Online Appendix to

"Financial Shocks, Credit Spreads, and the International Credit Channel

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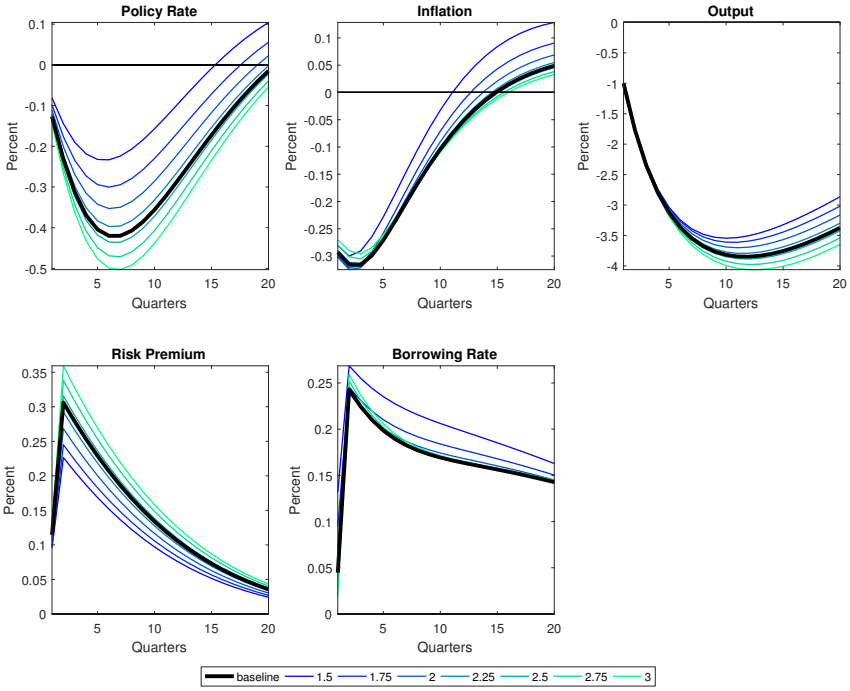
S1 Theoretical Model

The sign restrictions we derived from theory hold for a wide variety of financial and demand shocks. Figure S.1 reports the impulse responses to an unanticipated risk shock as in Christiano et al. (2014). The shock leads to a fall in output and inflation, an increase in the credit spread and a loosening of monetary policy. Consistent with our sign restrictions, and with the shock to the risk premium, the increase in the credit spread dominates over the fall in the policy rate, leading to an *increase* in the borrowing interest rate paid by entrepreneurs. As for the risk premium shock, this result is not affected by the strength of the response of monetary policy to the shocks, as the thin colored lines show.

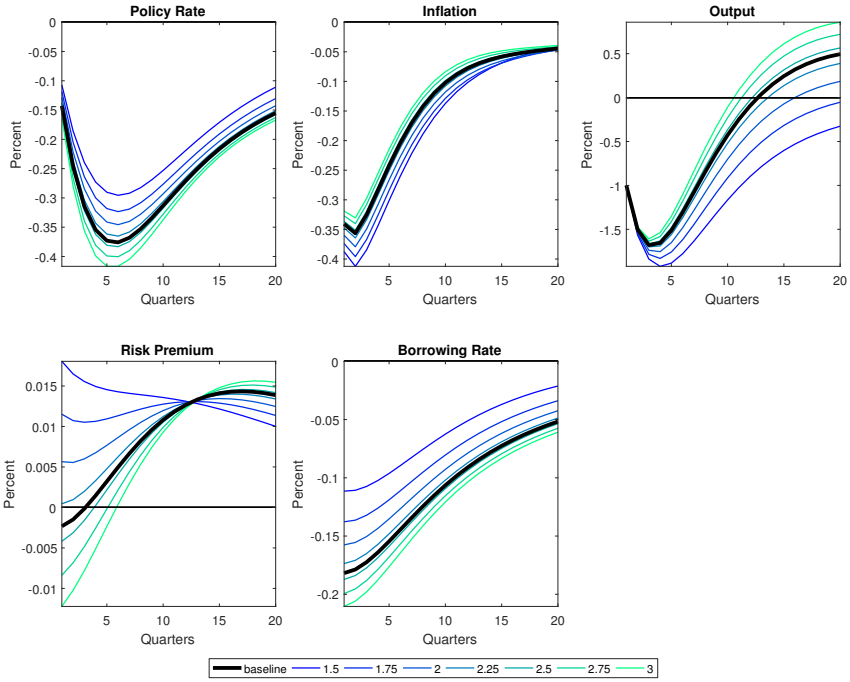
Similarly, our sign restrictions also hold when considering other types of aggregate demand shock. Figure S.2 reports the impulse responses to a shock to consumer preferences. As for the financial shock, the aggregate demand shock leads to a fall in output and inflation, an increase in the credit spread and a loosening of monetary policy. Consistent with our sign restrictions, and different from the financial shocks, the increase in the credit spread is now dominated by the fall in the policy rate, leading to a *fall* in the borrowing interest rate paid by entrepreneurs.

Figure S.1 Impulse Responses to a Risk Shock



Note. The thick dark line is computed using the parametrization in the baseline estimated model of Christiano et al. (2014). The thin colored lines are obtained by varying the coefficient on inflation in the Taylor Rule. We consider values from 1.5 to 3. The size of the shock is normalized so that it generates a fall in output of 1 percent.

Figure S.2 Impulse Responses to a Risk Consumers' Preference Shock



Note. The thick dark line is computed using the parametrization in the baseline estimated model of Christiano et al. (2014). The thin colored lines are obtained by varying the coefficient on inflation in the Taylor Rule. We consider values from 1.5 to 3. The size of the shock is normalized so that it generates a fall in output of 1 percent.

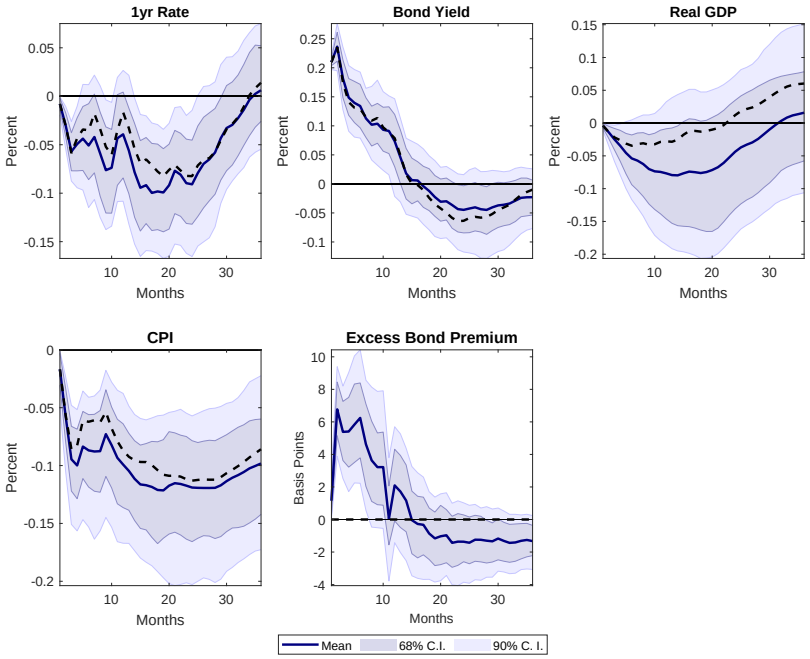
S2 Counterfactual exercise

Counterfactual Exercise: Closing the International Credit Channel. We compute the counterfactual impulse responses for US monetary, central bank information and financial shocks by setting to zero the coefficients of the credit spreads equations in both the UK and the US.

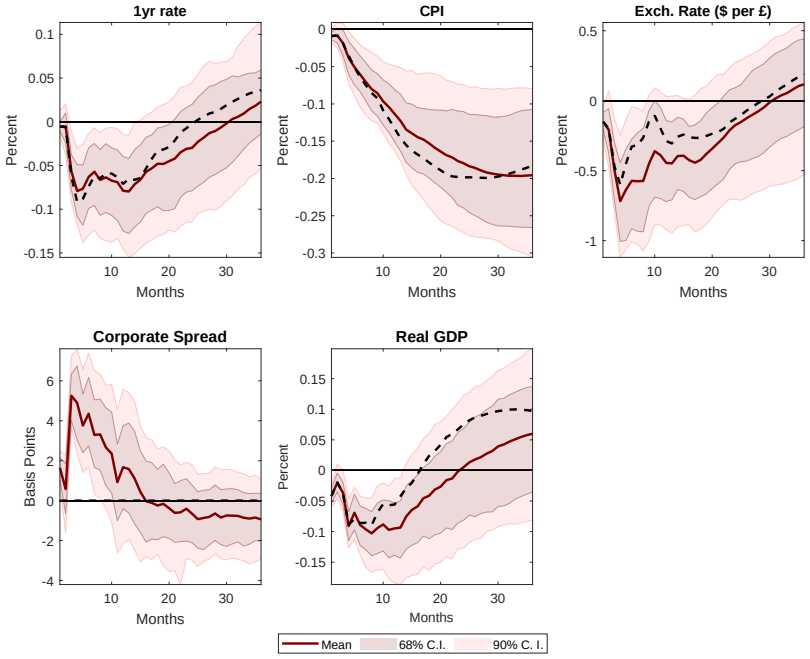
In the main text we report only the GDP responses in both countries. Here, we also report the remaining responses. Figure S.3 plots the impulse responses to a US financial shock when we close the credit channel. Figure S.4 plots the impulse responses to a US monetary policy shock when we close the credit channel. Figure S.5 plots the impulse responses to a US central bank information shock when we close the credit channel.

Figure S.3 US Financial Shock:
Closing the International Credit Channel

(A) United States



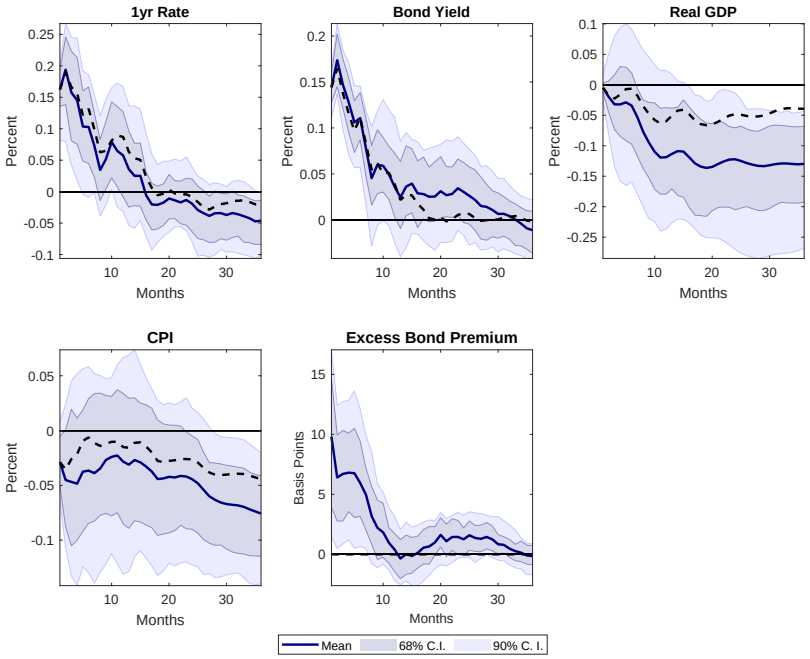
(B) United Kingdom



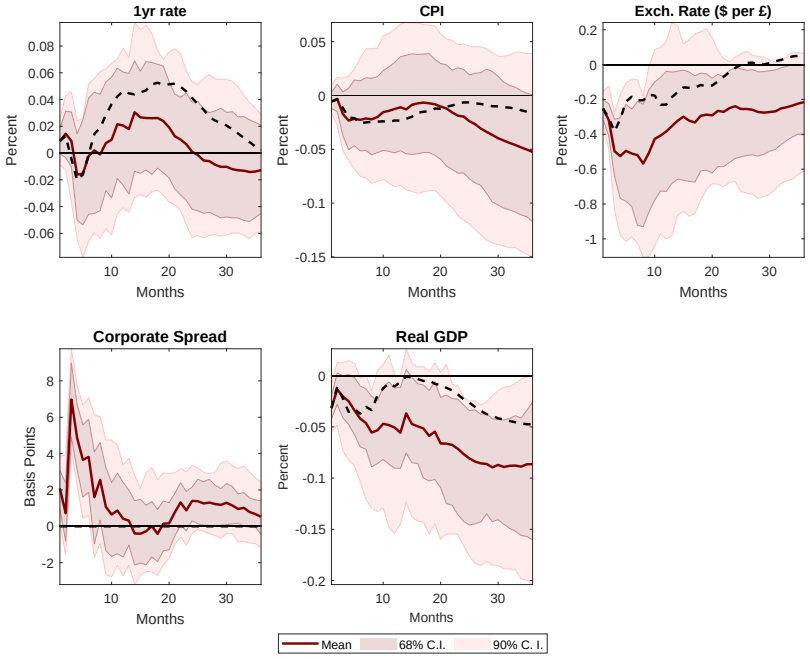
Note. The solid line and shaded areas report the mean, 68% and 90% confidence intervals computed using wild bootstrap with $2 * 10^6$ replications and and 10^4 rotations per bootstrap draw. The dashed line reports the counterfactual impulse response computed keeping credit spreads fixed.

Figure S.4 US Monetary Policy Shock:
Closing the International Credit Channel

(A) United States

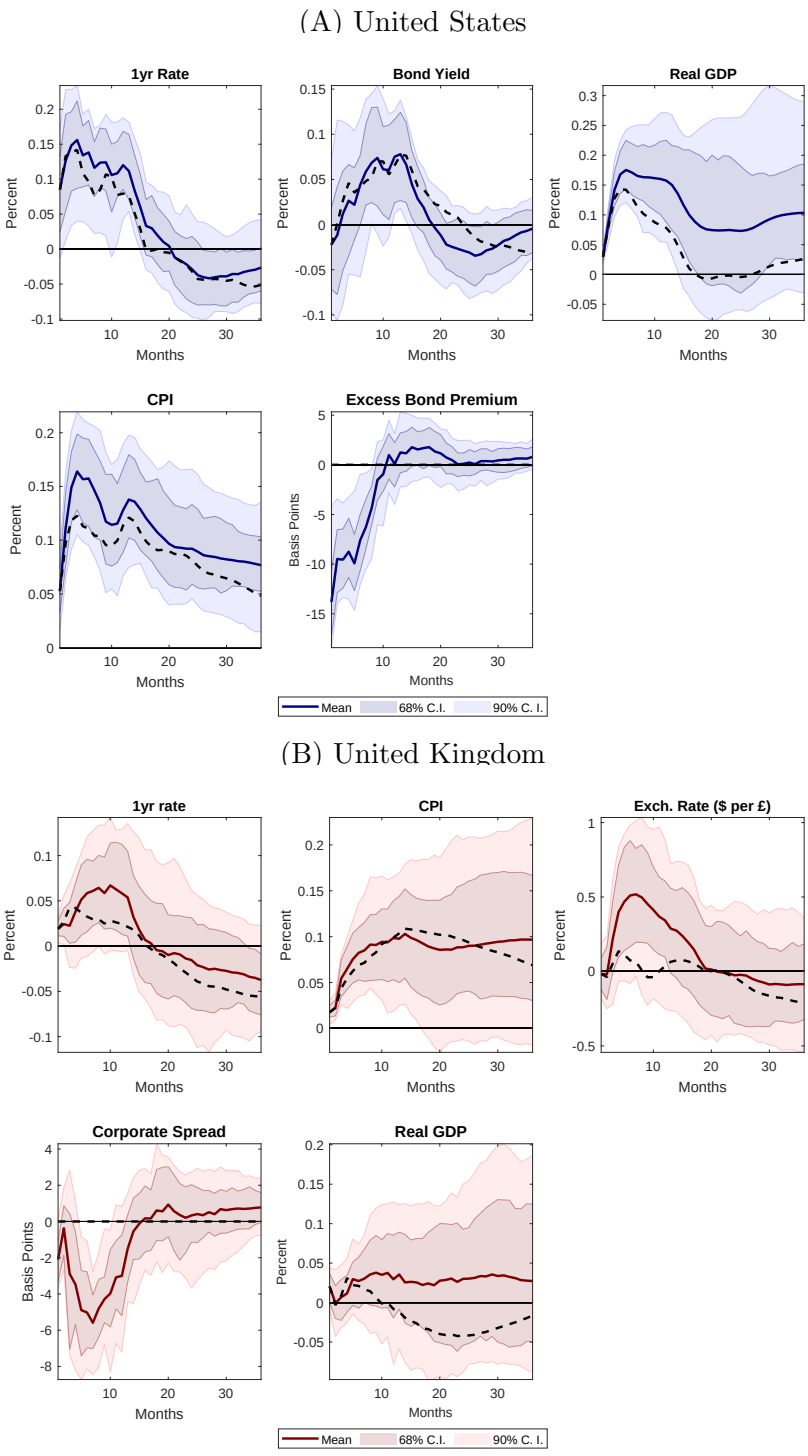


(B) United Kingdom



Note. The solid line and shaded areas report the mean, 68% and 90% confidence intervals computed using wild bootstrap with $2 * 10^6$ replications and and 10^4 rotations per bootstrap draw. The dashed line reports the counterfactual impulse response computed keeping credit spreads fixed.

Figure S.5 US Central Bank Information Shock: Closing the International Credit Channel



Note. The solid line and shaded areas report the mean, 68% and 90% confidence intervals computed using wild bootstrap with $2 * 10^6$ replications and and 10^4 rotations per bootstrap draw. The dashed line reports the counterfactual impulse response computed keeping credit spreads fixed.

S3 Robustness of the Baseline Results

In this Section we provide a battery of checks suggesting that our estimation results are robust in several respects.

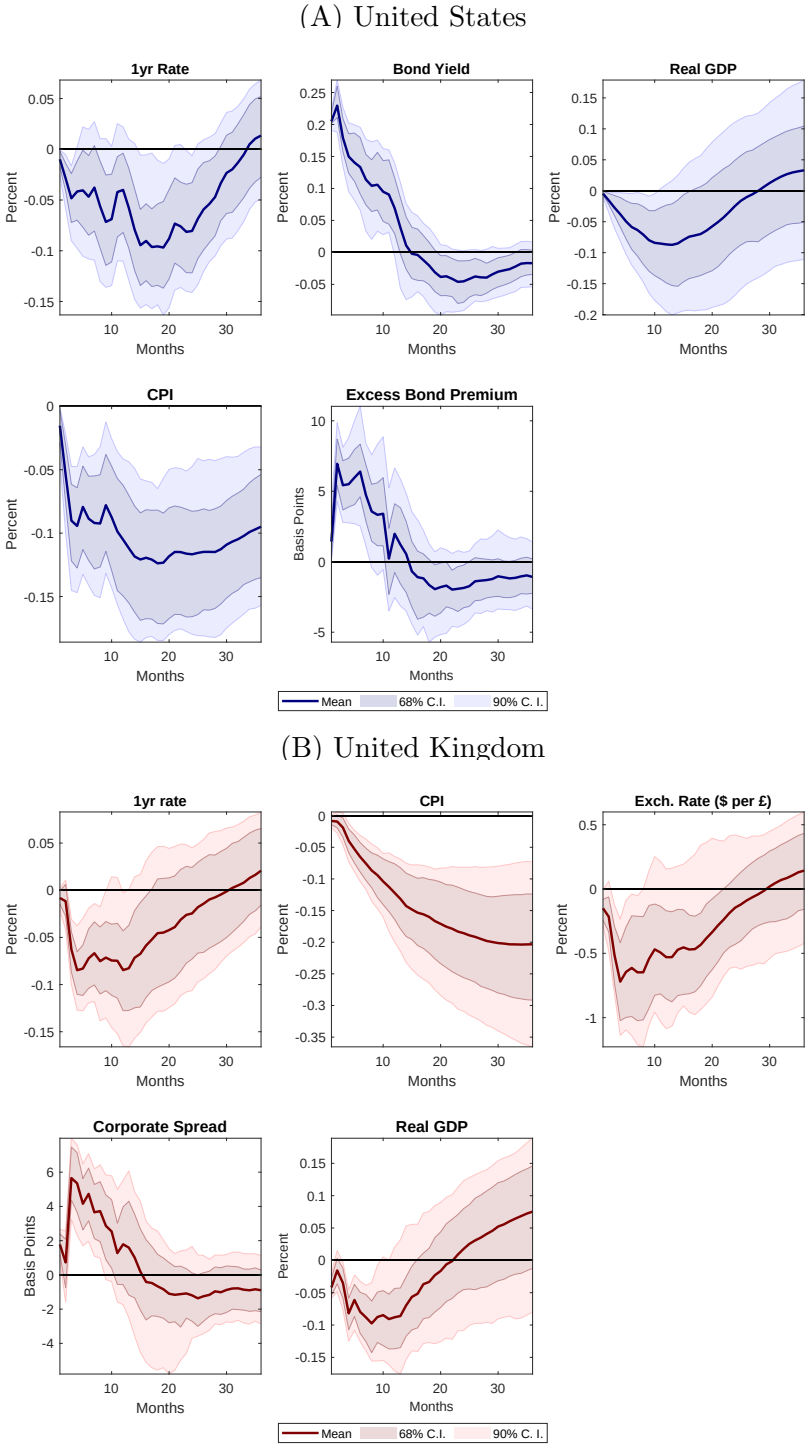
Identification of additional shocks. Figure S.6 plots the impulse responses that we obtain when we impose additional sign restrictions in order to identify, in addition to a monetary policy and a financial shock, an aggregate supply shock. These results are very similar to our baseline.

Inflation targeting sample. Figures S.7-S.9 report the results estimated on a shorter sample for the UK (starting in 1993:M1), when the UK adopted an inflation target as its nominal anchor following its exit from the Exchange Rate Mechanism. Note that we do not need here to reduce the sample for the US model since (as noted in the main text) the US and the UK models can be estimated separately. Again, the results we obtain are in line with our baseline, if less precisely estimated: the transmission mechanism of all three shocks, including via an international credit channel, remain largely intact, at least qualitatively.

Excluding the global financial crisis. Figures S.10-S.12 report the impulse responses computed over a shorter sample for both the UK and the US that excludes the global financial crisis, i.e. from 1979:M7 to 2007:M12. Not surprisingly, the period of the global financial crisis is especially important for pinning down the international transmission of US financial shocks, although it's worth noting that the domestic transmission of financial shocks appears largely unaffected by the shorter sample, which suggests that our identification strategy doesn't solely rely on that particular event. Moreover, the shorter sample also somewhat muddles the identification of information shocks. However, the impulse responses in Figures S.10-S.12 show that our results (despite being less precisely estimated) remain qualitatively in line with our baseline estimates.

Alternative measure of economic activity. Figures S.13-S.15 report results using Unemployment as a measure of economic activity in both countries. For all three shocks, the responses are consistent with our baseline results using GDP, and corroborate the existence of an international credit channel. The main differences are the unemployment responses, in both the US and the UK, to a US information shock, which are, at face value, harder to interpret than the corresponding GDP responses, but could be reconciled with information shocks containing news about labour productivity going forward.

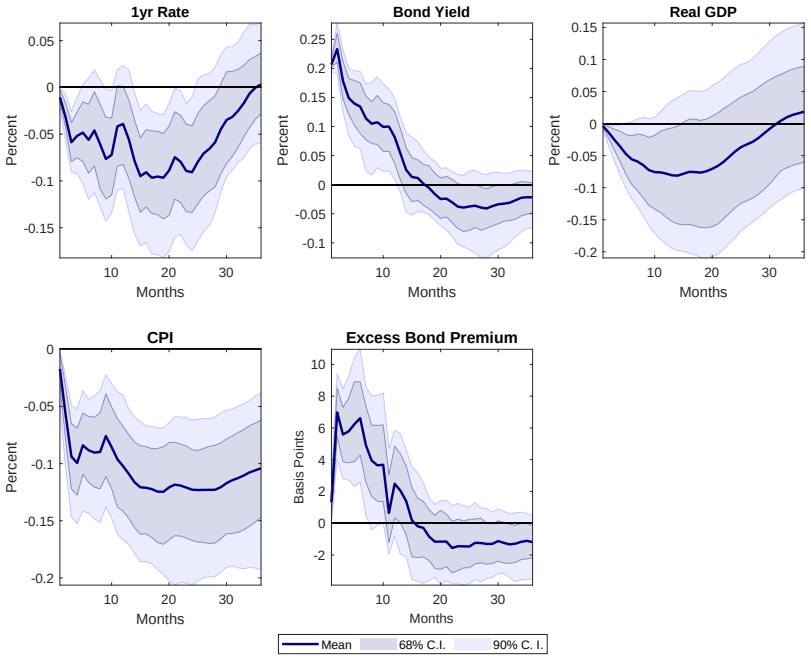
Figure S.6 US Financial Shock: Identifying Other Shocks



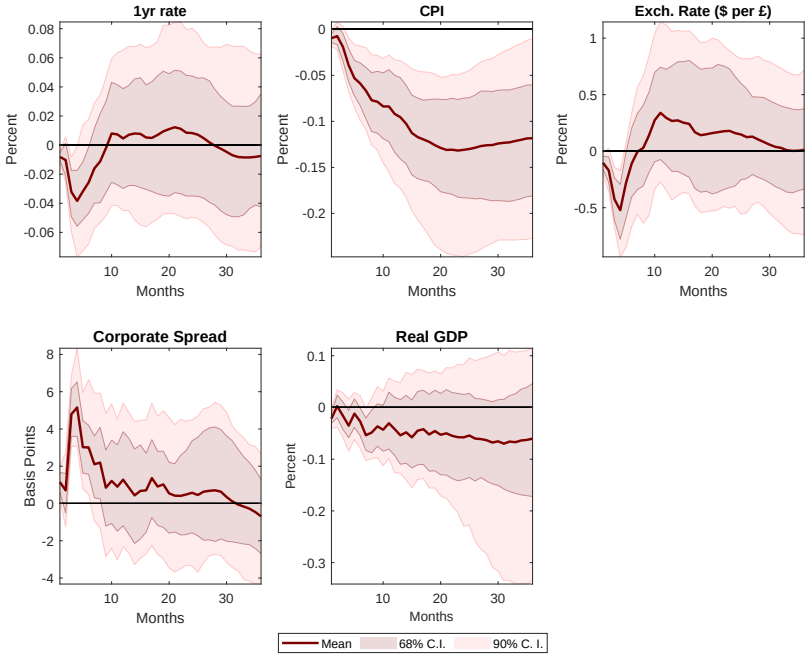
Note. The solid line and shaded areas report the mean, 68% and 90% confidence intervals computed using wild bootstrap with $2 * 10^6$ replications and and 10^4 rotations per bootstrap draw.

Figure S.7 US Financial Shock: UK Sample Post 1993

(A) United States



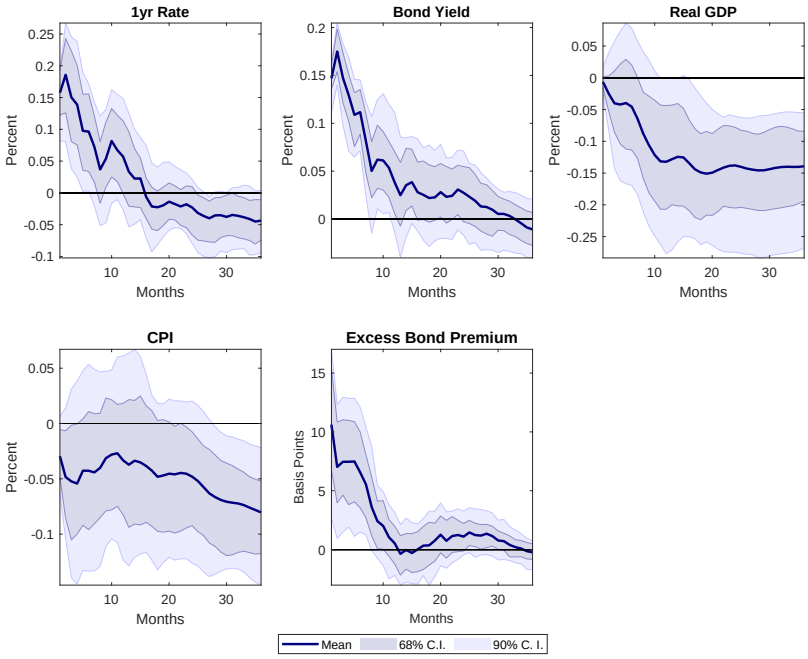
(B) United Kingdom



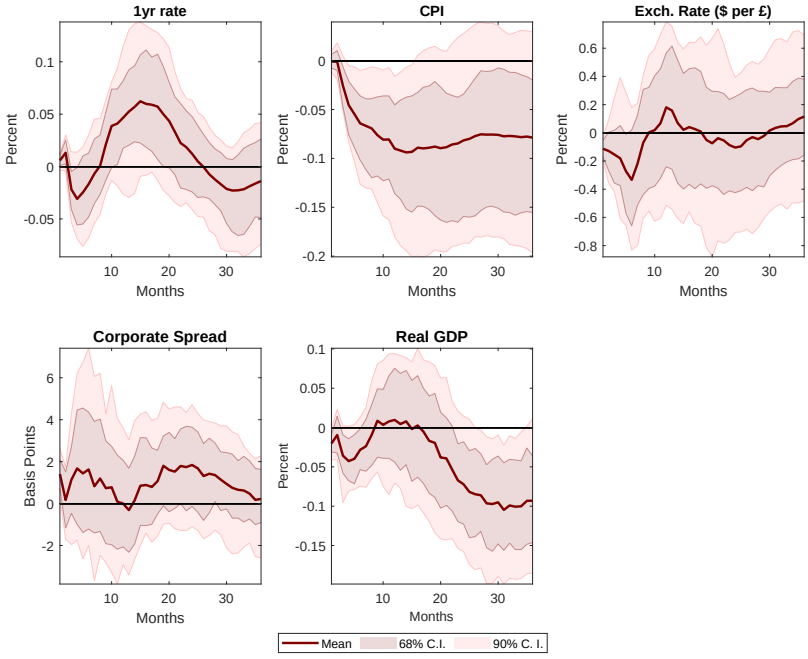
Note. The solid line and shaded areas report the mean, 68% and 90% confidence intervals computed using wild bootstrap with $2 * 10^6$ replications and and 10^4 rotations per bootstrap draw.

Figure S.8 US Monetary Policy Shock: UK Sample Post 1993

(A) United States



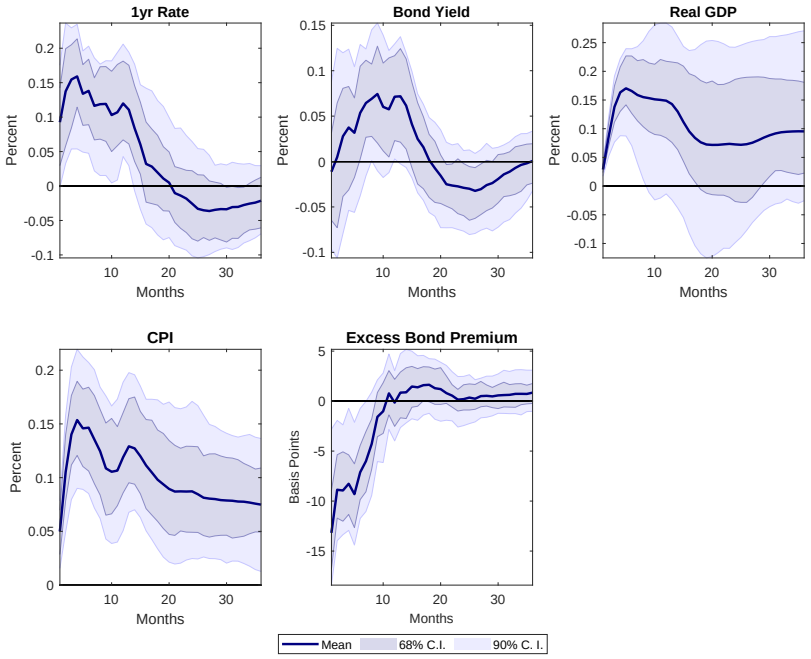
(B) United Kingdom



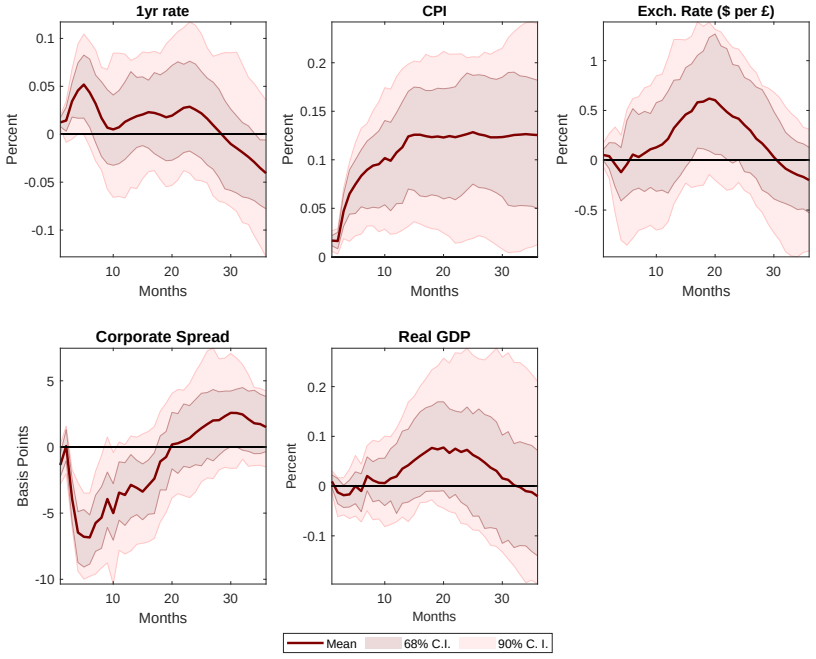
Note. The solid line and shaded areas report the mean, 68% and 90% confidence intervals computed using wild bootstrap with $2 * 10^6$ replications and and 10^4 rotations per bootstrap draw.

Figure S.9 US Central Bank Information Shock: UK Sample Post 1993

(A) United States

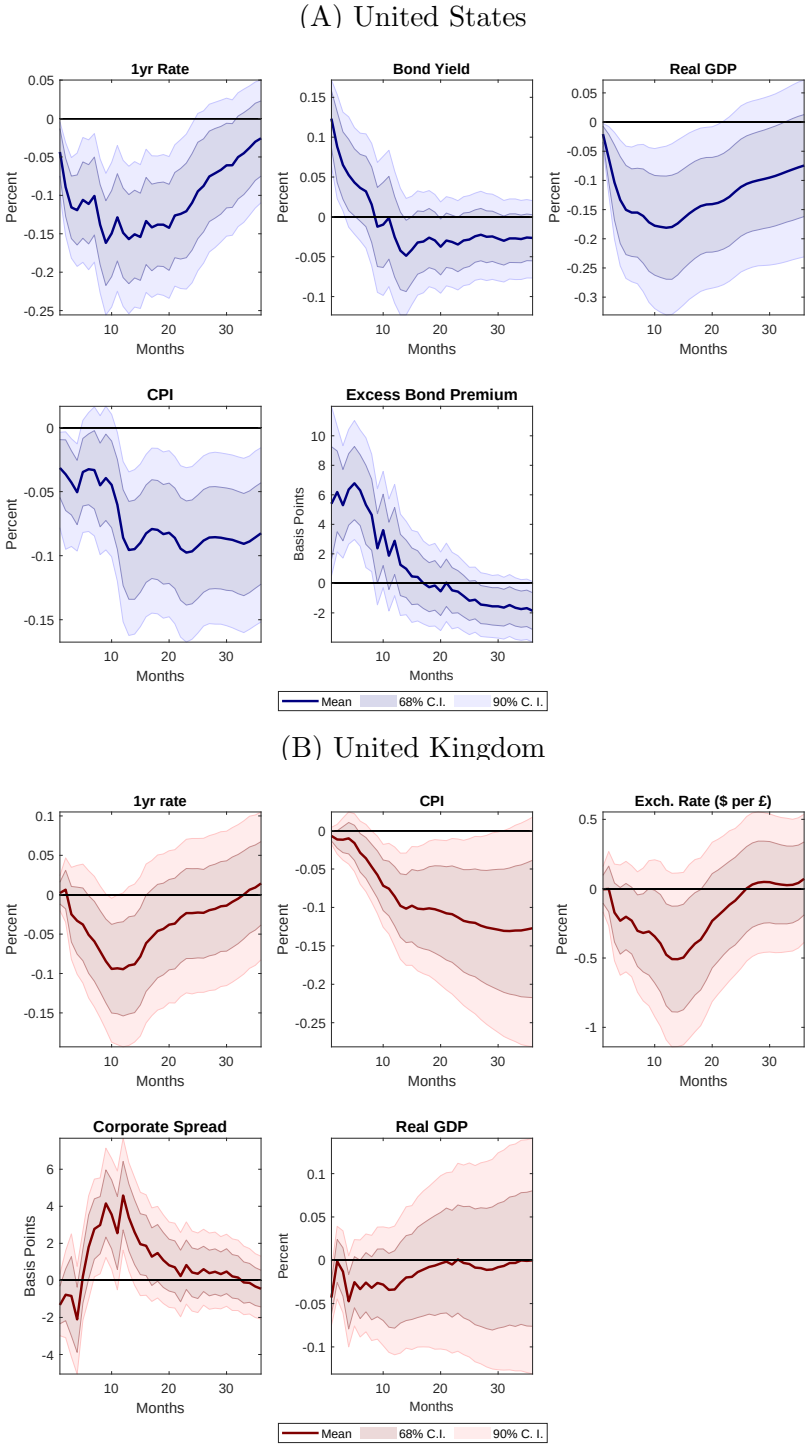


(B) United Kingdom



Note. The solid line and shaded areas report the mean, 68% and 90% confidence intervals computed using wild bootstrap with $2 * 10^6$ replications and and 10^4 rotations per bootstrap draw.

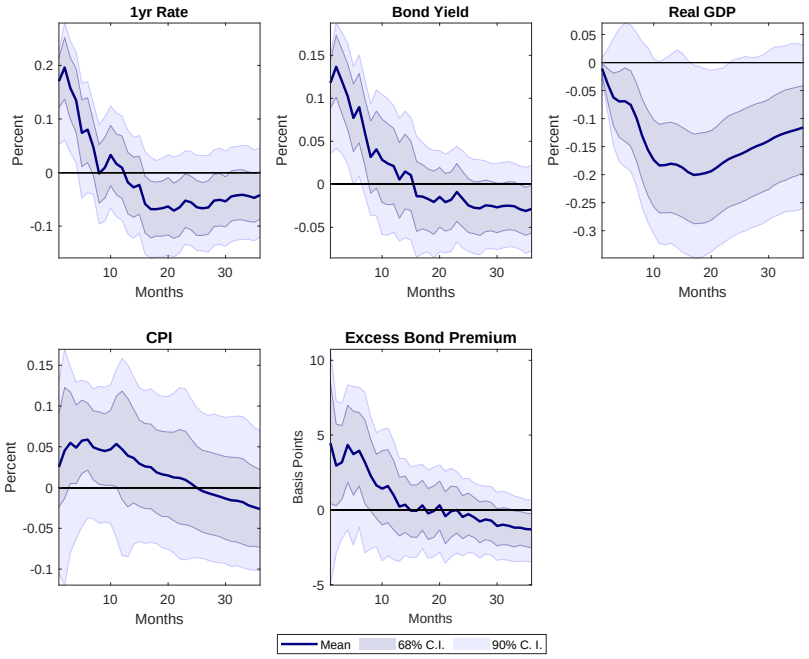
Figure S.10 US Financial Shock: Pre GFC Sample



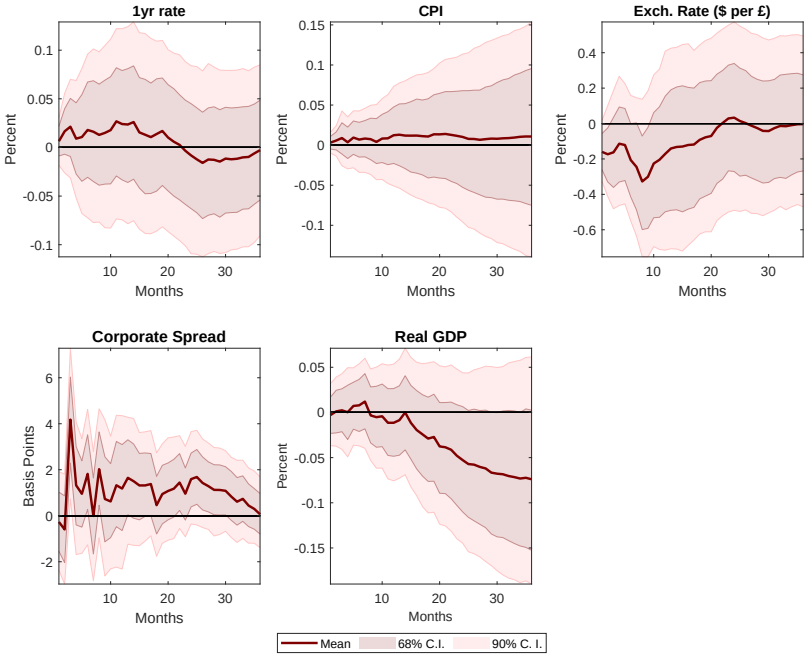
Note. The solid line and shaded areas report the mean, 68% and 90% confidence intervals computed using wild bootstrap with $2 * 10^6$ replications and and 10^4 rotations per bootstrap draw.

Figure S.11 US Monetary Policy Shock: Pre GFC Sample

(A) United States



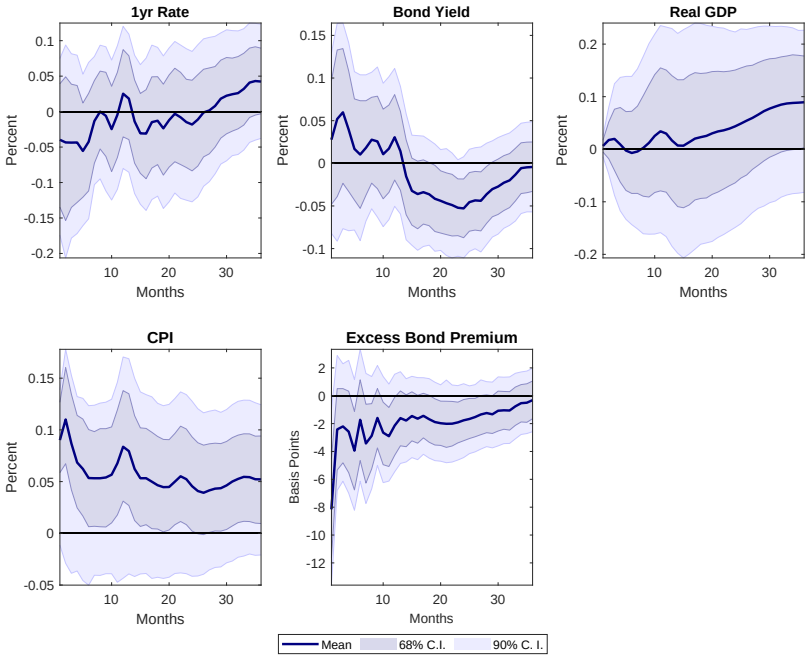
(B) United Kingdom



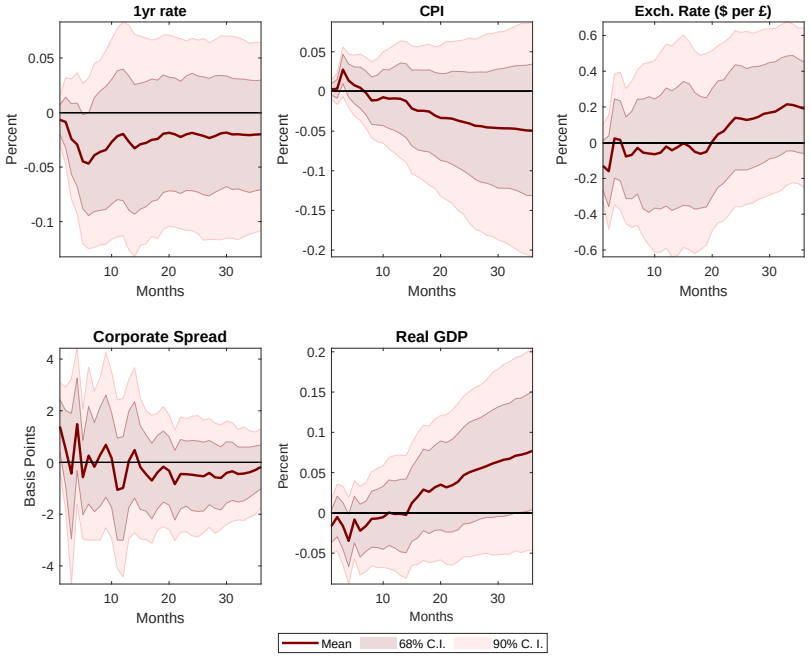
Note. The solid line and shaded areas report the mean, 68% and 90% confidence intervals computed using wild bootstrap with $2 * 10^6$ replications and and 10^4 rotations per bootstrap draw.

Figure S.12 US Central Bank Information Shock: Pre GFC Sample

(A) United States



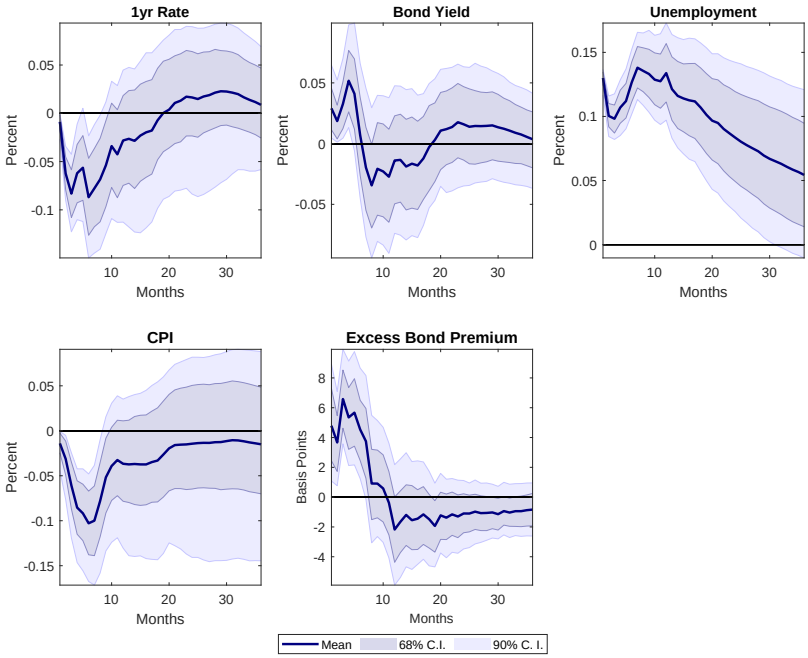
(B) United Kingdom



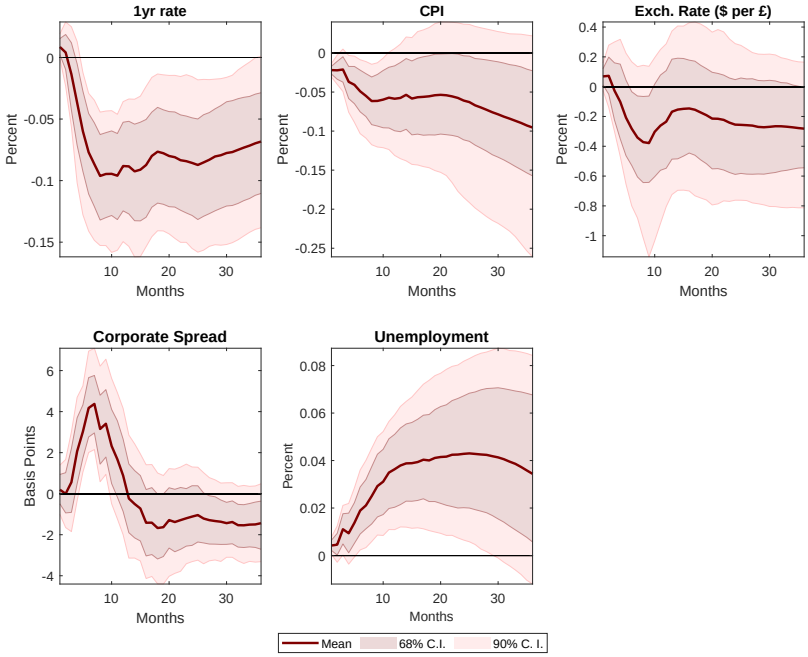
Note. The solid line and shaded areas report the mean, 68% and 90% confidence intervals computed using wild bootstrap with $2 * 10^6$ replications and and 10^4 rotations per bootstrap draw.

Figure S.13 US Financial Shock: Unemployment

(A) United States



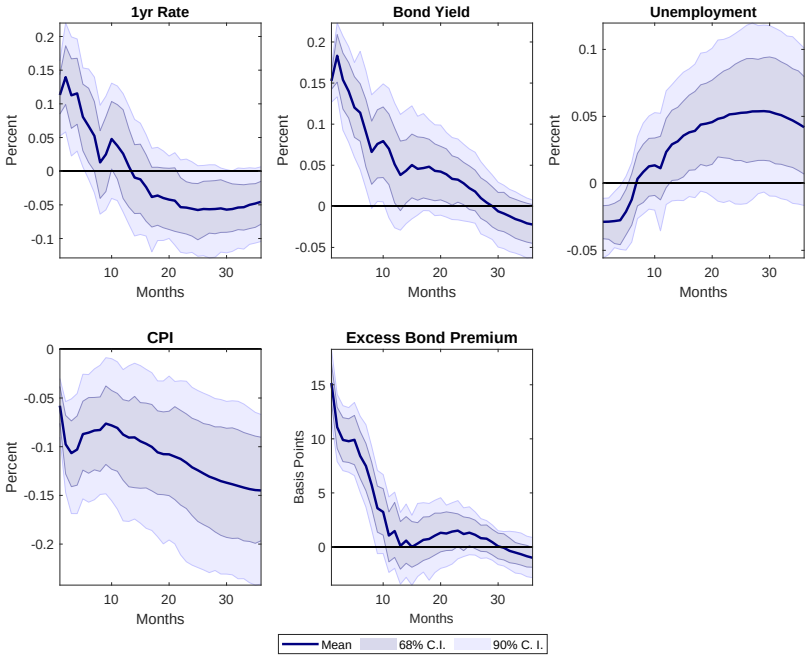
(B) United Kingdom



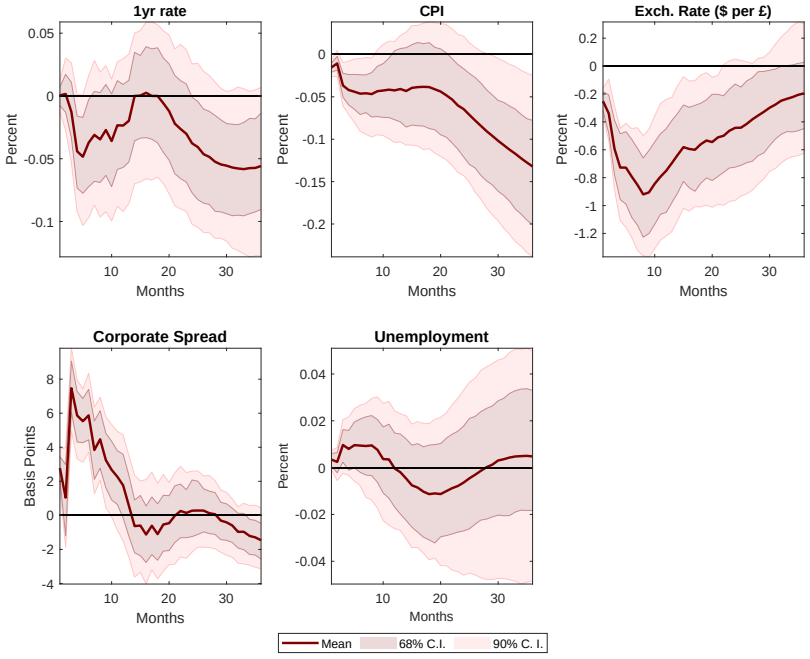
Note. The solid line and shaded areas report the mean, 68% and 90% confidence intervals computed using wild bootstrap with $2 * 10^6$ replications and and 10^4 rotations per bootstrap draw.

Figure S.14 US Monetary Policy Shock: Unemployment

(A) United States



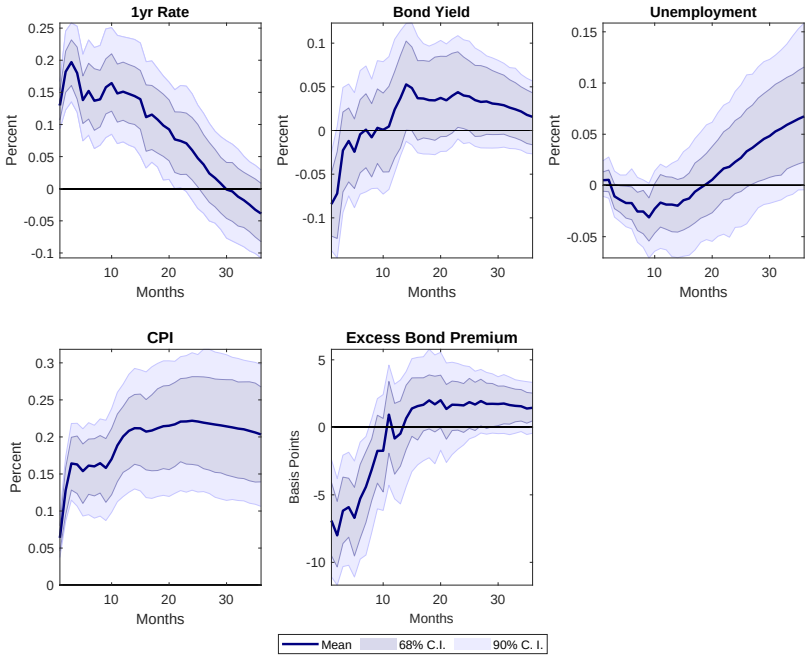
(B) United Kingdom



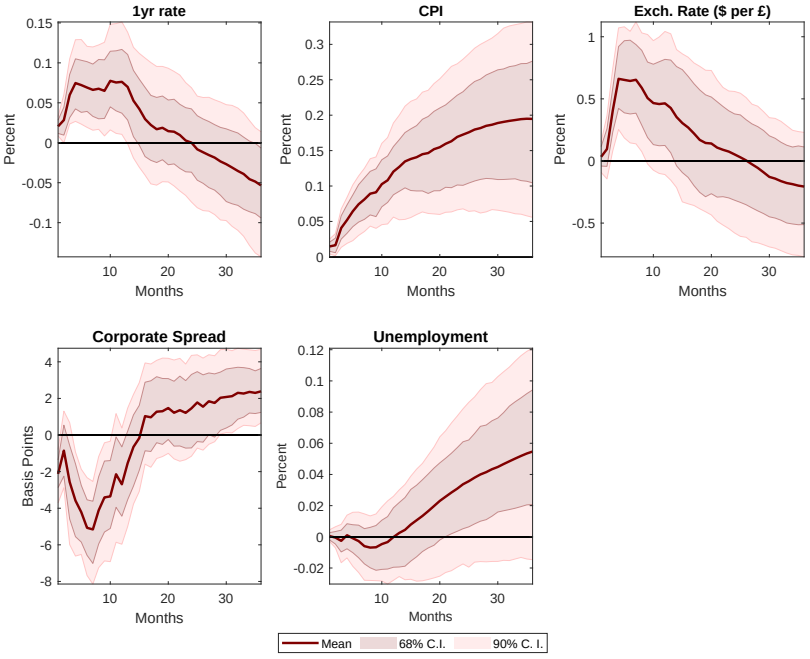
Note. The solid line and shaded areas report the mean, 68% and 90% confidence intervals computed using wild bootstrap with $2 * 10^6$ replications and and 10^4 rotations per bootstrap draw.

Figure S.15 US Central Bank Information Shock: Unemployment

(A) United States



(B) United Kingdom



Note. The solid line and shaded areas report the mean, 68% and 90% confidence intervals computed using wild bootstrap with $2 * 10^6$ replications and and 10^4 rotations per bootstrap draw.

References

Christiano, L., R. Motto, and M. Rostagno (2014): "Risk Shocks," *American Economic Review*, 104(1), 27–65.