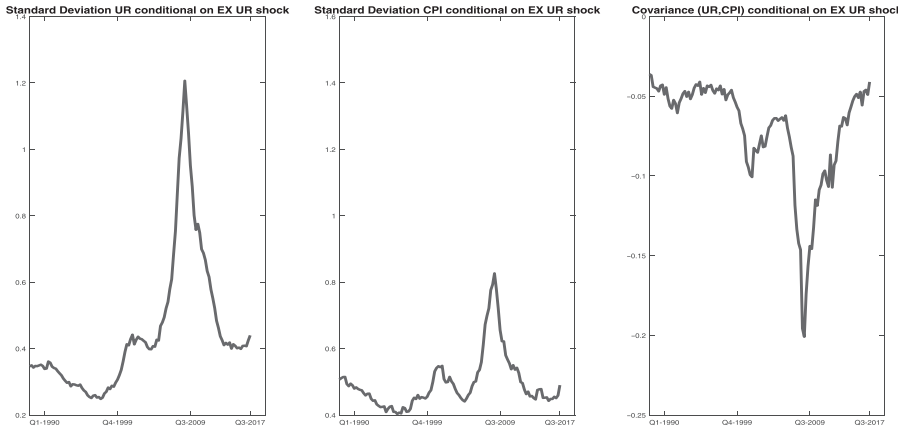

Fig 8. Conditional Moments: Standard Deviation and Covariance.

NOTES: Left panel: standard deviation of UR conditional to the expectation shock. Middle panel: standard deviation of CPI inflation conditional to the expectation shock. Right panel: covariance between UR and CPI inflation conditional to the expectation shock.

ity period (the "great moderation"), the volatility of both the unemployment rate and the inflation rate increases again since mid-2000s and it peaks in 2009. Remarkably, changes in the standard deviations of the unemployment and the inflation rate are reflected in the decline of the correlation between the two variables. In contrast, the decline in the conditional covariance between the two series is less sizable. Thus, the reduction in the correlation between inflation and unemployment is largely due to changes in the volatility of the two variables. Notice that the increase in the standard deviations of the unemployment rate mimics the changes over time in the pattern of the responses of unemployment to expectation shocks.

4. COUNTERFACTUAL

In the following, we try to better understand the importance of the expectation shocks over the most recent recession by means of a counterfactual exercise. Ideally, we would like to compare the time-varying effects of expectation shocks with other shocks.[15] Since identifying shocks with timing restrictions is often challenging, we find it more useful to explore how the variables of the model would have evolved absent the expectation shock, rather than contrasting the results of the shock to unemployment expectations with reduced-form shocks to some of the other variables of the VAR.

15. Online Appendix 3 reports the impulse responses with respect to shocks to the other variables in the VAR.

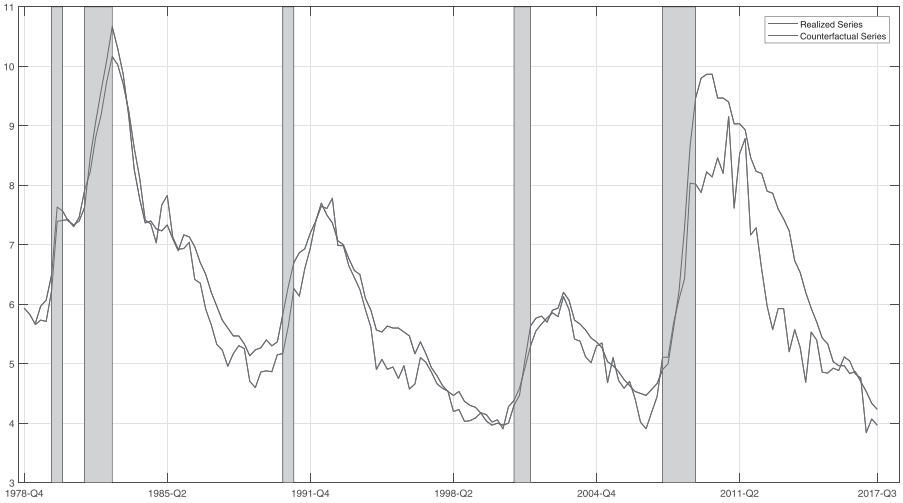

Fig 9. Unemployment Path Absent Expectation Shocks.

NOTES: Unemployment rate: realized series (blue line) versus model-implied in the absence of the expectation shock (red line).

The results presented in this section confirm that expectation shocks are particularly important to explain fluctuations in the unemployment rate, especially in the post-2000 period as already documented by the impulse responses (Figure 5) and also by the contribution of the expectation shocks to the forecast error variance of the endogenous variables (Table 2).

Figure 9 reports the realized unemployment rate and the model-implied unemployment rate, absent the expectation shock. The unemployment rate displayed substantial fluctuations over the sample. Notwithstanding the large increase in the unemployment rate during the twin recessions of the early 1980s, expectation shocks do not seem to have contributed to shape the dynamics of unemployment in those years, as already suggested by results reported in previous sections. By visual inspection, with the exception of the 2000Q1–2001Q2 period, expectation shocks contributed to maintain unemployment high during the following economic cycles. This result is particularly evident in the last decade.

Figure 10 focuses on the post-2000 recessions. Our results suggest that changes in expectations about future economic activity might have contributed to the economic boom that preceded the 2001 recession. Indeed, since year 2000, that is, the year before the start of the recession, and until the middle of the recession, realized unemployment (blue line) lays below the unemployment rate implied by the model in the absence of the expectation shocks (red line). Unanticipated downward shifts in expectation of future unemployment, that is, optimistic expectations, contributed to keep unemployment low in those years (see Figure 10, top panel).

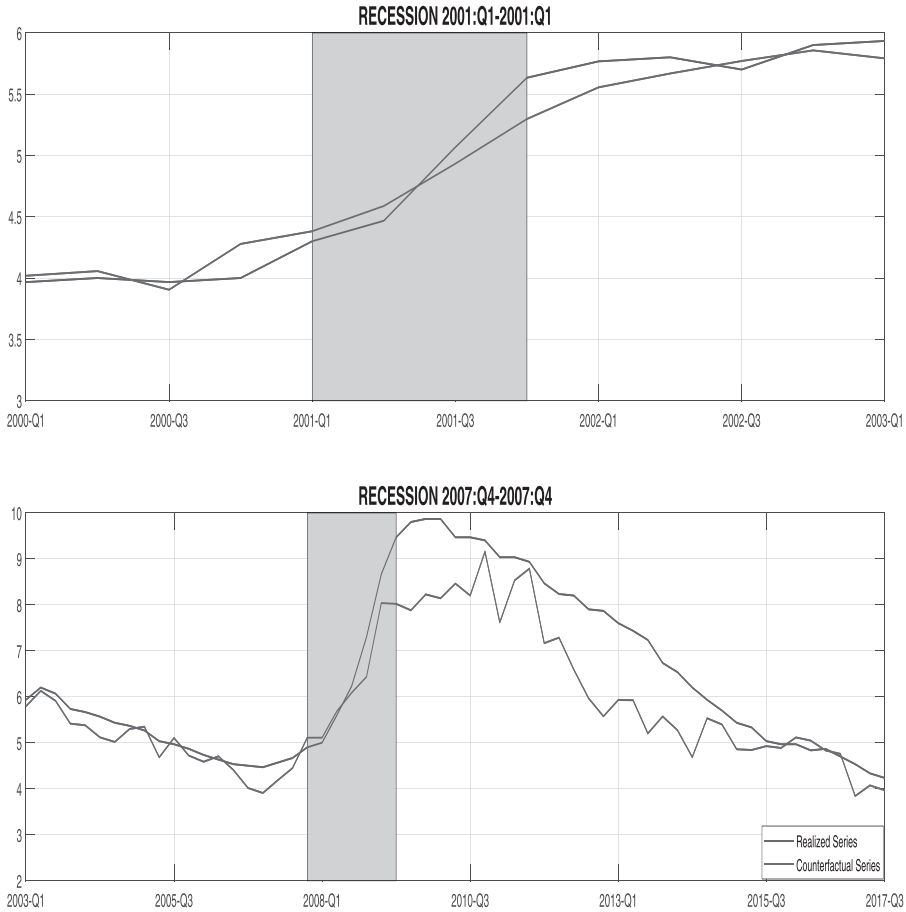

Fig 10. Unemployment Path Absent Expectation Shock across Recent Recessions.

NOTES: Unemployment rate: realized series (blue line) versus model-implied in the absence of the expectation shock (red line). Unemployment dynamics around 2001 recession (Top panel) and 2007–09 recession (bottom panel).

The role of expectation shocks seems to be particularly pronounced during and after the most recent recession. Since mid-2008 realized unemployment (blue line) lays above the unemployment rate implied by the model in the absence of the expectation shocks (red line). Unanticipated downward revisions to expected unemployment, that is, pessimistic expectations, contributed to maintain the unemployment rate high during and after the recession phase. This is in line with previous results on (i) particularly large and long-lived during the 2007–09 economic downturn effects of unanticipated shifts in expectations on the unemployment rate are, as shown in Figure 5, bottom panel; (ii) the higher model-implied persistence of unemployment

over the same period conditional on the expectation shock as shown in Figure 7 (left panel).

It is possible to know that absent the expectation shocks, the evolution of inflation and the interest rate is closer to the realized series compared to the unemployment rate.[16] This result is also in line with the larger contribution of the expectation shock to the forecast error variance of unemployment compared to inflation and the interest rate.

5. CONCLUSION

This paper provides new evidence on expectation-driven cycles. We use unemployment expectations as compiled by the SPF to measure expectations of future developments in economic activity and a structural time-varying VAR to assess the importance of expectation shocks for the changing dynamics of unemployment. Expectation shocks display a gradually larger and more persistent effect on the unemployment rate.

Our results indicate that unanticipated shifts to expected unemployment are relevant sources of economic fluctuations. We detect significant changes to unemployment in response to expectation shocks beginning in early 2000s that become particularly marked during the most recent recession. Shocks to unemployment expectations display a gradually larger and more persistent effect on the unemployment rate. Accordingly, changes in the autocorrelation of the unemployment rate, conditional to expectation shocks, are in line with evidence of higher unemployment persistence over time. In addition, we document that unanticipated changes in expectations contributed to the gradual increase in the persistence of the unemployment rate and to the decline in the correlation between inflation and unemployment since the 2000s.

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16. Overall, expectation shocks contributed to keep both inflation and the interest rate low. In particular, expectation shocks account for part of the fall in inflation during the recent recession and contributed to the low in the most recent period. Expectation shocks also contributed to match the low level of the short-term rate, especially since the mid-2008. See Online Appendix 2.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

Table A1: Parameters Specification
Figure A.1: IRFs to Expectations shocks - baseline VAR
Figure A.2: CPI Inflation IRF to EX-UR Shock over recessions
Figure A.3: IR IRF to EX-UR Shock over recessions
Figure A.4: CPI Inflation and interest rate path absent expectation shock
Figure A.5: IRFs to EX-UR and UR Shocks over recessions
Figure A.6: IRFs to CPI and IR shocks over recessions
Figure A.7: Second order moments: IR shock
Figure A.8: Time varying matrix of coefficients
Figure A.9: Time varying innovation variance matrix
Figure A.10: IRFs: Shock to unemployment expectations - baseline VAR
Figure A.11: IRFs: Shock to unemployment expectations - baseline VAR
Figure A.12: Impulse response of three variables included in the baseline VAR to EX-UR Shock
Figure A.13: Impulse response of three variables included in the baseline VAR to EX-UR Shock
Figure A.14: IRFs in VAR Models with financial variables: shock to UR expectations-response of UR
Figure A.15: IRFs in VAR Models with financial variables: shock to UR expectations-response of UR
Figure A.16: Variance decomposition of UR in VAR Models with financial variables: shock to UR expectations
Figure A.17: Variance decomposition of UR in VAR Models with financial variables: shock to UR expectations
Figure A.18: IRFs expectation shock - constant parameters VAR
Figure A.19: Response of unemployment rate to expectations shocks over recession
Figure A.20: IRFs to expectation shock - Time variation across recessions
Figure A.21: Conditional moments: Autocorrelation and correlation
Figure A.22: Conditional moments: Standard deviation and covariance