Appendix

A Trend Inflation as a Proxy for Long-Term Inflation Forecasts

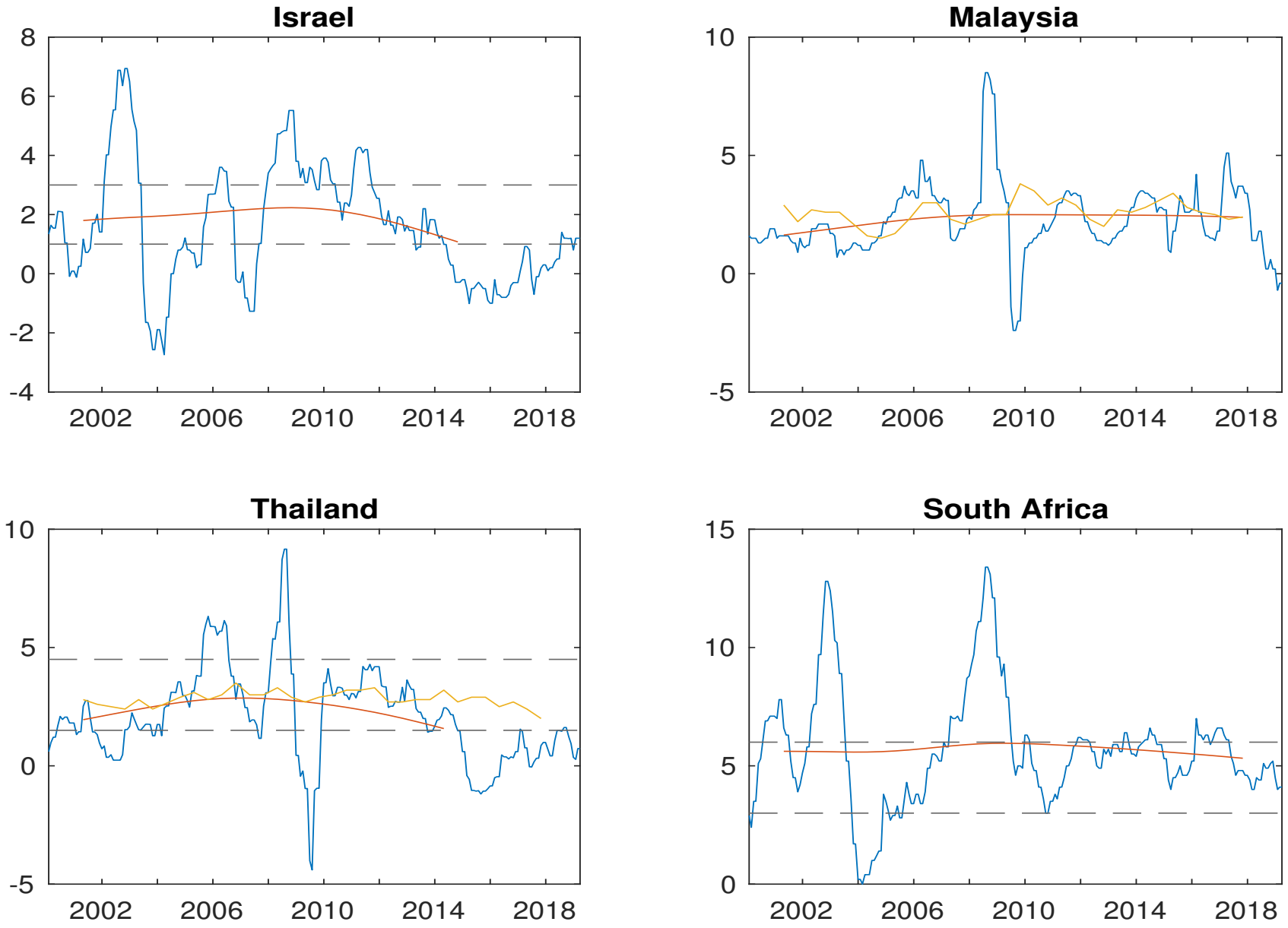
An advantage of the small open economy approach is that it only requires forecasts for inflation, or a proxy in the case of countries with no long-term forecasts available as is the case for Israel and South Africa.

Inflation expectations are hoped to match measures of inflation that exclude unexpected shocks and better reflect the inflation environment. Different measures of core inflation exist. I use the inflation trend obtained by applying the Hodrick-Prescott filter to the series of realized inflation of each country. Of course, the filter is sensitive to the sample period used. The resulting trend can also be outside of the target inflation band due to the innate dynamics of the series, which would be at odds with survey data (see figure 1).

Unlike other countries, there is no marked upward or downward trend in the inflation of Israel nor South Africa during the sample period. For each country, trend inflation is calculated for the whole period but only considered within the time range for which survey data is available for the rest of the countries, and as long as the trend is within the inflation target band.

Figure A.1 shows the realized and trend inflation for Israel and South Africa, and compares them with those of Malaysia and Thailand, two countries with a similar pattern for inflation (i.e. no marked trend) and for which survey data is available. Trend inflation seems to be a good proxy for the long-term inflation forecasts of Israel and South Africa. Finally, since the 5-year and long-term forecasts closely follow each other (see figure 1), I use trend inflation for both tenors.

Figure A.1. Trend versus Long-Horizon Forecasts of Inflation



B Connectedness of Yield Components

Figure B.1 shows that the connectedness index for the yields of emerging markets fluctuates around 30%, with notable spikes around the taper tantrum episode in 2013, and after the 2016 U.S. presidential election. In contrast, Adrian et al. (2019) report that the index fluctuates around 80% for advanced countries.

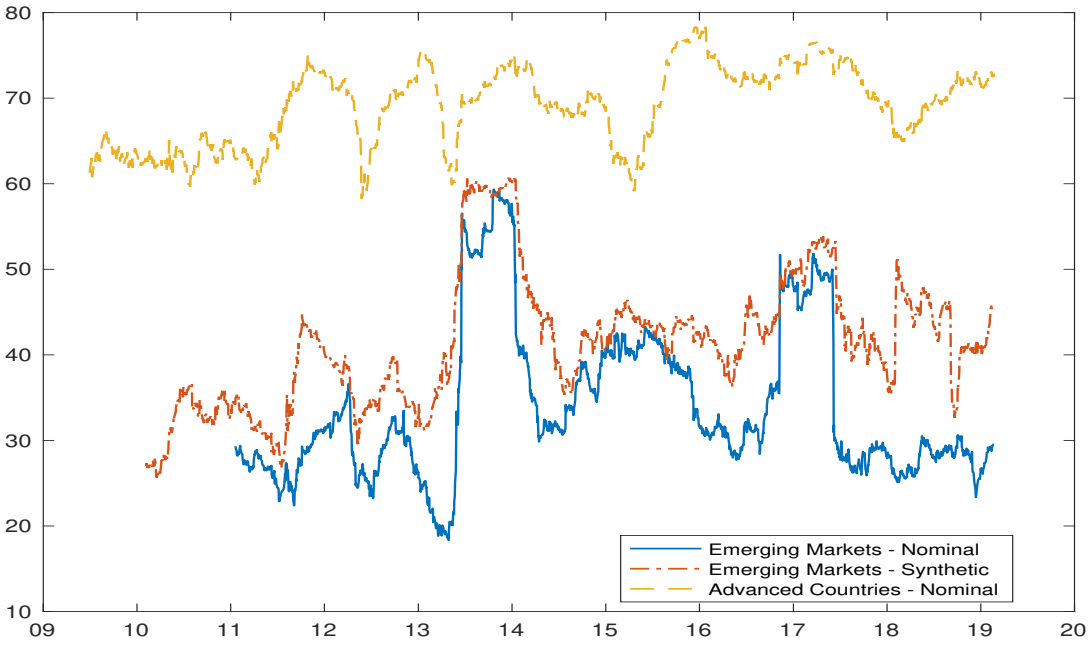
The evidence of highly connected yields in advanced countries and low connected yields in emerging markets is consistent with a view in which global bond markets essentially operate under a core-periphery structure, in which the bond markets of advanced countries constitute the (highly interconnected) core and those of emerging markets represent the (less connected) periphery. Countries in the periphery are in turn connected to the network mainly through countries in the core.[57] According to this view, shocks to emerging market yields are mainly idiosyncratic—reflected in less comovement—so what matters for them are not spillovers originating in other emerging markets but in advanced countries.

The connectedness index for the yields of emerging markets shows no clear trend for either the nominal or synthetic yields nor their components. In contrast, Adrian et al. (2019) document that the increase in the connectedness of the yields of advanced countries has been driven by an increase in the connectedness of their term premia. Nevertheless, the term premia in emerging markets has been slightly more connected since 2013, whereas the credit risk compensation is relatively less connected (see figure B.1b). In fact, the level of the index for the synthetic yields tends to be higher than that for the nominal yields (see figure B.1a), suggesting that credit risk is indeed a more idiosyncratic component of the yields.

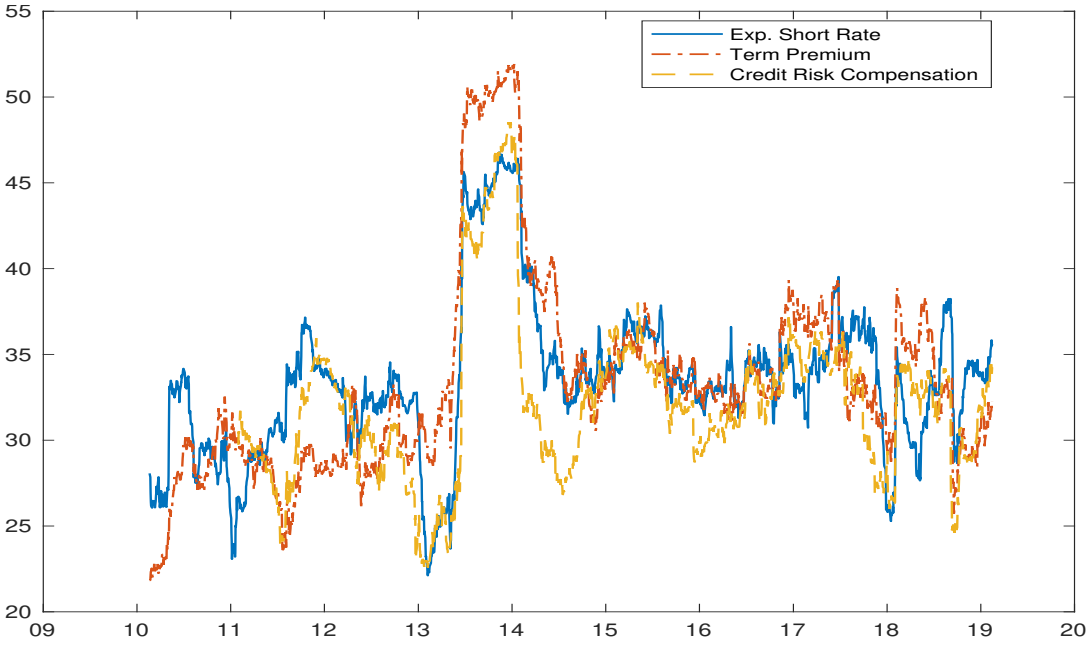
Finally, notice that the low connectedness among the yields of emerging markets supports estimating the term structure models for their yield curves separately (as it has been done in the paper) rather than jointly.

[57] The core-periphery structure has been shown to be a good description of different networks in economics and finance.

Figure B.1. Connectedness of Emerging Market 10-Year Yields



(a) Nominal and Synthetic Yields



(b) Nominal Yield Components

Notes: This figure plots the connectedness index of Diebold and Yilmaz (2014) for the 10-year nominal yields of emerging markets. Panel (a) compares the connectedness of nominal yields (solid line) against that of synthetic yields (dashed-dotted line) and the nominal yields of advanced countries (dashed line). Panel (b) compares the connectedness of each component of the nominal yields: the expected future short rate (solid line), the term premium (dashed-dotted line) and the credit risk compensation (dashed line). The index is obtained using a vector autoregression of order 1, with a forecast horizon of 10 days and a rolling window of 150 days for the daily changes of the 10-year nominal yields and each of their components. The index for some components has a shorter history because its computation requires a balanced panel and the components do not start on the same date (e.g. the construction of the synthetic curves does not involve nominal yields).

C Supplementary Tables

D Supplementary Figures

Table C.1. Drivers of the Emerging Market 5-Year Nominal Yield and Its Components

	Nominal	E. Short Rate	Term Premium	Credit Risk
U.S. Term Premium	1.27***	0.96***	0.85***	-0.54***
	(0.17)	(0.09)	(0.11)	(0.14)
U.S. E. Short Rate	0.04	0.12***	0.02	-0.10**
	(0.06)	(0.04)	(0.04)	(0.04)
Policy Rate	0.41***	0.39***	0.06***	-0.05
	(0.03)	(0.02)	(0.02)	(0.02)
Inflation	12.34***	1.29	6.41***	4.64*
	(2.33)	(1.92)	(1.50)	(1.87)
Unemployment	18.56***	0.50	6.40***	11.65***
	(3.11)	(2.08)	(1.50)	(2.19)
LC per USD (Std.)	33.70***	28.68***	16.30***	-11.27**
	(5.28)	(3.74)	(3.13)	(3.73)
Log(Vix)	57.65***	-18.75	15.51*	60.90***
	(9.95)	(11.95)	(7.67)	(10.01)
Log(EPU U.S.)	8.97	-2.28	-1.37	12.63***
	(4.88)	(3.04)	(2.51)	(3.68)
Log(EPU Global)	-66.11***	-41.52***	-17.98	-6.61
	(16.52)	(7.66)	(9.91)	(10.40)
Global Ind. Prod.	2.32**	0.63	-0.11	1.81*
	(0.84)	(0.89)	(0.34)	(0.78)
Fixed Effects	Yes	Yes	Yes	Yes
Lags	4	4	4	4
No. Countries	15	15	15	15
Observations	2194	2194	2194	2194
R^2	0.74	0.74	0.42	0.28

Notes: This table reports the estimated slope coefficients of panel data regressions of the 5-year nominal yield and its components (the expected short rate, the term premium and the credit risk compensation) on selected explanatory variables. The sample includes monthly data for 15 emerging markets starting in 2000:1 and ending in 2019:1. The dependent variables are expressed in basis points. The explanatory variables are the U.S. term premium and the U.S. expected short rate according to Kim and Wright (2005) with the same maturity as the dependent variables, the policy rate, domestic inflation and unemployment, the standardized exchange rate (local currency per USD), the log of the Vix, the log of the U.S. and global economic policy uncertainty indexes based on Baker et al. (2016), the global economic activity index of Hamilton (2019). Driscoll–Kraay standard errors in parenthesis. Lag length up to which the residuals may be autocorrelated is indicated. *, **, *** asterisks respectively indicate significance at the 10%, 5% and 1% level.

Table C.2. Drivers of the Emerging Market 1-Year Nominal Yield and Its Components

	Nominal	E. Short Rate	Term Premium	Credit Risk
U.S. Term Premium	1.87***	2.46***	0.13	-0.71
	(0.38)	(0.34)	(0.30)	(0.40)
U.S. E. Short Rate	-0.01	-0.04	0.07	-0.04
	(0.04)	(0.03)	(0.03)	(0.04)
Policy Rate	0.73***	0.69***	0.13***	-0.09**
	(0.03)	(0.04)	(0.03)	(0.03)
Inflation	7.48**	-1.60	8.31**	0.76
	(2.30)	(3.10)	(2.74)	(3.09)
Unemployment	4.98	-1.87	-3.26	10.10***
	(2.81)	(2.30)	(2.01)	(2.48)
LC per USD (Std.)	28.41***	26.53***	19.35***	-17.46**
	(4.61)	(5.78)	(4.89)	(5.83)
Log(Vix)	33.84***	-25.93	-13.53	73.30***
	(7.50)	(14.79)	(10.70)	(12.16)
Log(EPU U.S.)	4.71	-1.29	-10.23**	16.23**
	(3.36)	(4.95)	(3.10)	(5.20)
Log(EPU Global)	-50.90***	-36.89**	-7.68	-6.33
	(12.55)	(11.58)	(10.10)	(14.83)
Global Ind. Prod.	2.28**	-0.07	-2.22*	4.57***
	(0.77)	(0.97)	(0.86)	(0.82)
Fixed Effects	Yes	Yes	Yes	Yes
Lags	4	4	4	4
No. Countries	15	15	15	15
Observations	2194	2194	2194	2194
R^2	0.82	0.76	0.25	0.20

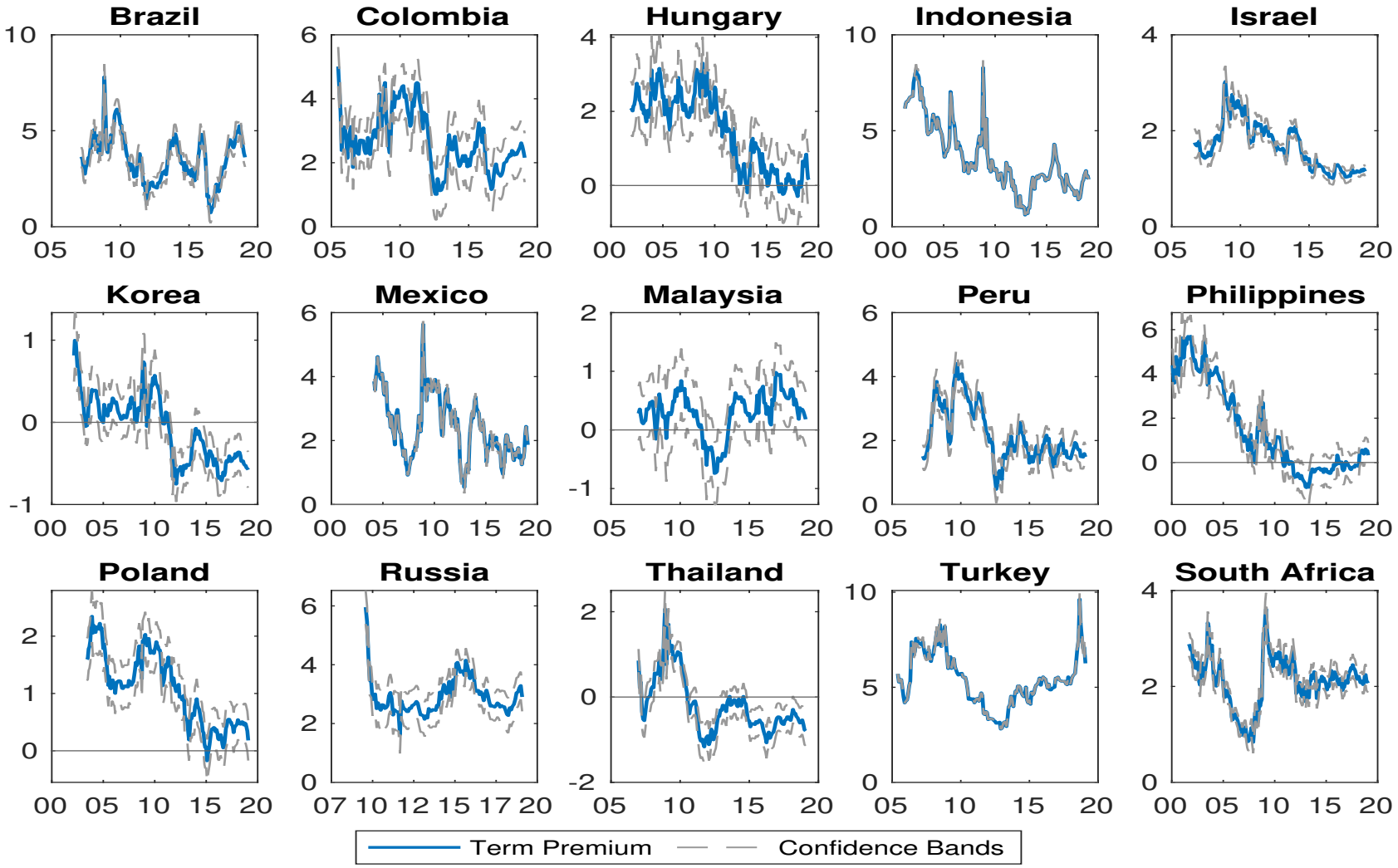
Notes: This table reports the estimated slope coefficients of panel data regressions of the 1-year nominal yield and its components (the expected short rate, the term premium and the credit risk compensation) on selected explanatory variables. The sample includes monthly data for 15 emerging markets starting in 2000:1 and ending in 2019:1. The dependent variables are expressed in basis points. The explanatory variables are the U.S. term premium and the U.S. expected short rate according to Kim and Wright (2005) with the same maturity as the dependent variables, the policy rate, domestic inflation and unemployment, the standardized exchange rate (local currency per USD), the log of the Vix, the log of the U.S. and global economic policy uncertainty indexes based on Baker et al. (2016), the global economic activity index of Hamilton (2019). Driscoll–Kraay standard errors in parenthesis. Lag length up to which the residuals may be autocorrelated is indicated. *, **, *** asterisks respectively indicate significance at the 10%, 5% and 1% level.

Table C.3. Descriptive Statistics of U.S. Monetary Policy Surprises

	Mean	Std. Dev.	Min.	Max.	Obs
Target Surprises (abs. values)	2.7	6.7	0.0	46.5	162
Target Surprises > 0	2.9	3.5	0.0	14.4	47
Target Surprises < 0	-4.9	9.8	-46.5	-0.3	63
Forward Guidance Surprises (abs. values)	6.0	6.5	0.0	54.6	162
Forward Guidance Surprises > 0	5.4	4.9	0.0	24.9	89
Forward Guidance Surprises < 0	-6.7	8.0	-54.6	-0.0	73
Asset Purchase Surprises (abs. values)	2.2	3.5	0.1	29.9	86
Asset Purchase Surprises > 0	1.9	2.2	0.1	10.3	41
Asset Purchase Surprises < 0	-2.5	4.4	-29.9	-0.1	45

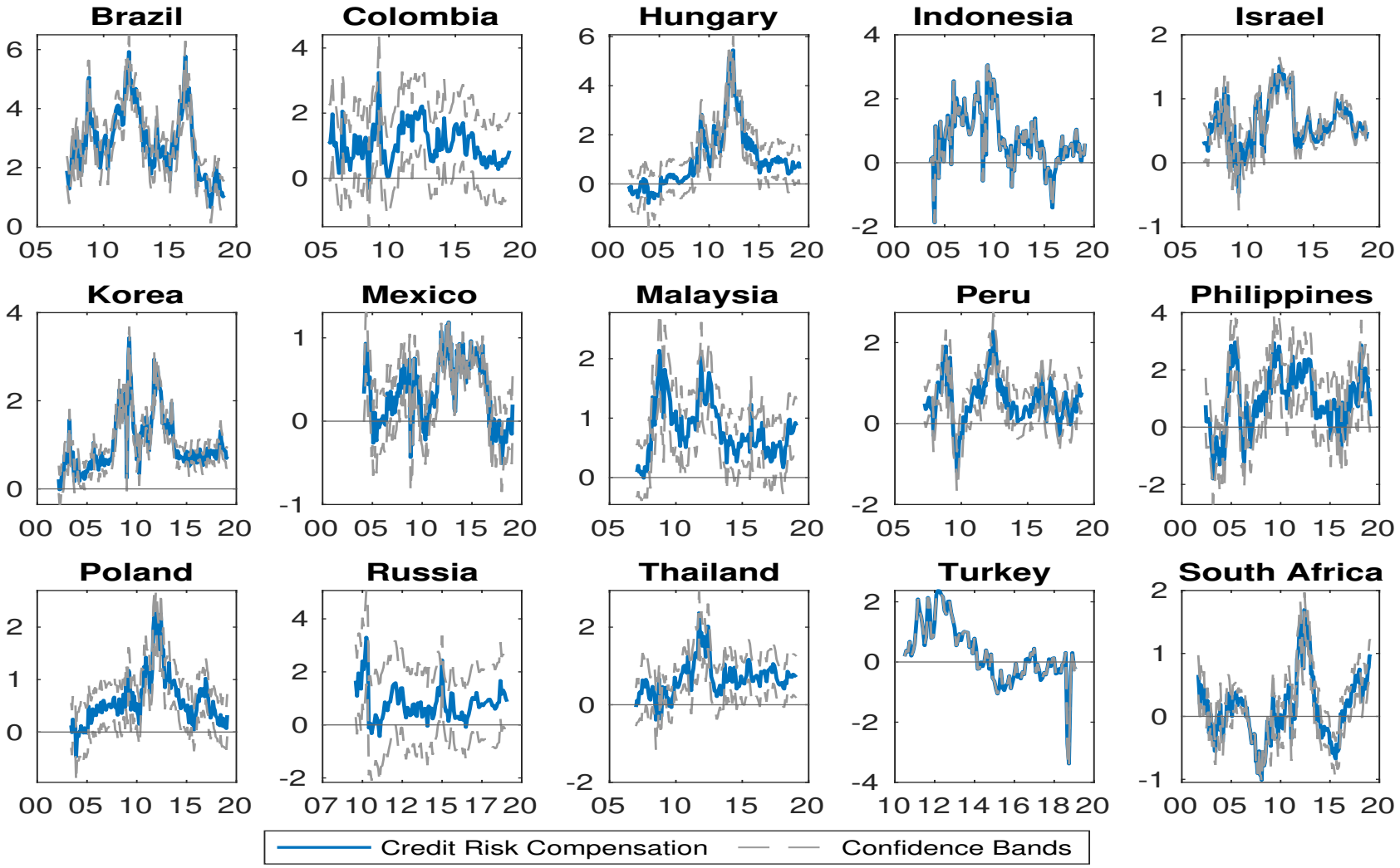
Notes: This table reports the average, the standard deviation, the minimum and the maximum values on monetary policy announcement days for the target, forward guidance and asset purchase surprises, see section 5.2 for the definitions. Asset purchase surprises are considered from October 2008 onwards. Target and forward guidance surprises span the whole sample period from January 2000 to January 2019.

Figure D.1. The 10-Year Term Premium of Emerging Markets



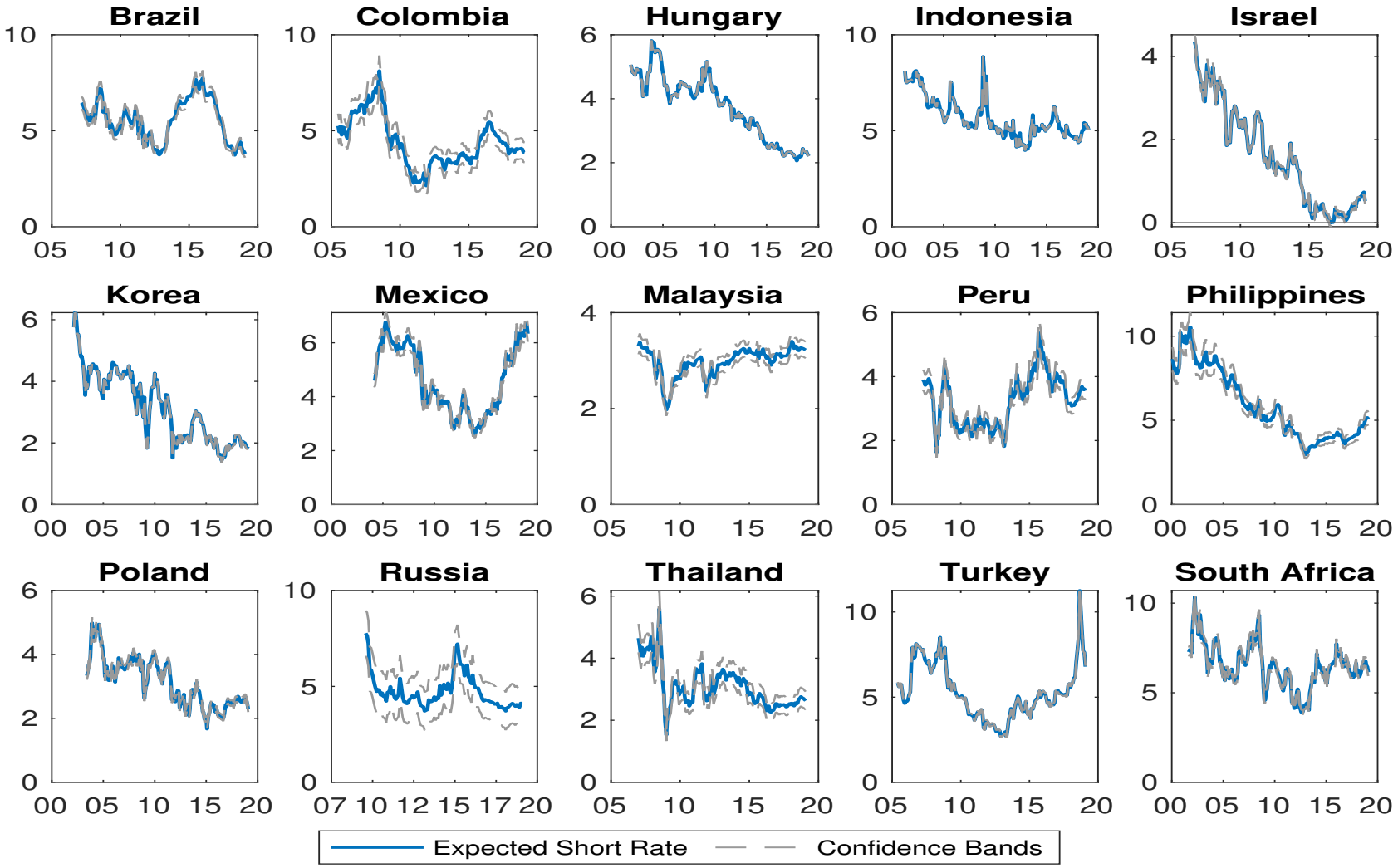
Notes: This figure plots the model-implied term premium of the emerging markets in the sample for the 10-year maturity (solid line) along with their confidence intervals equal to ±2 standard errors (dashed lines). The standard errors are estimated using the delta method. The covariance matrix is estimated using the sample Hessian estimator calculated numerically from the joint log density.

Figure D.2. The 10-Year Credit Risk Compensation of Emerging Markets



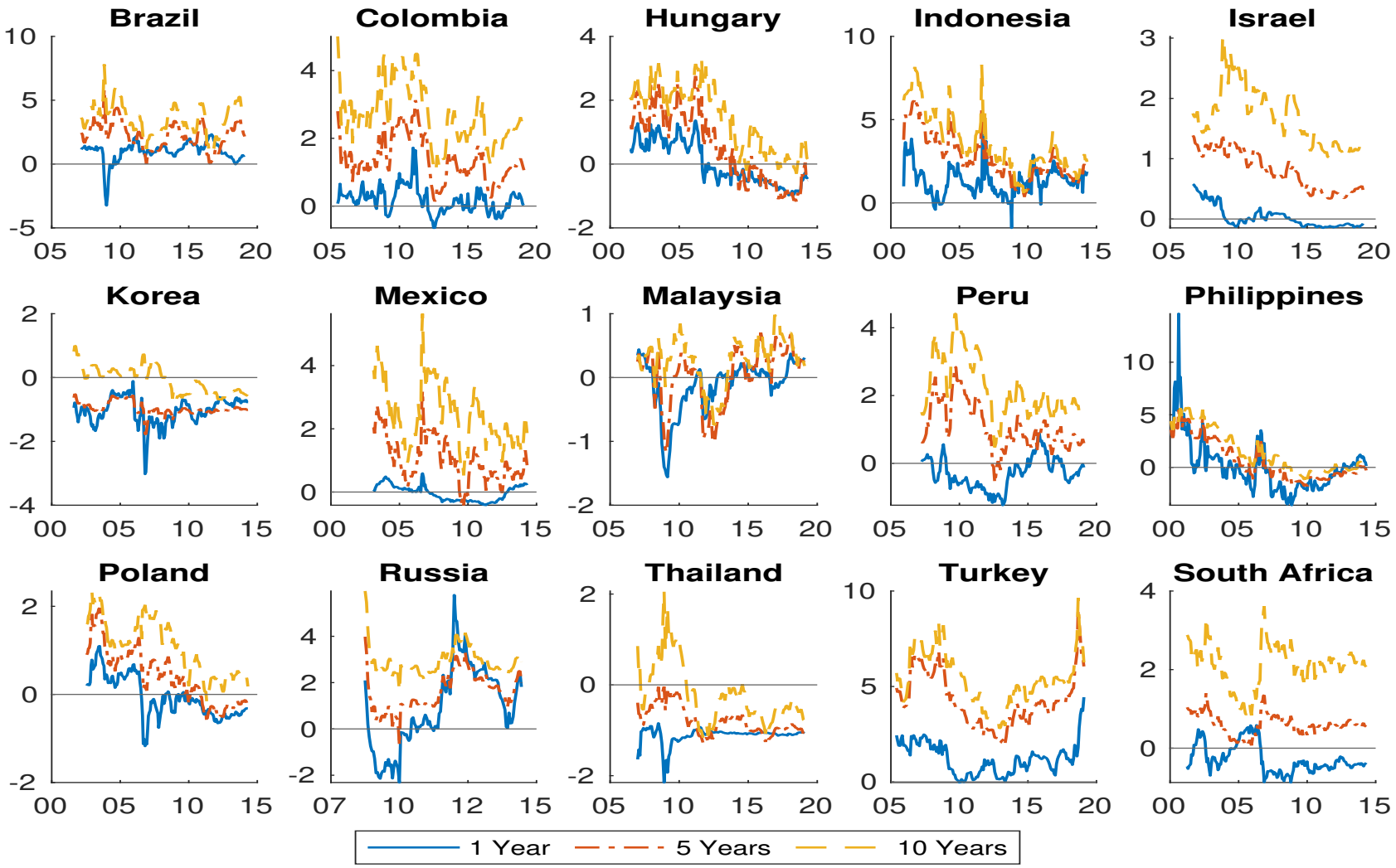
Notes: This figure plots the model-implied credit risk compensation of the emerging markets in the sample for the 10-year maturity (solid line) along with their confidence intervals equal to ±2 standard errors (dashed lines). The standard errors are estimated using the delta method. The covariance matrix is estimated using the sample Hessian estimator calculated numerically from the joint log density.

Figure D.3. The 10-Year Expected Future Short Rate of Emerging Markets



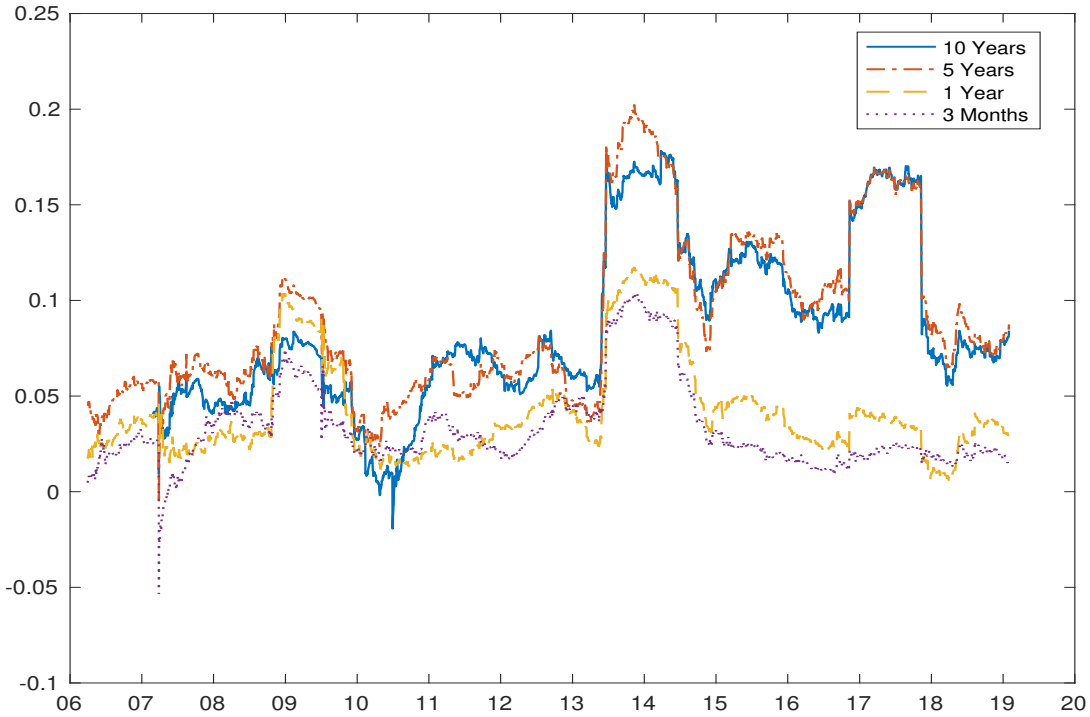
Notes: This figure plots the model-implied expected future short term interest rate of the emerging markets in the sample for the 10-year maturity (solid line) along with their confidence intervals equal to ±2 standard errors (dashed lines). The standard errors are estimated using the delta method. The covariance matrix is estimated using the sample Hessian estimator calculated numerically from the joint log density.

Figure D.4. Term Structure of Term Premia

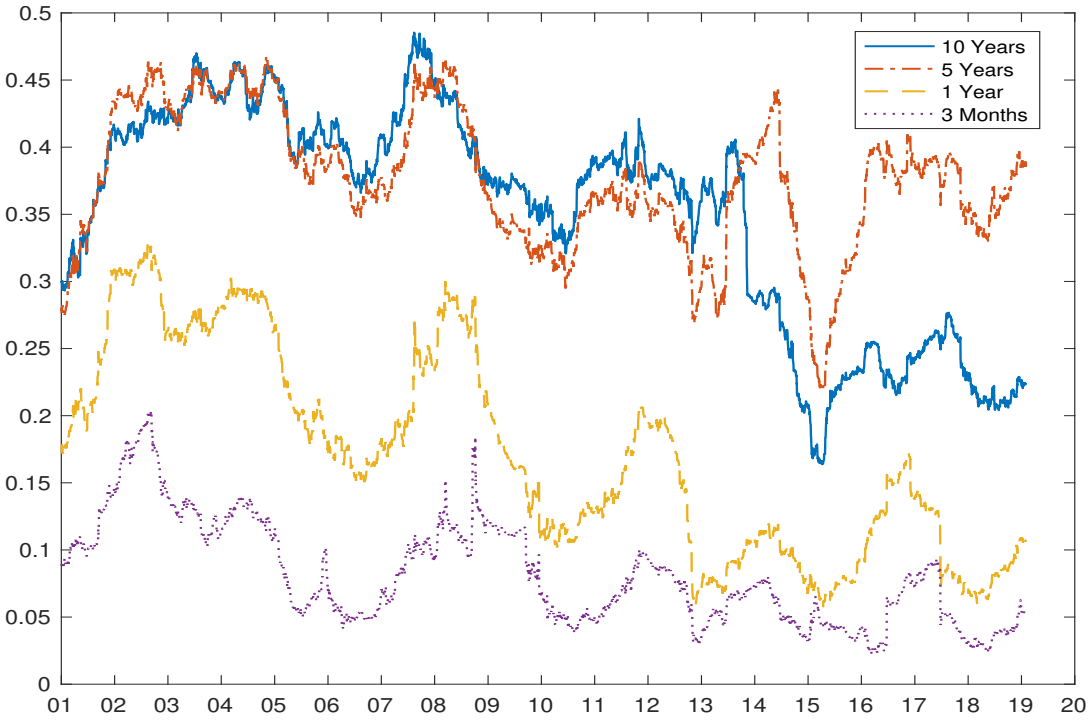


Notes: This figure plots the estimated term premia for 1 year (solid line), 5 years (dashed line) and 10 years (dash-dotted line).

Figure D.5. Comovement of Yield Curves: Rolling Correlations



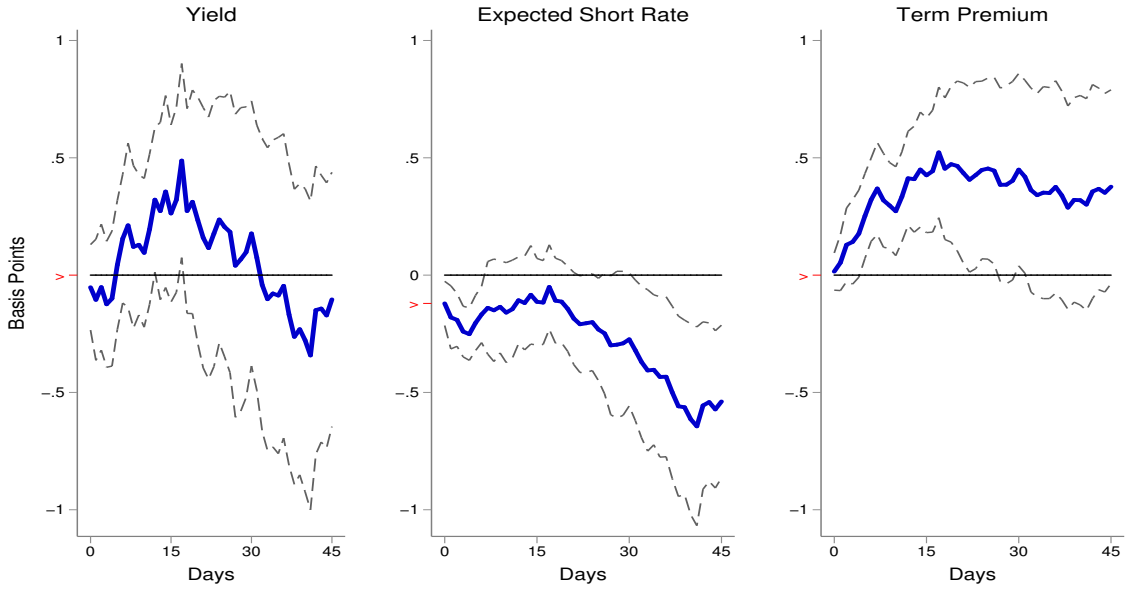
(a) Emerging Markets



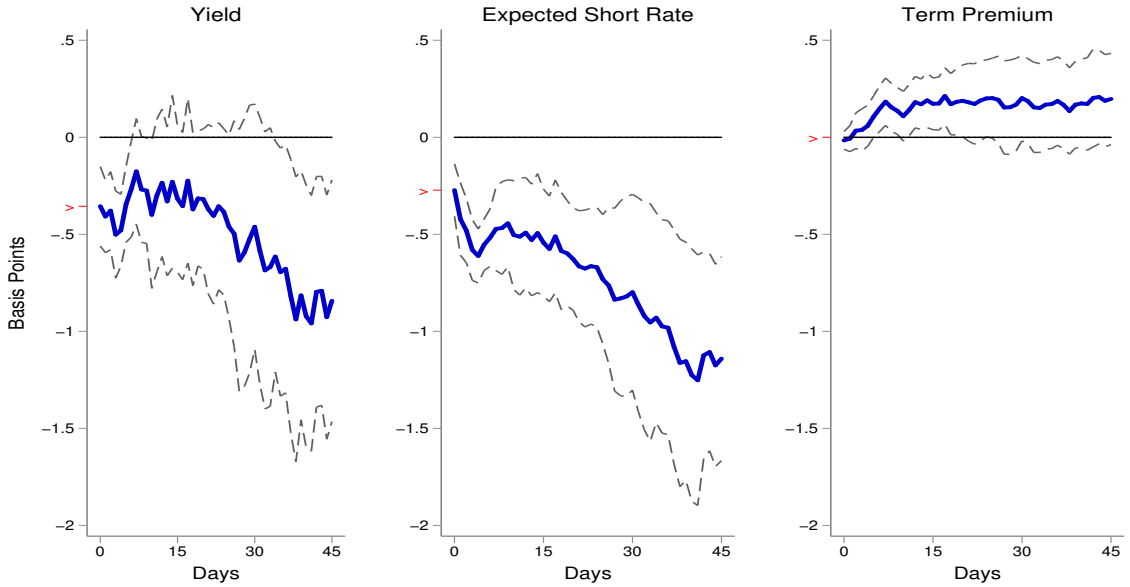
(b) Advanced Countries

Notes: This figure plots one-year rolling correlation coefficients of daily changes in the nominal yields of emerging markets and advanced countries averaged across all country pairs for the for 10-year (solid line), 5-year (dashed-dotted line), 1-year (dashed line), and 3-month (dotted line) maturities.

Figure D.6. Response of the U.S. Yield Curve to a Target Surprise



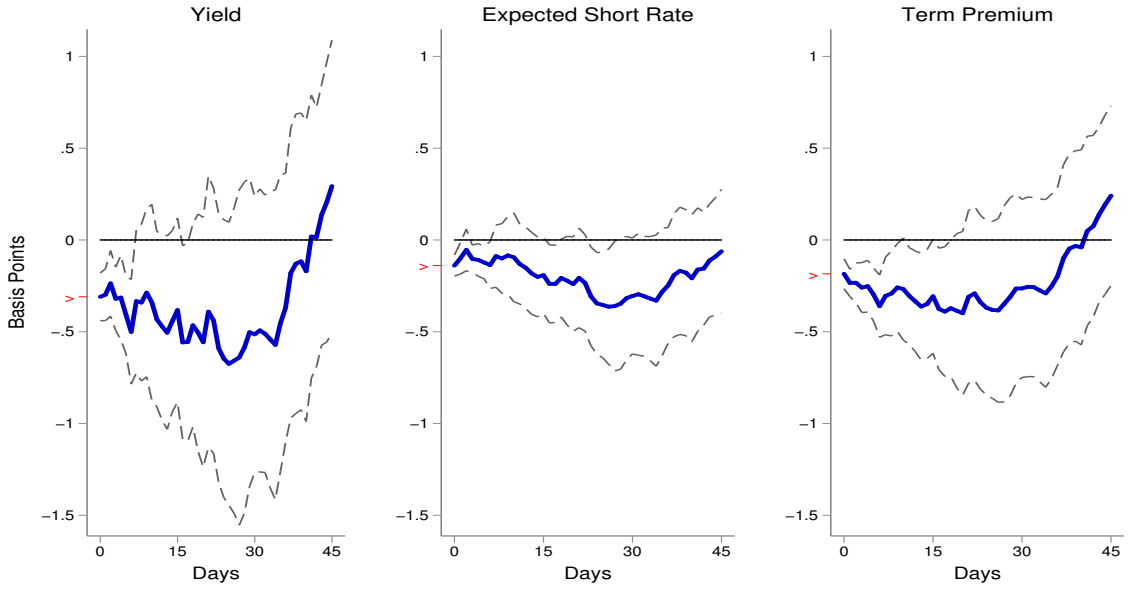
(a) 10-Year Yield



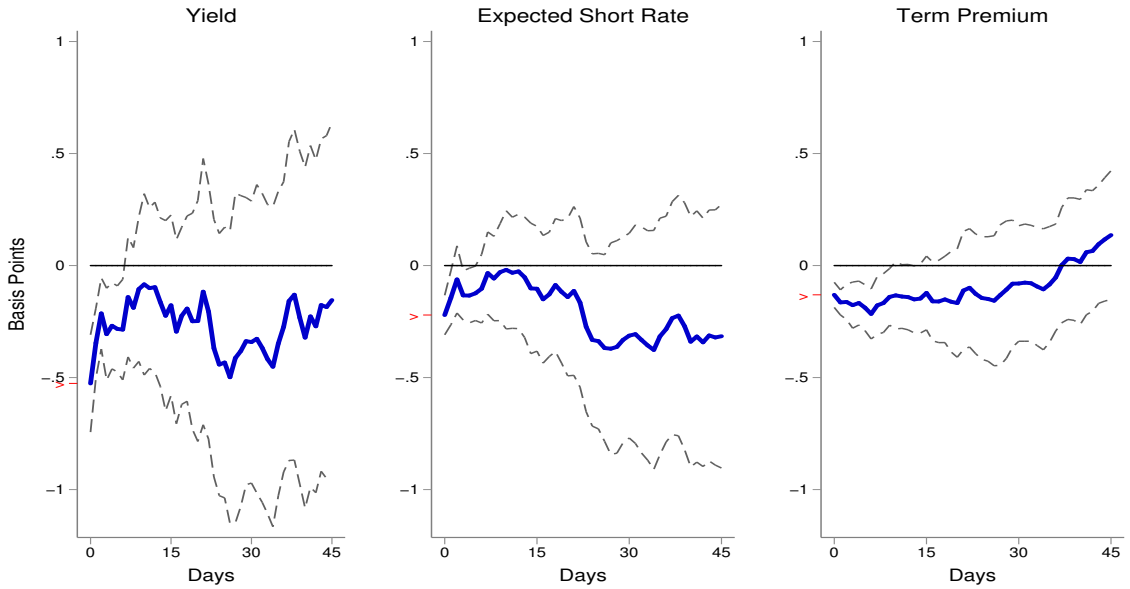
(b) 2-Year Yield

Notes: This figure shows the response following Jordà (2005) of the 10- and 2-year U.S. yields and their components to a target surprise. The U.S. yield is the zero coupon yield from Gürkaynak et al. (2007). The yield is decomposed into an expected future short-term interest rate and a term premium following Kim and Wright (2005). Target surprises are identified using intraday data around Fed's monetary policy announcements, see section 5.2 for details. The 90% confidence bands are based on Driscoll–Kraay standard errors.

Figure D.7. Response of the U.S. Yield Curve to a Forward Guidance Surprise: 2000-2008



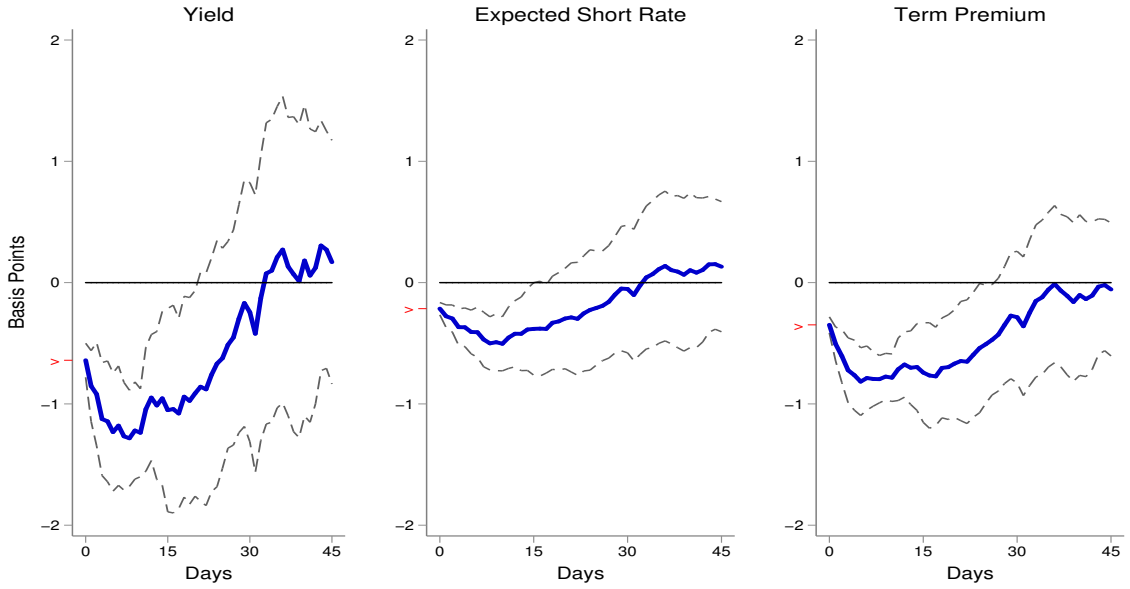
(a) 10-Year Yield



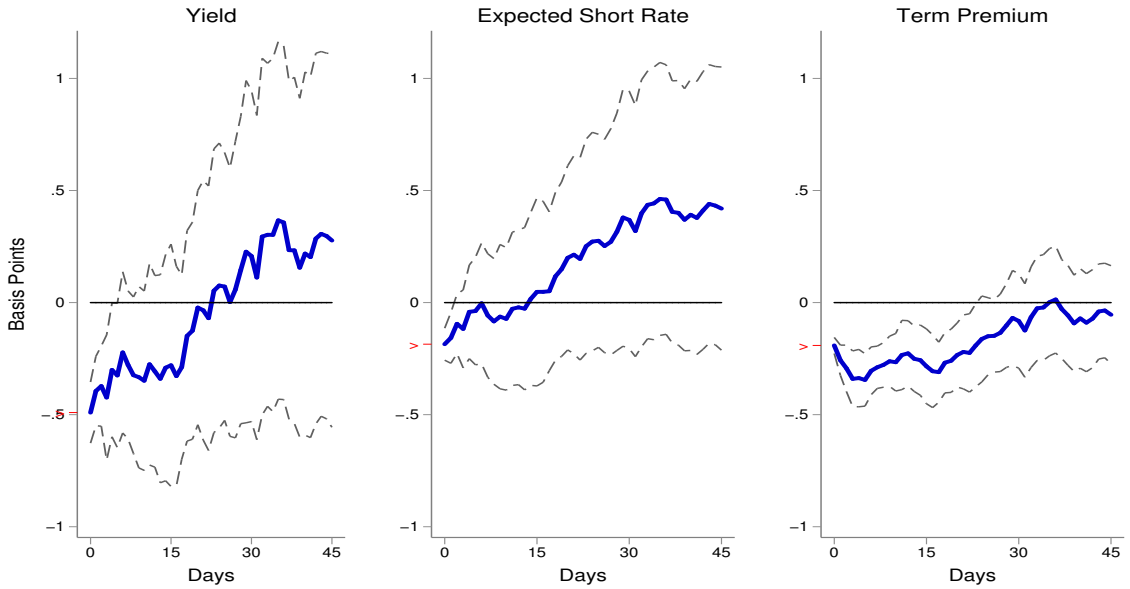
(b) 2-Year Yield

Notes: This figure shows the response following Jordà (2005) of the 10- and 2-year U.S. yields and their components to a forward guidance surprise. The U.S. yield is the zero coupon yield from Gürkaynak et al. (2007). The yield is decomposed into an expected future short-term interest rate and a term premium following Kim and Wright (2005). Forward guidance surprises are identified using intraday data around Fed's monetary policy announcements, see section 5.2 for details. The 90% confidence bands are based on Driscoll–Kraay standard errors.

Figure D.8. Response of the U.S. Yield Curve to a Forward Guidance Surprise: 2008-2019



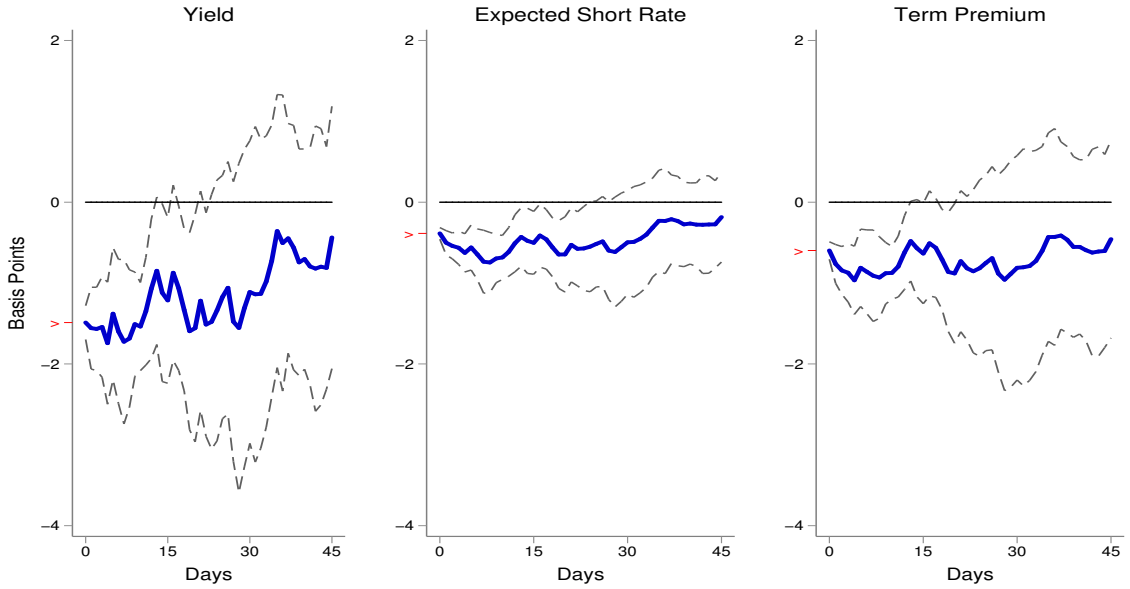
(a) 10-Year Yield



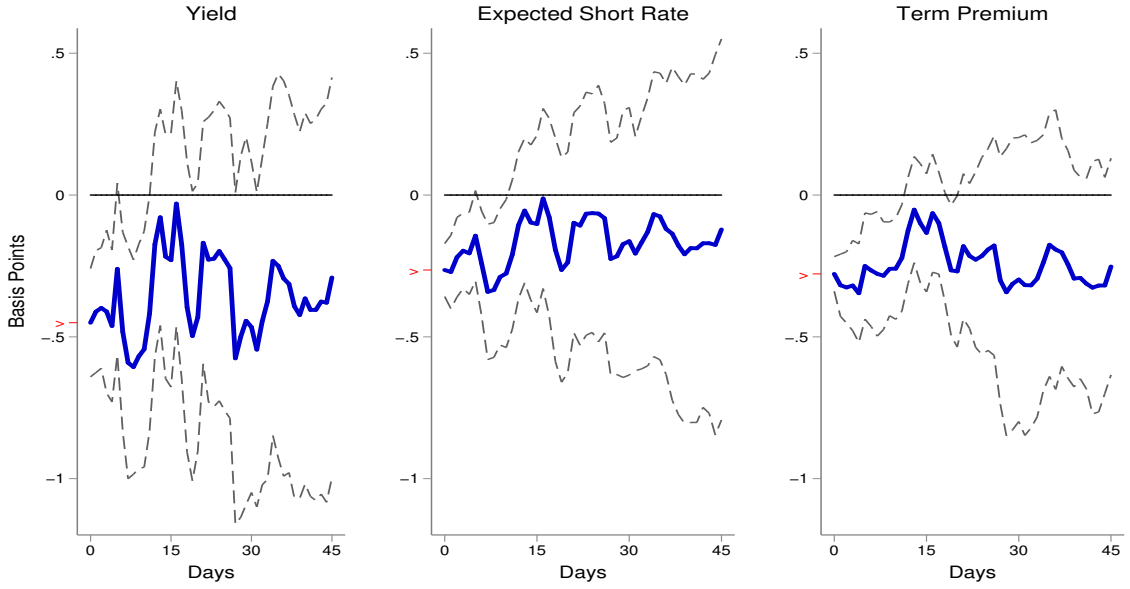
(b) 2-Year Yield

Notes: This figure shows the response following Jordà (2005) of the 10- and 2-year U.S. yields and their components to a forward guidance surprise. The U.S. yield is the zero coupon yield from Gürkaynak et al. (2007). The yield is decomposed into an expected future short-term interest rate and a term premium following Kim and Wright (2005). Forward guidance surprises are identified using intraday data around Fed's monetary policy announcements, see section 5.2 for details. The 90% confidence bands are based on Driscoll–Kraay standard errors.

Figure D.9. Response of the U.S. Yield Curve to an Asset Purchase Surprise



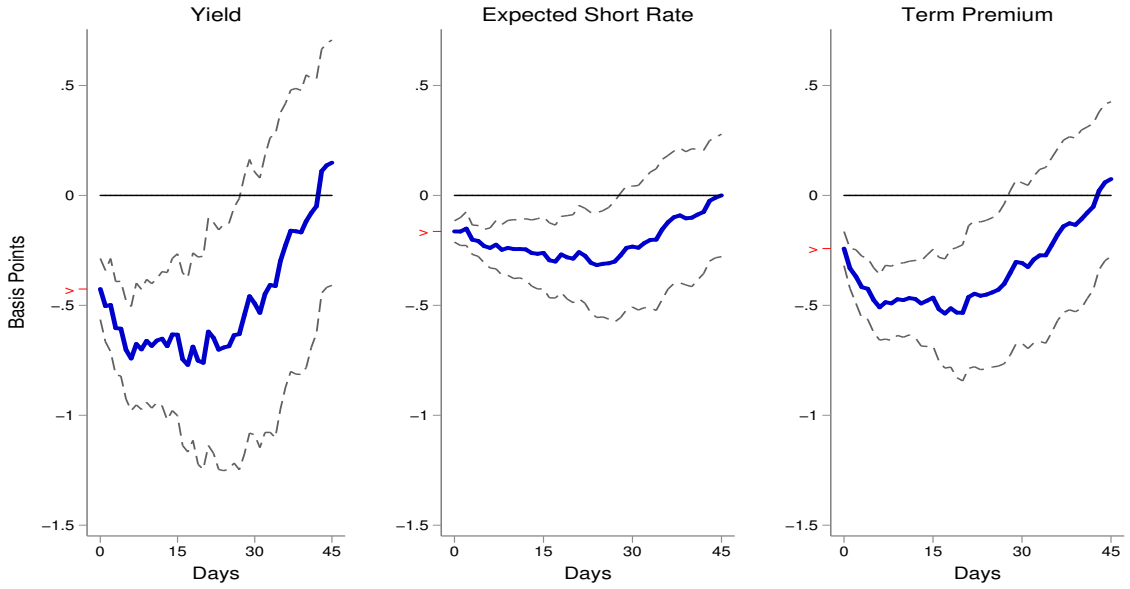
(a) 10-Year Yield



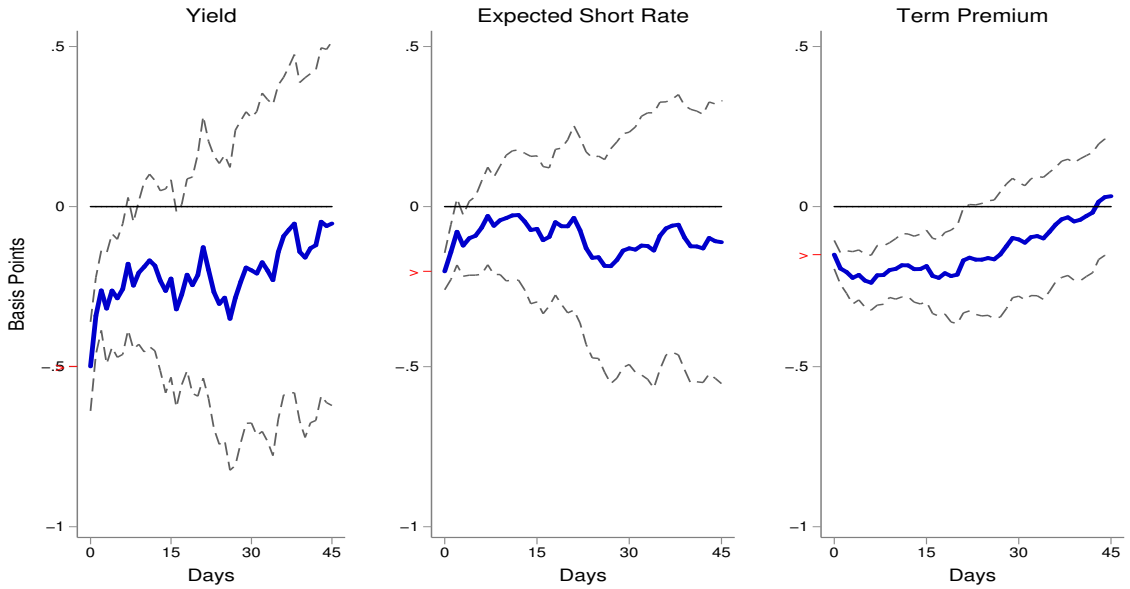
(b) 2-Year Yield

Notes: This figure shows the response following Jordà (2005) of the 10- and 2-year U.S. yields and their components to an asset purchase surprise. The U.S. yield is the zero coupon yield from Gürkaynak et al. (2007). The yield is decomposed into an expected future short-term interest rate and a term premium following Kim and Wright (2005). Asset purchase surprises are identified using intraday data around Fed's monetary policy announcements, see section 5.2 for details. The 90% confidence bands are based on Driscoll–Kraay standard errors.

Figure D.10. Response of the U.S. Yield Curve to a Forward Guidance Surprise: 2000-2019



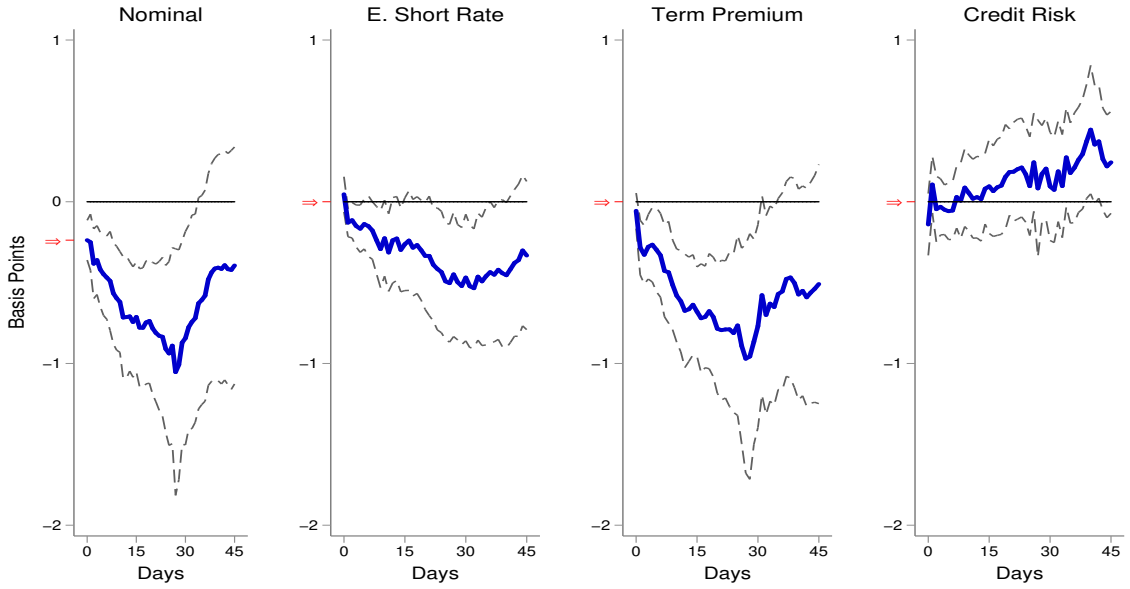
(a) 10-Year Yield



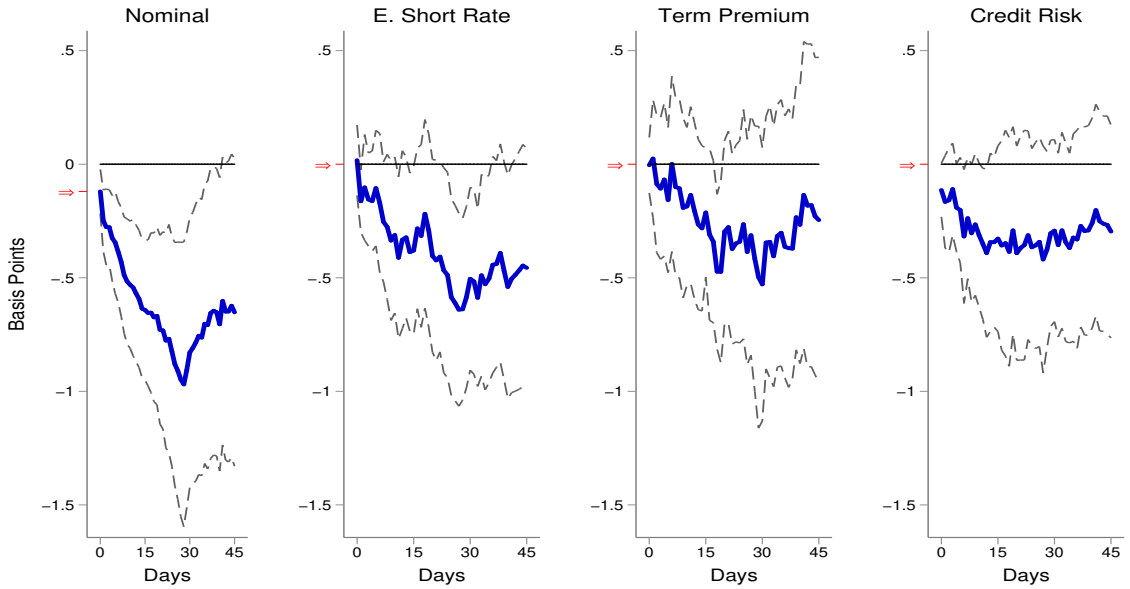
(b) 2-Year Yield

Notes: This figure shows the response following Jordà (2005) of the 10- and 2-year U.S. yields and their components to a forward guidance surprise. The U.S. yield is the zero coupon yield from Gürkaynak et al. (2007). The yield is decomposed into an expected future short-term interest rate and a term premium following Kim and Wright (2005). Forward guidance surprises are identified using intraday data around Fed's monetary policy announcements, see section 5.2 for details. The 90% confidence bands are based on Driscoll–Kraay standard errors.

Figure D.11. Response of the Emerging Market Yield Curve to a Forward Guidance Surprise: 2000-2019



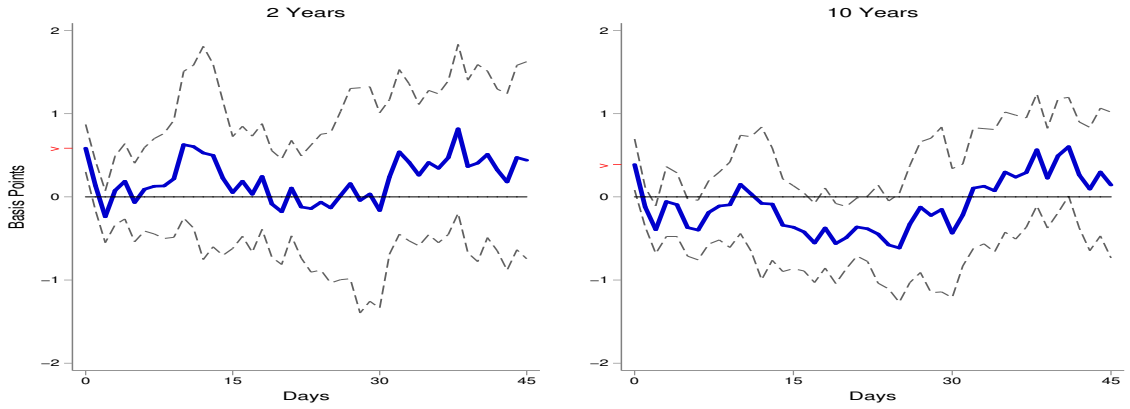
(a) 10-Year Yield



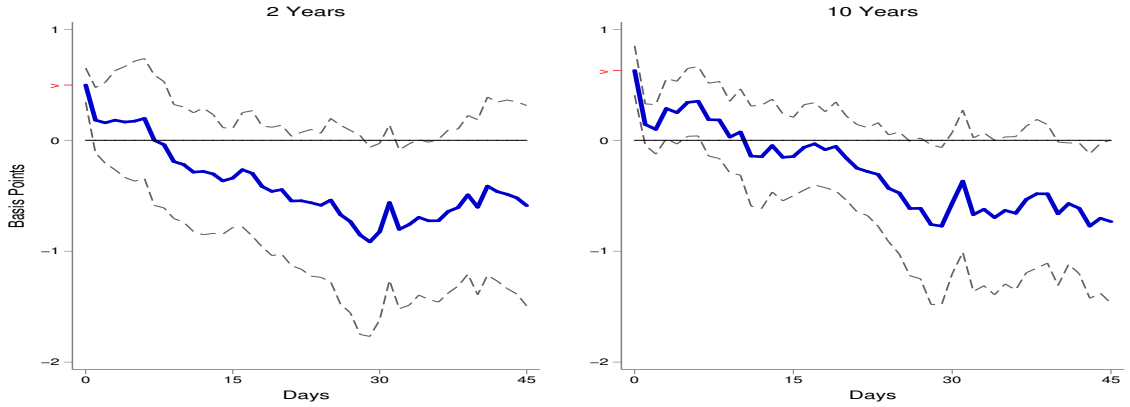
(b) 2-Year Yield

Notes: This figure shows the response following Jordà (2005) of the 10- and 2-year emerging market nominal yields and their components to a forward guidance surprise. Nominal yields are decomposed into an expected future short-term interest rate, a term premium and a credit risk compensation, see section 4 for details. Forward guidance surprises are identified using intraday data around Fed's monetary policy announcements, see section 5.2 for details. The 90% confidence bands are based on Driscoll–Kraay standard errors.

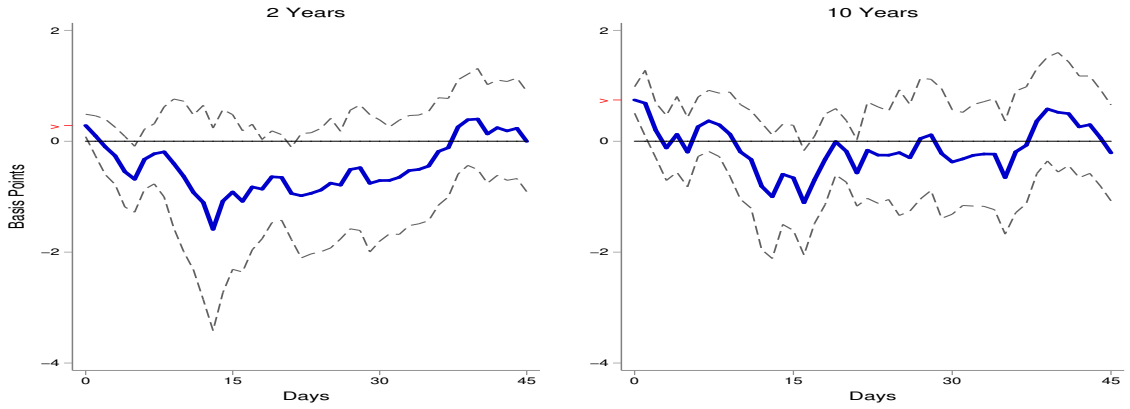
Figure D.12. Response of the Forward Premium to U.S. Monetary Policy Surprises



(a) Target Surprise: 2000-2008



(b) Forward Guidance Surprise: 2000-2019



(c) Asset Purchase Surprise: 2009-2019

Notes: This figure shows the response following Jordà (2005) of the 10- and 2-year foreign exchange forward premium for emerging markets to U.S. monetary policy surprises. The forward premium is calculated using cross-currency swaps, which are in turn constructed using cross-currency basis swaps and interest rate swaps, see section 2.1 for details. The target, forward guidance and asset purchase surprises are identified using intraday data around Fed's monetary policy announcements, see section 5.2 for details. The 90% confidence bands are based on Driscoll–Kraay standard errors.