1. (a) See the figure (1) below:

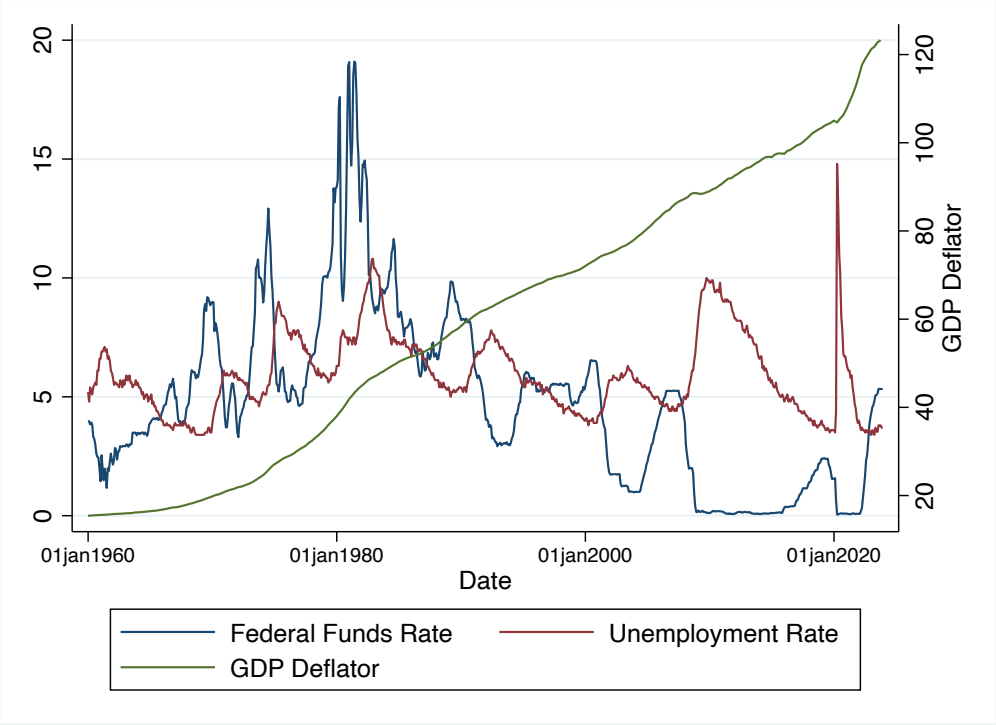

Figure 1: Federal Funds Rate, the civilian unemployment rate, and the GDP deflator (1960-2024)

(b) See code.

(c) That is because of the financial crisis in 2008. The financial crisis will lead to anomalies in our analysis and will further complicate it. First, it will make those time series non-stationary in the whole sample period. Secondly, the financial crisis will have effects on all those three values. So the assumption of those three time series are not correlated will not be true any more.

(d) See the figure (2) below:

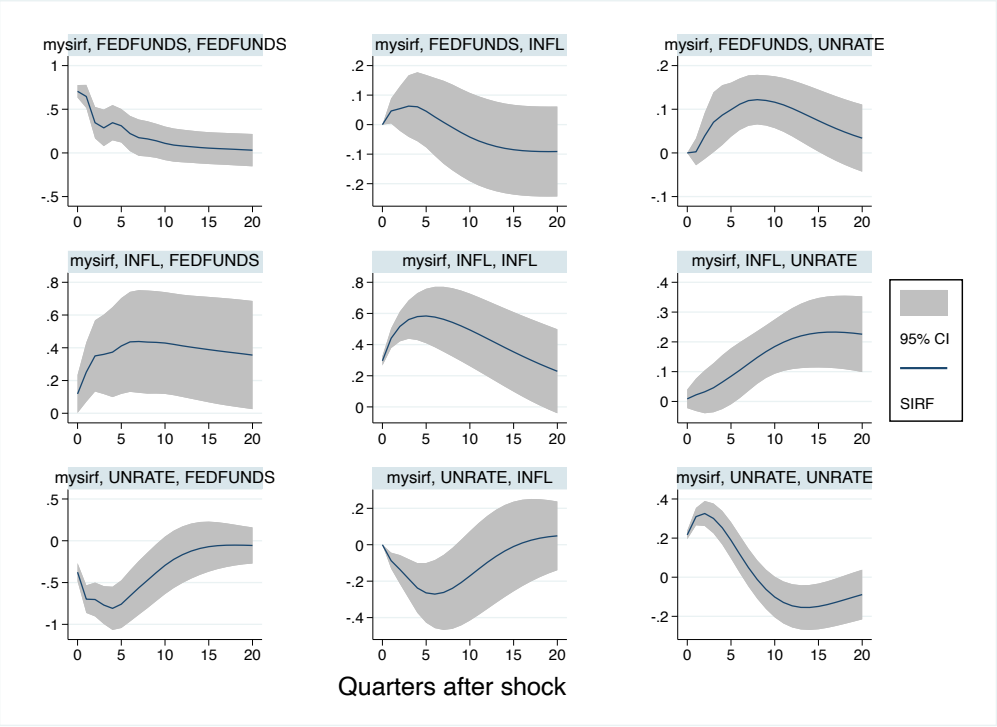

Figure 2: Impulse-Response Analysis

(e) Federal Funds Rate: From the first row of the figure we can see that when Federal Fund Rate has a shock, the inflation rate first goes up and then goes down below the initial level. On the other hand, the unemployment rate first increase and then decrease to a level that slightly higher than initial level.

Inflation Rate: When there is a shock to inflation rate, then then federal funds rate goes up and then decrease a little bit but is still above the initial level. The unemployed rate goes up monotonically.

Unemployment: When there is a shock to unemployment, the federal rates first decreases and then goes up but still below the initial level. The inflation rate is similar, it first goes down and then goes back, however, to its initial level.

(f) See the figure (3) below:

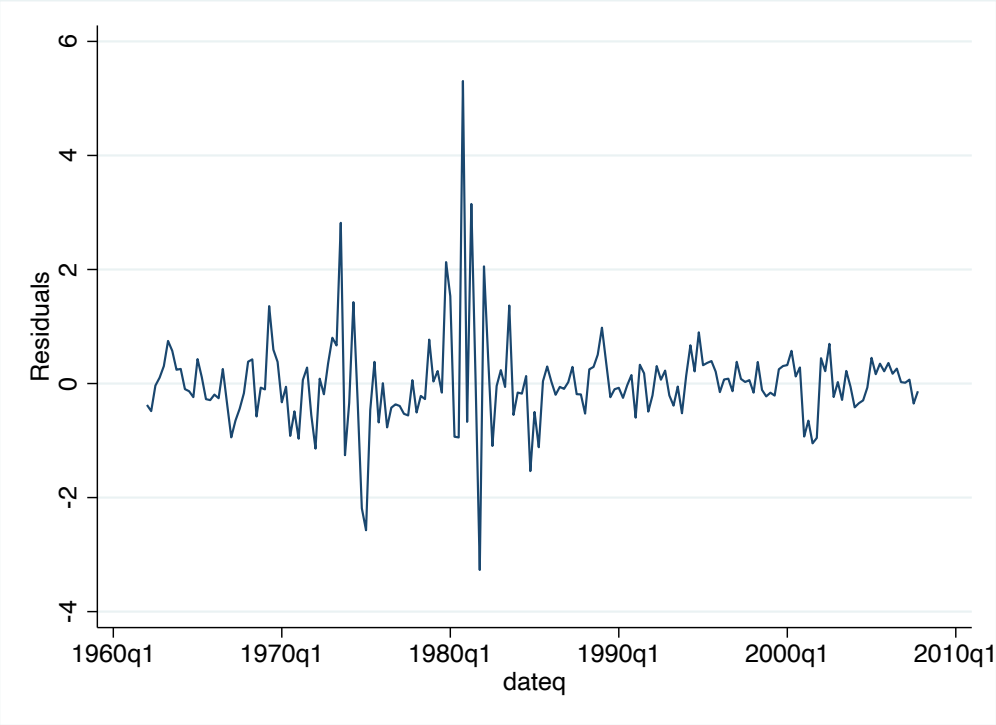

Figure 3: Predicted series of monetary shocks

(g) The estimated monetary shock between 2001Q3 and 2001Q4 is negative. It is related to 911 terrorist attack. The Federal reduces the interest rate to stimulate consumption and aggregate demand.

2. (a) See code.

   (b) See the figure (4)

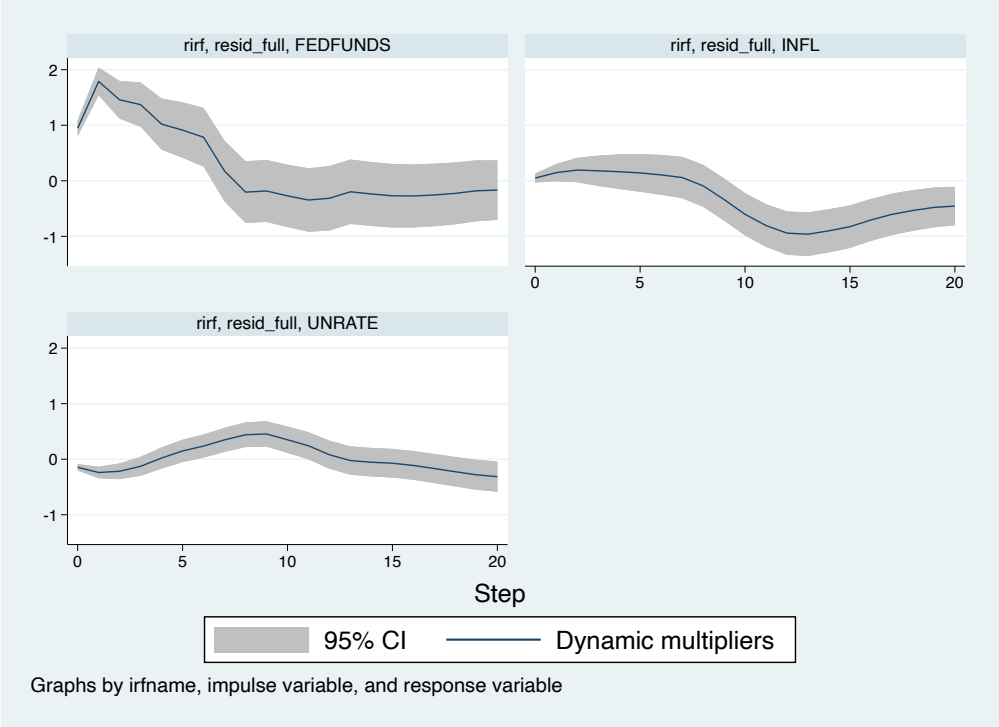

Figure 4: Impulse Response Function Analysis

(c) See the figure (5)

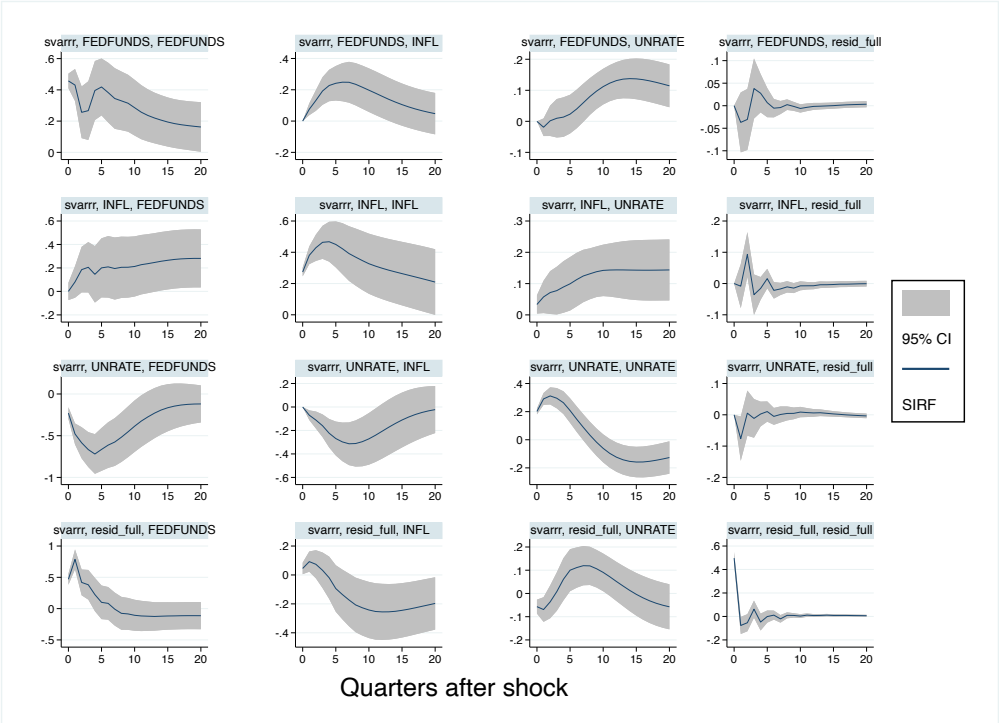

Figure 5: Impulse Response Function Analysis

(d) It is because the Romer shock will affect inflation rate, federal funds rate and unemployment rate within the same period. However, there is no backward effect, i.e. those rates does not contemporaneously impact Romer shock. In Romer and Romer (2004), they argue that their measure of shock is free of future response.

(e) From SVAR figure (5), we can see that there are contemporaneous impact of Romer shock on inflation and unemployment rate.

But for VAR method, figure (4) only exhibits lagged terms effect. Hence the magnitude of the effect is lower.

(f) We can see in Figure (5) that the effect of federal rates on inflation rates is much higher compared to Figure (2). This is due to endogeneity and anticipated shocks. However, when we consider Romer shocks, these problems are reduced.

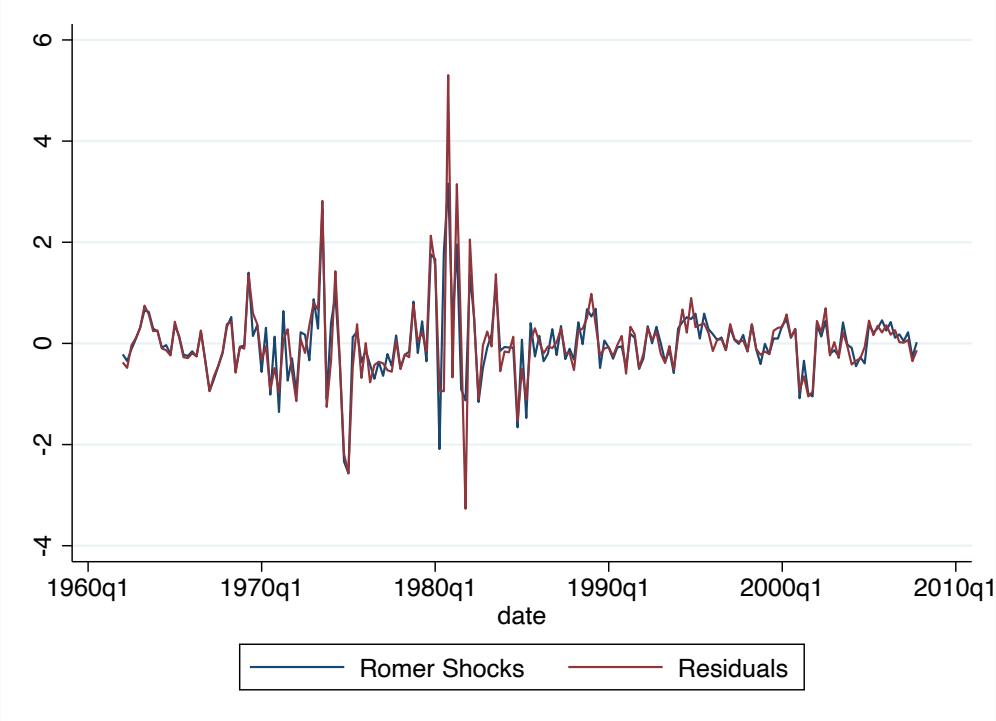

Figure 6: Romer and SVAR Monetary Shocks

(g) From Figure (6) we can see that the effect of shocks are still there. However, the magnitude of Romer shocks in 2001q3 is smaller.