Appendix

A A Proxy for Long-Term Inflation Forecasts

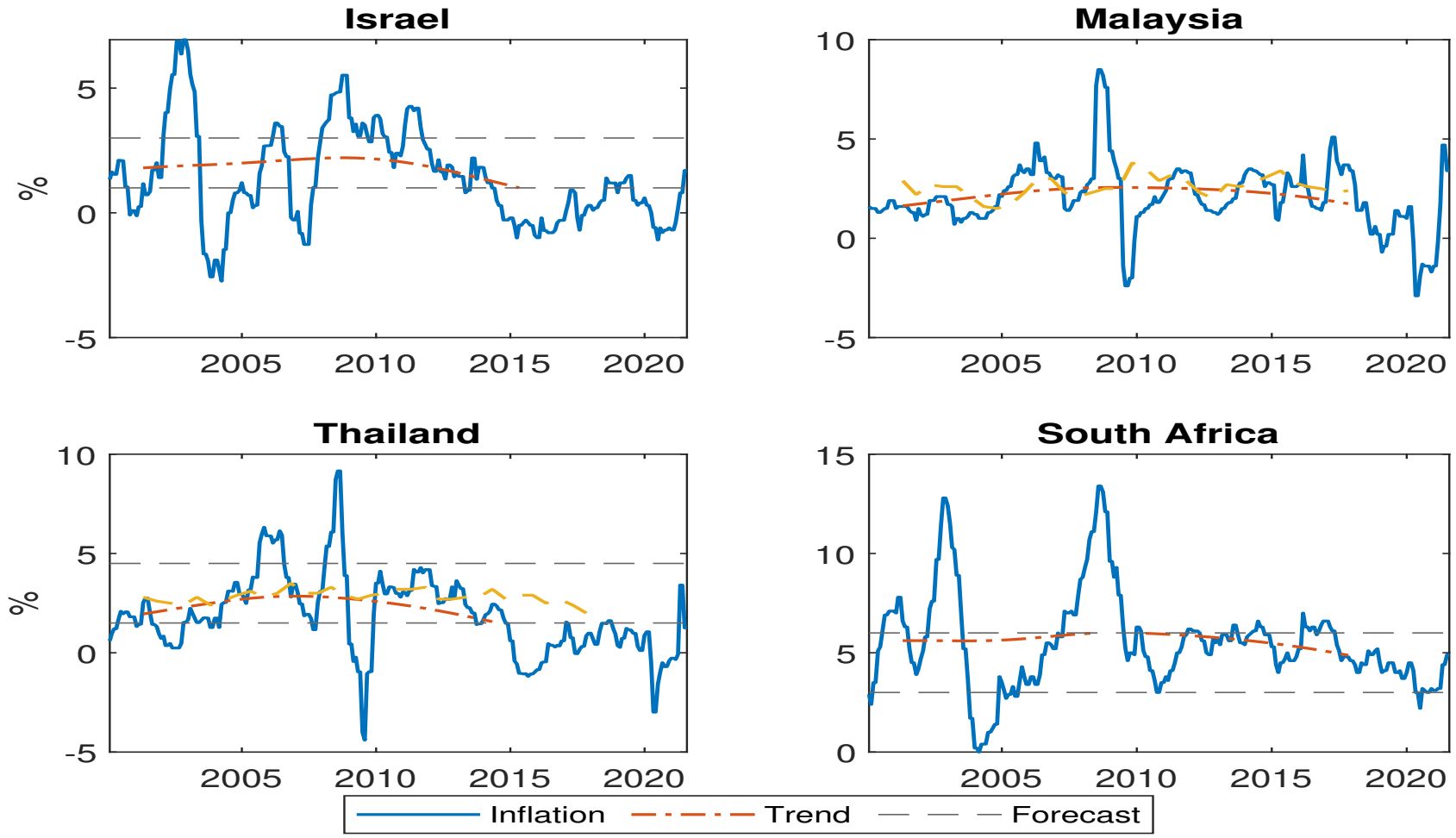
An advantage of the small open economy approach to infer long-term forecasts for the short rate is that, for emerging markets, it only requires data on inflation forecasts, or a proxy in the case of countries with no long-term forecasts available as is the case for Israel and South Africa.

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.

There are two main concerns for using this approach. Namely, the filter is sensitive to the sample period used and the resulting trend can 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). In the case of Israel and South Africa, however, there is no marked upward or downward trend in their inflation during the sample period. Therefore, for both countries, trend inflation is calculated for the whole period for which survey data is available for the rest of the countries in the sample, and as long as the resulting trend is within the respective inflation target band.

Figure A.1 shows the realized and trend inflation for Israel and South Africa along with those of Malaysia and Thailand, two countries with a similar pattern for inflation (i.e., no marked upward or downward trend) and for which survey data is available. The figure shows that trend inflation seems to be a good proxy for the long-term inflation forecasts in Malaysia and Thailand. Also, as can be seen in the main text (figure 1), 5-year and long-term inflation forecasts follow each other closely, therefore trend inflation is used as the proxy for both the 5-year and the long-term inflation forecasts in the case of Israel and South Africa.

Figure A.1. Inflation Trend and Long-Horizon Forecast for Inflation



Notes: This figure plots the consumer price inflation (solid line), inflation trend based on the Hodrick–Prescott filter (dash-dotted line) and long-term inflation forecast (dashed line) for each country. The figure includes the the most recent upper and lower bounds for the domestic inflation target.

B Comovement of Yields

This section shows that the long end of the yield curves of emerging markets comoves relatively more than the short end, that synthetic yields comove relatively more than nominal yields, and that the components of emerging market yields comove similarly.

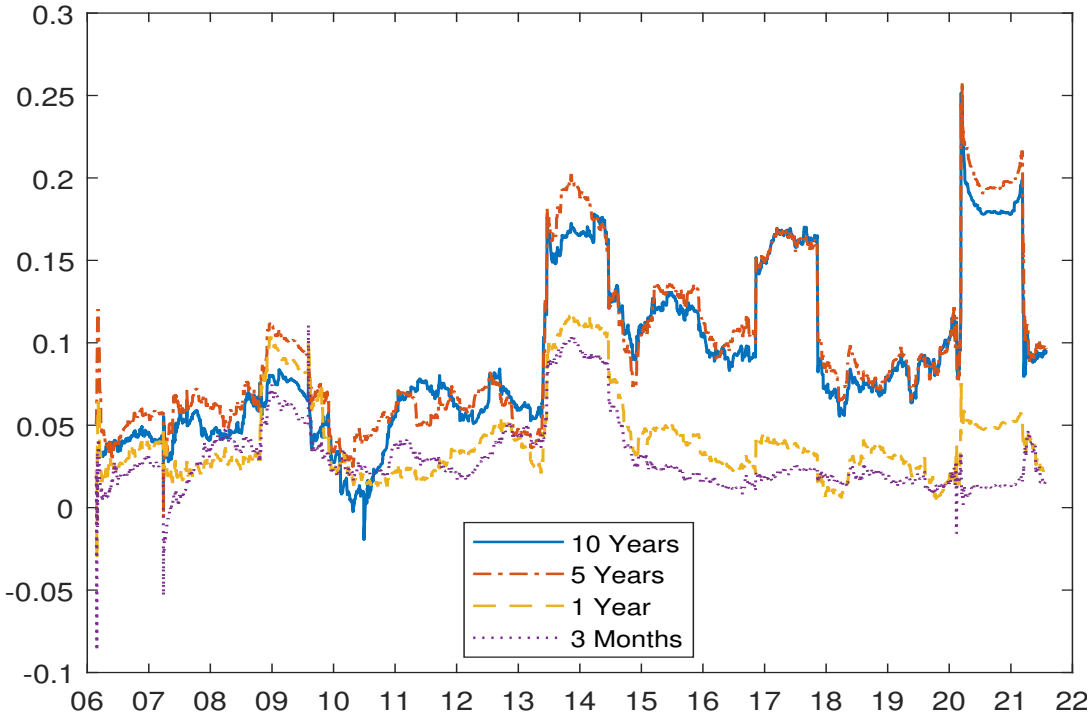
Two indicators help in assessing the comovement of yields. One approach is to use rolling correlations of daily yield changes. Another approach is to use the connectedness index of Diebold and Yilmaz (2014), which assesses shares of forecast error variation in a country's yields due to shocks arising elsewhere; the index ranges from 0 to 100%.

The long-term yields of emerging markets comove relatively more than short-term ones, yet local factors remain relevant. Figures B.1 and B.2 use each indicator to capture the comovement of the nominal yields of emerging markets and advanced economies at different maturities. Both figures exhibit the same patterns. In particular, they show that the long-term yields of emerging markets became more connected after the global financial crisis, and more so since the 2013 taper tantrum; whereas those of advanced economies have been more connected since the beginning of the sample period. Intuitively, shocks to emerging market yields are mainly idiosyncratic. Moreover, regardless of the indicator, the level of comovement among the long-term yields of emerging markets is less than half relative to advanced economies, suggesting that local investors remain key holders of their long-term bonds. The low connectedness among emerging market yields supports estimating the term structure models for their yield curves separately rather than jointly.

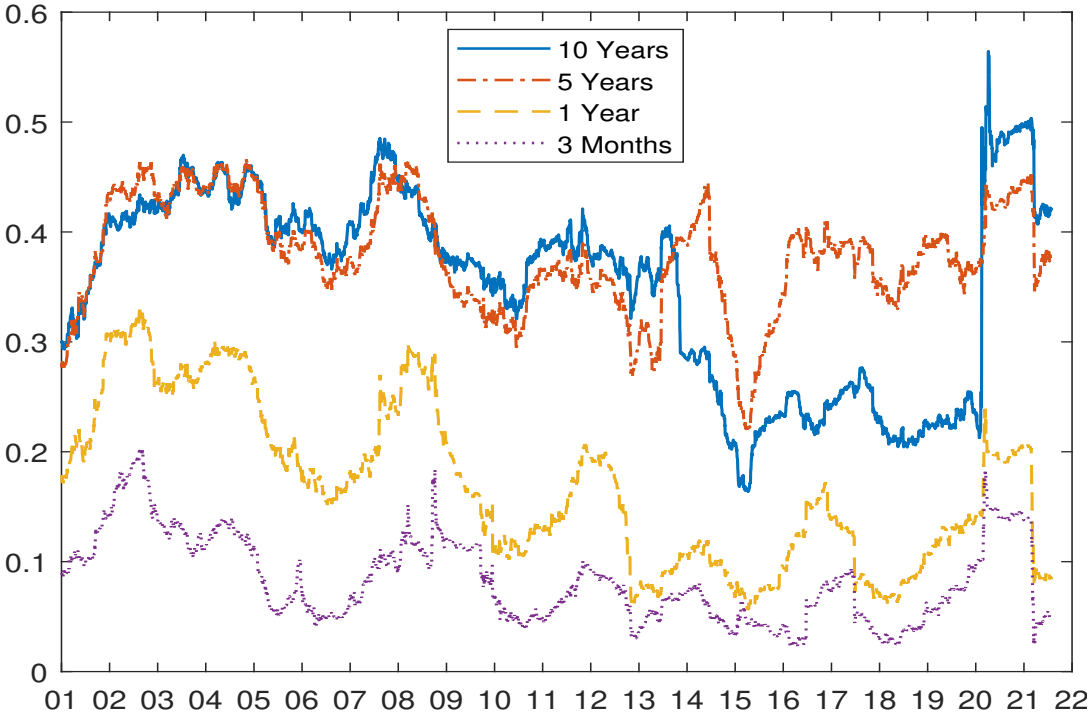
Synthetic yields comove relatively more than nominal yields. Figure B.3a compares the connectedness index for the nominal and synthetic yields of emerging markets. The level of the index for synthetic yields tends to be higher than for nominal yields, suggesting that the credit risk component is more idiosyncratic.

The components of emerging market yields comove similarly. Figure B.3b compares the connectedness index of their components. They all comove similarly, although the expected future short rate comoves slightly more over the sample period, suggesting that the monetary stance of some emerging markets tends to be aligned.

Figure B.1. Comovement of Yield Curves: Rolling Correlations



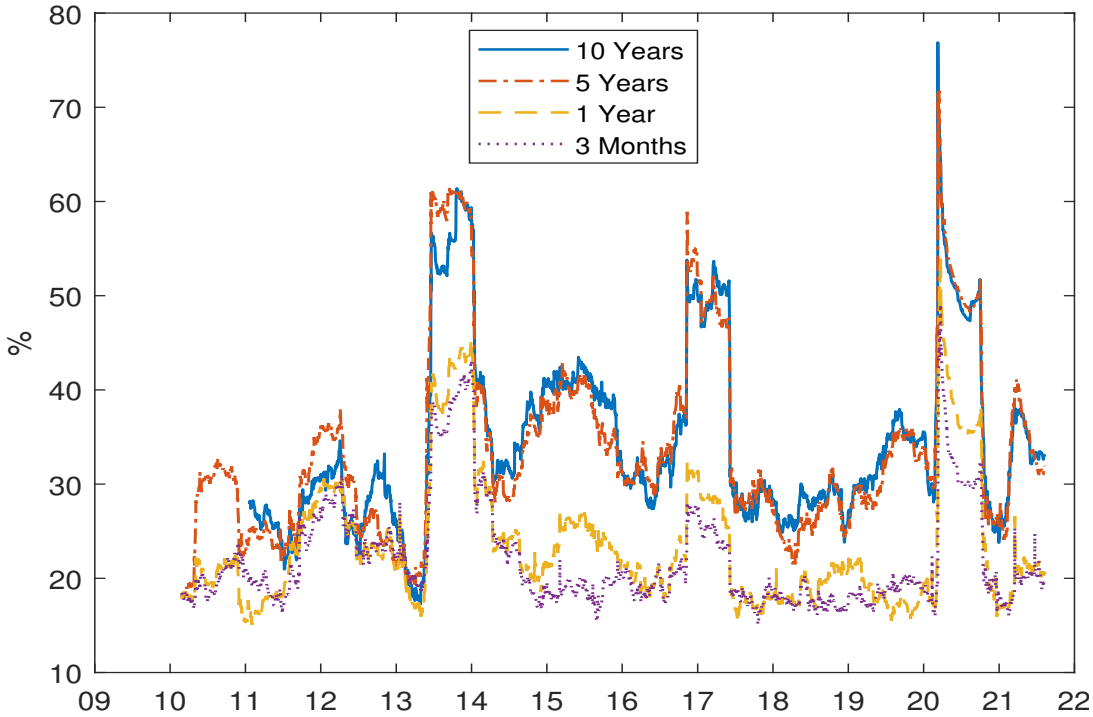
(a) Emerging Markets



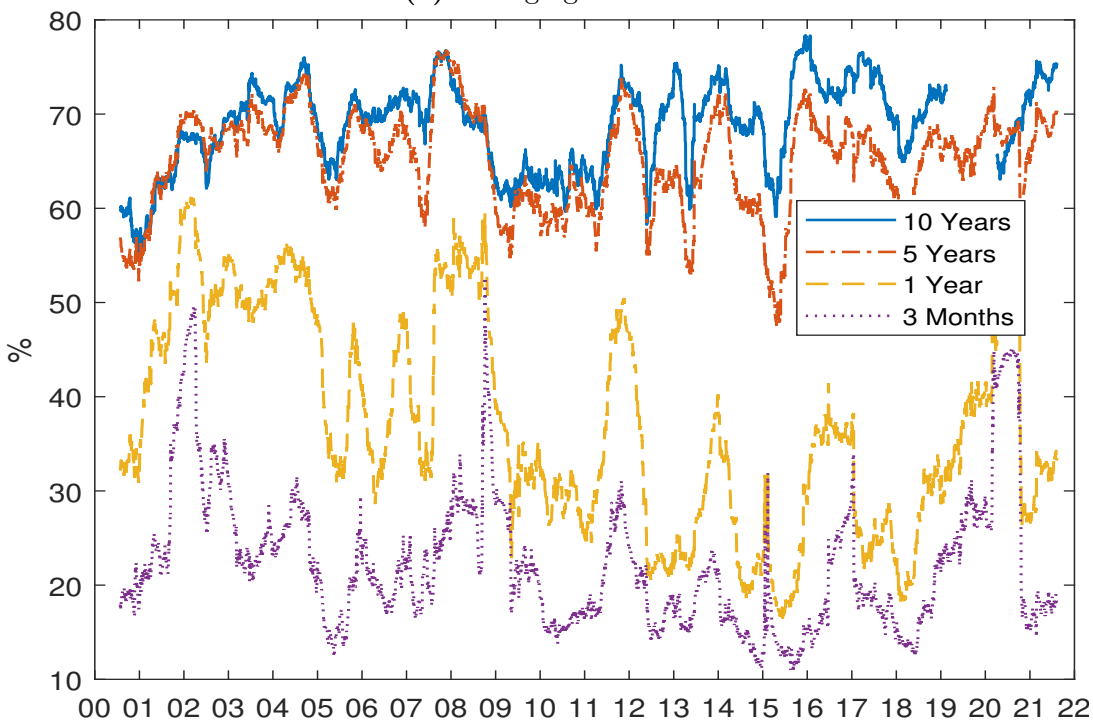
(b) Advanced Economies

Notes: This figure plots one-year rolling correlation coefficients of daily changes in the nominal yields of emerging markets (panel a) and advanced economies (panel b) averaged across country pairs for different maturities: 10 years (solid line), 5 years (dash-dotted line), 1 year (dashed line), and 3 months (dotted line).

Figure B.2. Comovement of Yield Curves: Connectedness Index



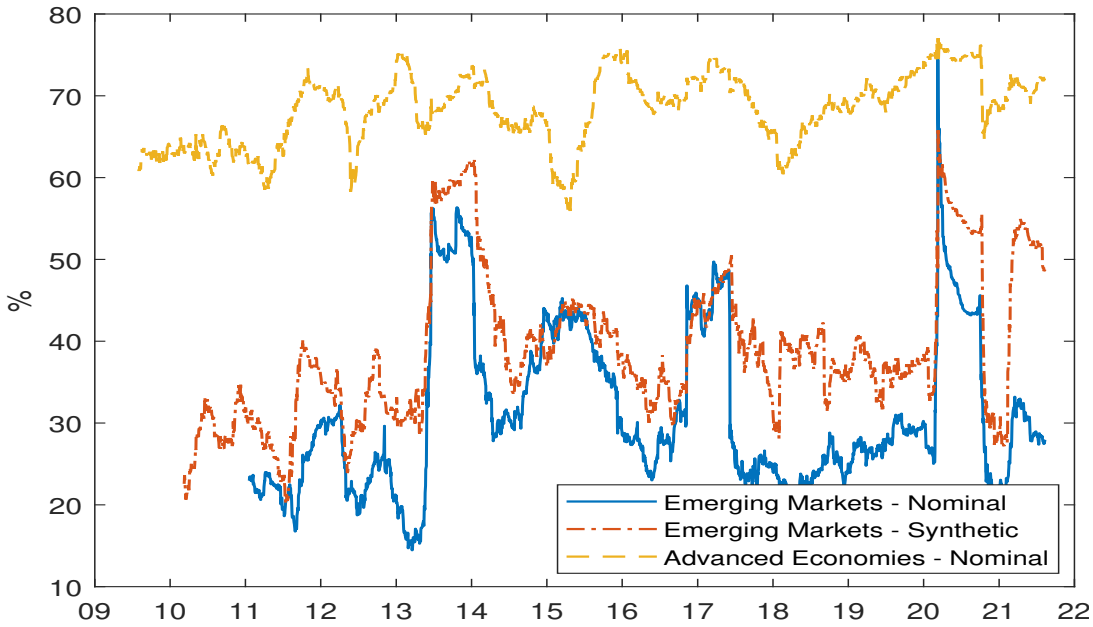
(a) Emerging Markets



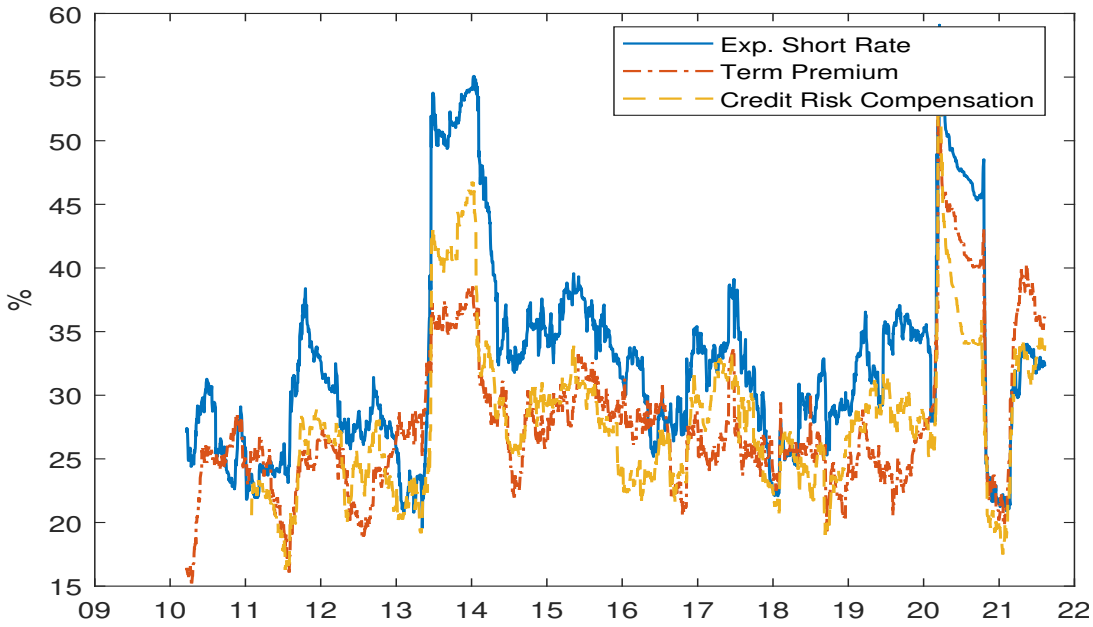
(b) Advanced Economies

Notes: This figure plots the connectedness index of Diebold and Yilmaz (2014) for the nominal yields of emerging markets (panel a) and advanced economies (panel b) for different maturities: 10 years (solid line), 5 years (dash-dotted line), 1 year (dashed line), and 3 months (dotted 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 nominal yields at each maturity, see Adrian et al. (2019) and Bostanci and Yilmaz (2020).

Figure B.3. Connectedness of 10-Year Yields and Components



(a) Nominal and Synthetic Yields



(b) Nominal Yield Components

Notes: This figure plots the connectedness index of Diebold and Yilmaz (2014) for 10-year yields. Panel (a) compares the connectedness index of nominal (solid line) and synthetic (dash-dotted line) yields of emerging markets and the nominal (dashed line) yields of advanced economies. Panel (b) compares the connectedness index of each component of the nominal yields of emerging markets: the expected future short rate (solid line), the term premium (dash-dotted line) and the credit risk compensation (dashed line). 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). 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 yields and their components.

C Supplementary Tables

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	1.31***	0.95***	0.58***	-0.25*
	(0.15)	(0.12)	(0.07)	(0.12)
U.S. E. Short Rate	0.06	0.20***	0.01	-0.17***
	(0.05)	(0.04)	(0.03)	(0.04)
Local Policy Rate	0.44***	0.56***	-0.08***	-0.00
	(0.02)	(0.03)	(0.01)	(0.02)
Inflation	10.06***	4.33	3.49**	2.58
	(2.30)	(2.71)	(1.29)	(1.67)
Unemployment	14.20***	0.83	5.69**	7.53***
	(2.65)	(2.67)	(1.99)	(1.76)
LC per USD (Std.)	32.72***	30.89***	18.95***	-12.92**
	(5.69)	(4.87)	(2.48)	(4.22)
Log(VIX)	52.05***	-6.76	9.55	49.41***
	(9.12)	(13.19)	(5.69)	(10.16)
Log(EPU U.S.)	6.51	-7.07	3.02	9.08*
	(4.97)	(4.32)	(1.84)	(3.97)
Log(EPU Global)	-56.23***	-27.38*	-16.93*	-13.46
	(15.43)	(11.16)	(7.62)	(9.09)
Global Ind. Prod.	1.85*	-1.46	1.08***	2.22*
	(0.79)	(0.96)	(0.29)	(0.87)
Fixed Effects	Yes	Yes	Yes	Yes
Lags	4	4	4	4
No. Countries	15	15	15	15
Observations	2493	2493	2493	2493
R^2	0.76	0.77	0.20	0.24

Notes: This table reports the estimated slope coefficients of panel data regressions of the 5-year nominal yield and its components (expected short rate, term premium and credit risk compensation) on selected explanatory variables. The sample includes monthly data for 15 emerging markets starting in 2000:1 and ending in 2021:7. 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 (2021). 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.

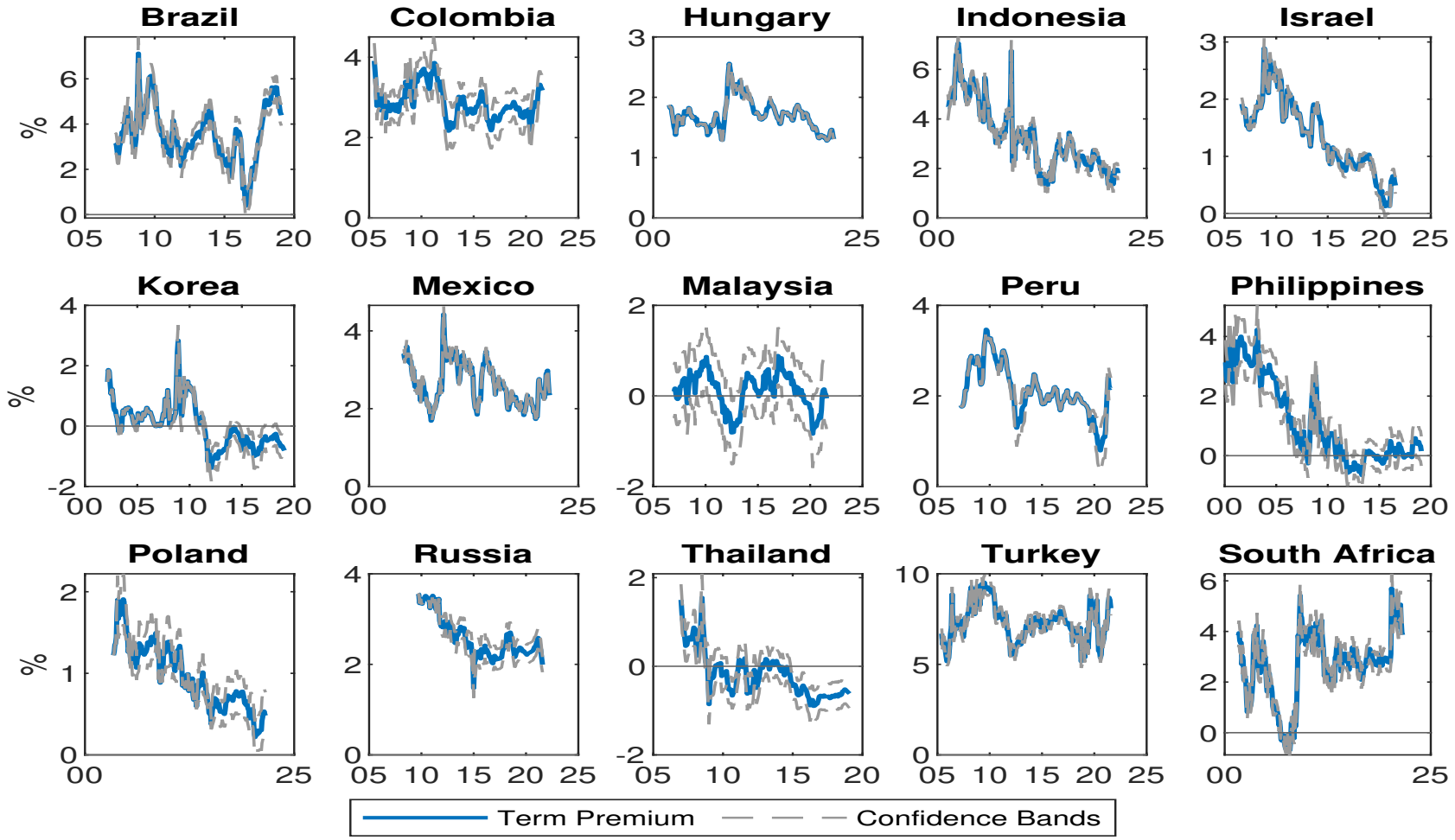
Table C.2. Drivers of the Emerging Market 1-Year Nominal Yield and Its Components

	Nominal	E. Short Rate	Term Premium	Credit Risk
U.S. Term Premium	2.16***	2.15***	-0.14	-0.07
	(0.32)	(0.38)	(0.25)	(0.30)
U.S. E. Short Rate	-0.01	0.02	0.07***	-0.12***
	(0.03)	(0.04)	(0.02)	(0.03)
Local Policy Rate	0.72***	0.75***	0.04**	-0.01
	(0.02)	(0.03)	(0.02)	(0.02)
Inflation	6.07**	3.50	4.61*	2.24
	(2.29)	(3.21)	(1.96)	(1.58)
Unemployment	3.33	-0.05	-1.62	4.51**
	(1.95)	(2.64)	(1.22)	(1.55)
LC per USD (Std.)	25.90***	29.37***	21.59***	-12.80**
	(5.00)	(5.68)	(3.69)	(4.71)
Log(VIX)	34.13***	-4.69	-20.64**	65.56***
	(7.00)	(13.90)	(7.07)	(11.42)
Log(EPU U.S.)	2.94	-4.61	-6.31*	10.19**
	(3.26)	(5.85)	(2.46)	(3.87)
Log(EPU Global)	-44.88***	-34.23**	1.29	-8.10
	(11.84)	(12.77)	(7.86)	(8.89)
Global Ind. Prod.	2.09**	-2.42**	-0.80	3.72***
	(0.66)	(0.91)	(0.68)	(0.71)
Fixed Effects	Yes	Yes	Yes	Yes
Lags	4	4	4	4
No. Countries	15	15	15	15
Observations	2493	2493	2493	2493
R^2	0.84	0.78	0.20	0.27

Notes: This table reports the estimated slope coefficients of panel data regressions of the 1-year nominal yield and its components (expected short rate, term premium and credit risk compensation) on selected explanatory variables. The sample includes monthly data for 15 emerging markets starting in 2000:1 and ending in 2021:7. 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 (2021). 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.

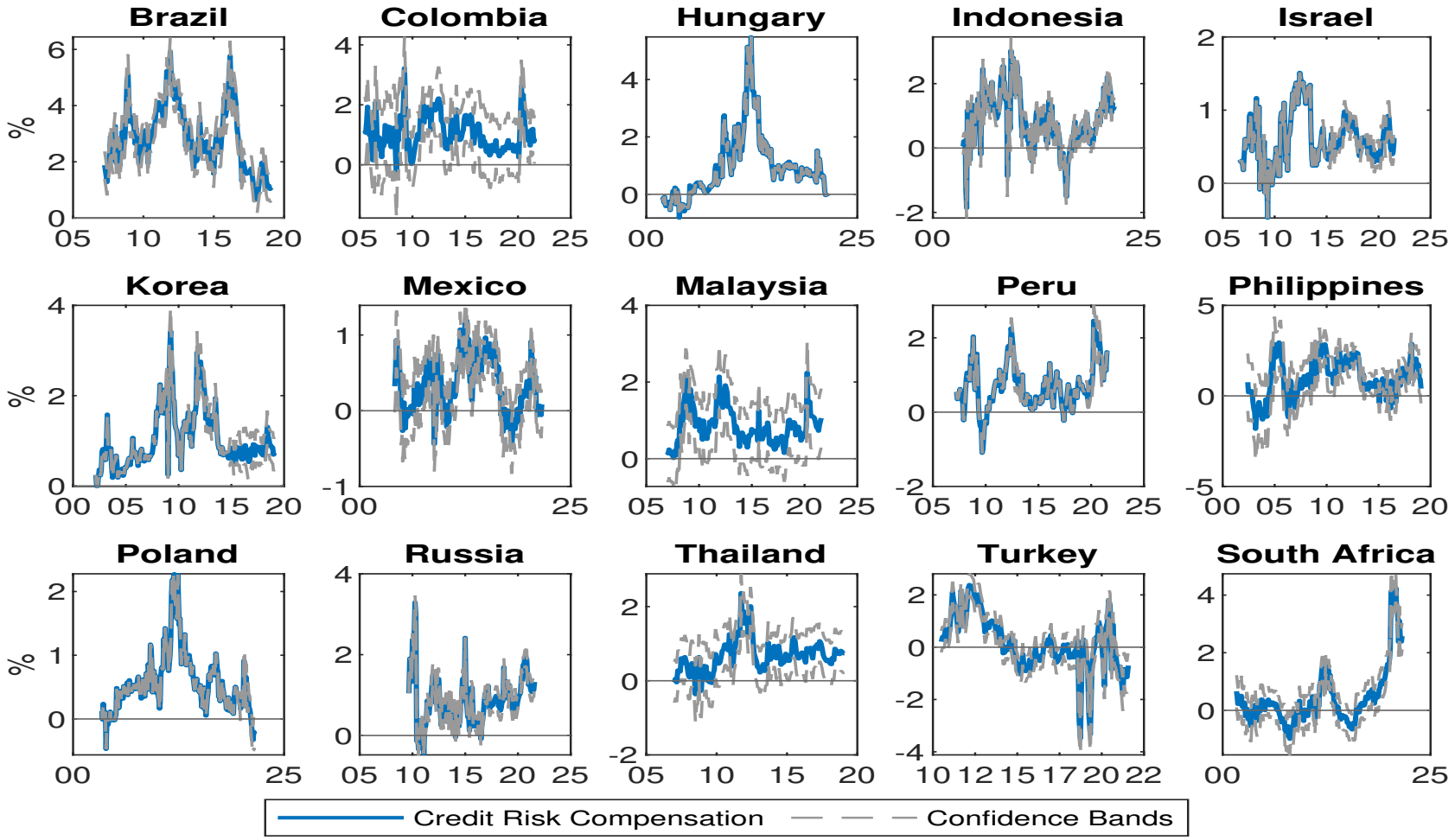
D Supplementary Figures

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



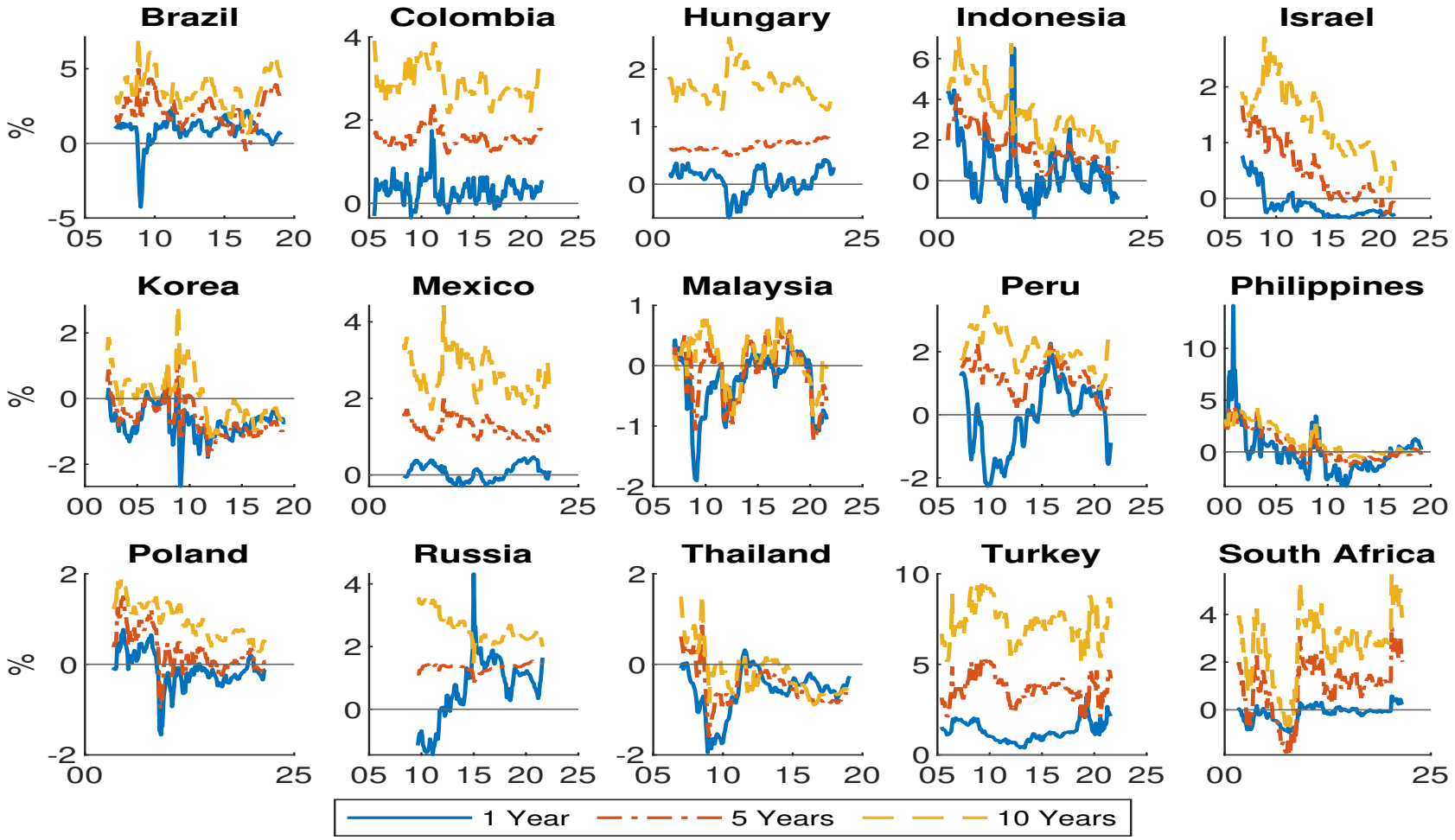
Notes: This figure plots the model-implied 10-year term premium (solid line) along with 2-standard-error confidence intervals (dashed lines). The standard errors are estimated using the delta method. The covariance matrix is estimated using the sample Hessian estimator calculated numerically from the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

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



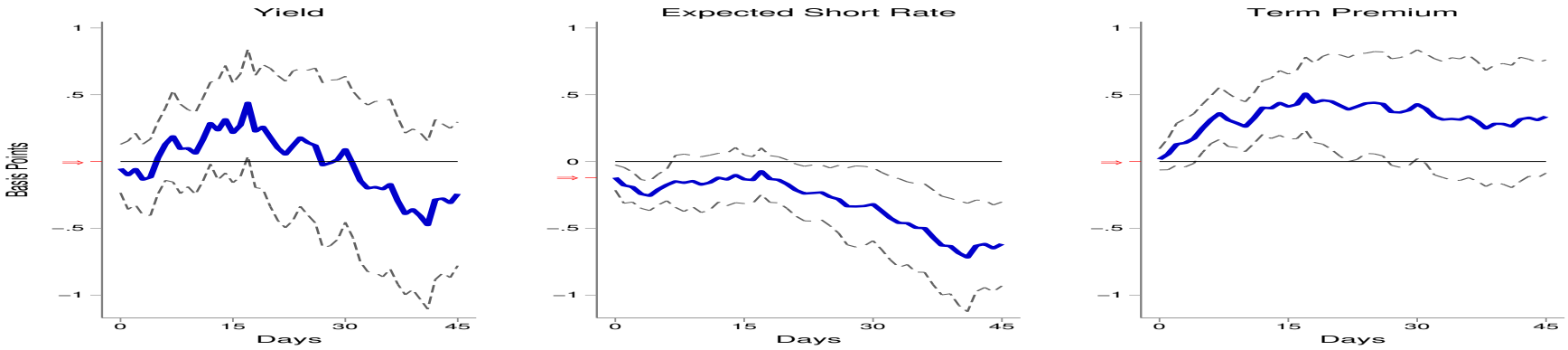
Notes: This figure plots the model-implied 10-year credit risk compensation (solid line) along with 2-standard-error confidence intervals (dashed lines). The standard errors are estimated using the delta method. The covariance matrix is estimated using the sample Hessian estimator calculated numerically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

Figure D.3. Term Structure of Term Premia

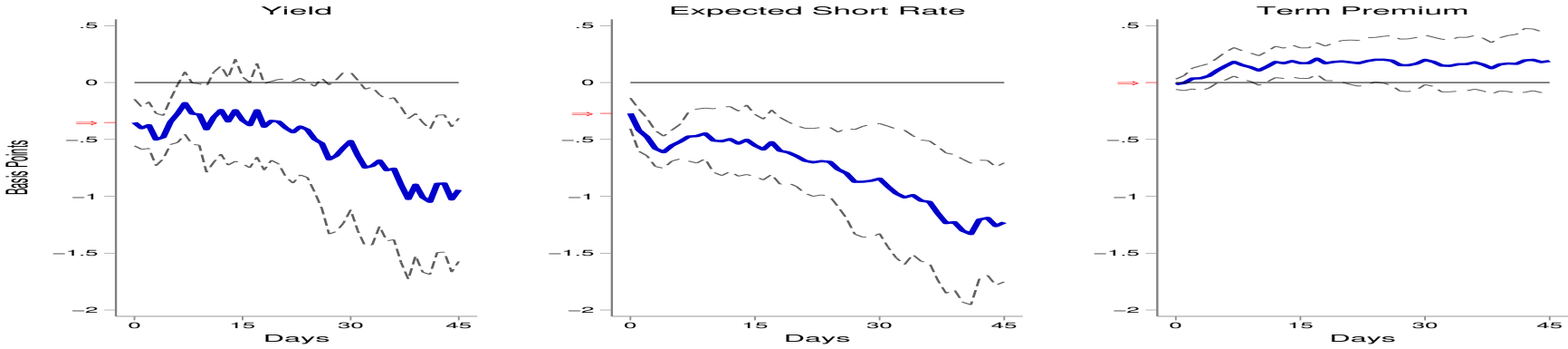


Notes: This figure plots the model-implied term premium for different maturities: 1 year (solid line), 5 years (dashed line) and 10 years (dash-dotted line).

Figure D.4. Response of the U.S. Yield Curve to a Target Surprise



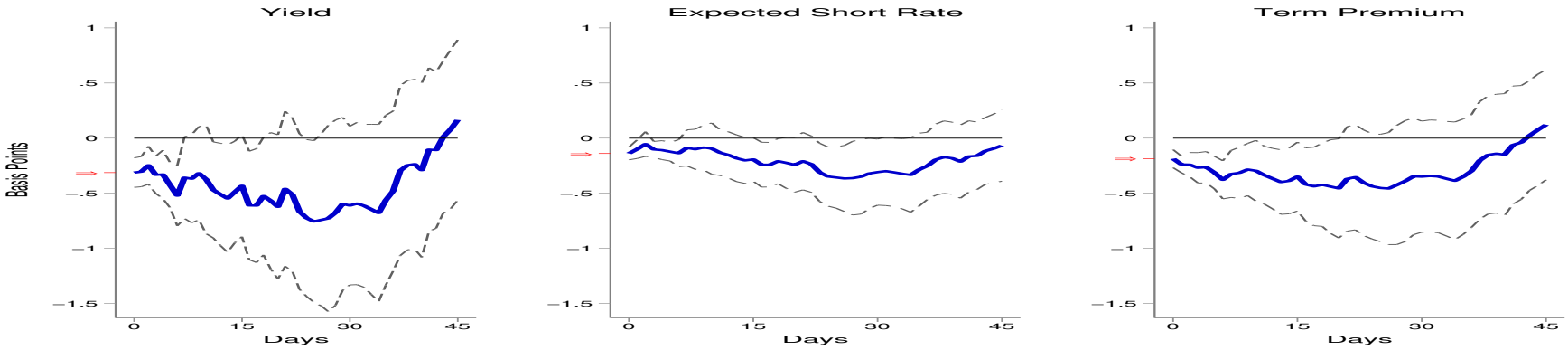
(a) 10-Year Yield



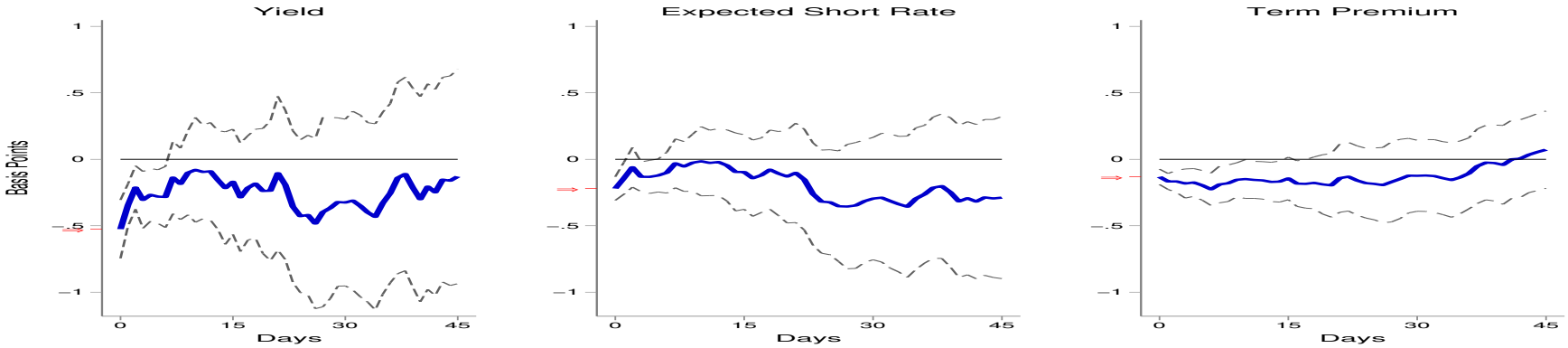
(b) 2-Year Yield

Notes: This figure shows the response following Jordà (2005) of the 10- and 2-year U.S. yields and their components to a target easing surprise of 1 basis point. U.S. yields are zero-coupon yields from Gürkaynak et al. (2007), and are 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 2 for details. An arrow indicates the contemporaneous ($h = 0$) effect. The 90% confidence bands are based on Driscoll–Kraay standard errors.

Figure D.5. Response of the U.S. Yield Curve to a Forward Guidance Surprise: 2000-2008



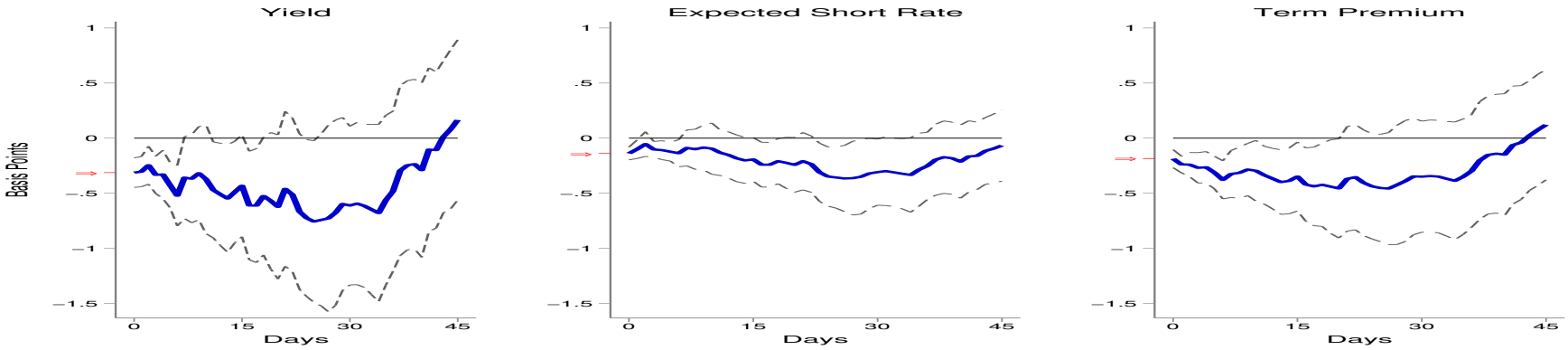
(a) 10-Year Yield



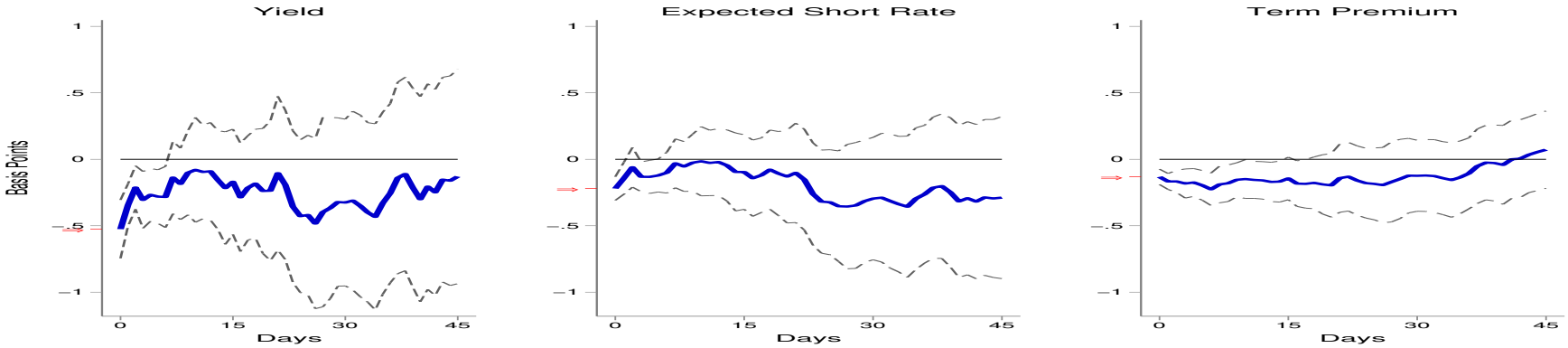
(b) 2-Year Yield

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 easing surprise of 1 basis point. U.S. yields are zero-coupon yields from Gürkaynak et al. (2007), and are 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 2 for details. An arrow indicates the contemporaneous ($h = 0$) effect. The 90% confidence bands are based on Driscoll–Kraay standard errors.

Figure D.6. Response of the U.S. Yield Curve to a Forward Guidance Surprise: 2008-2019



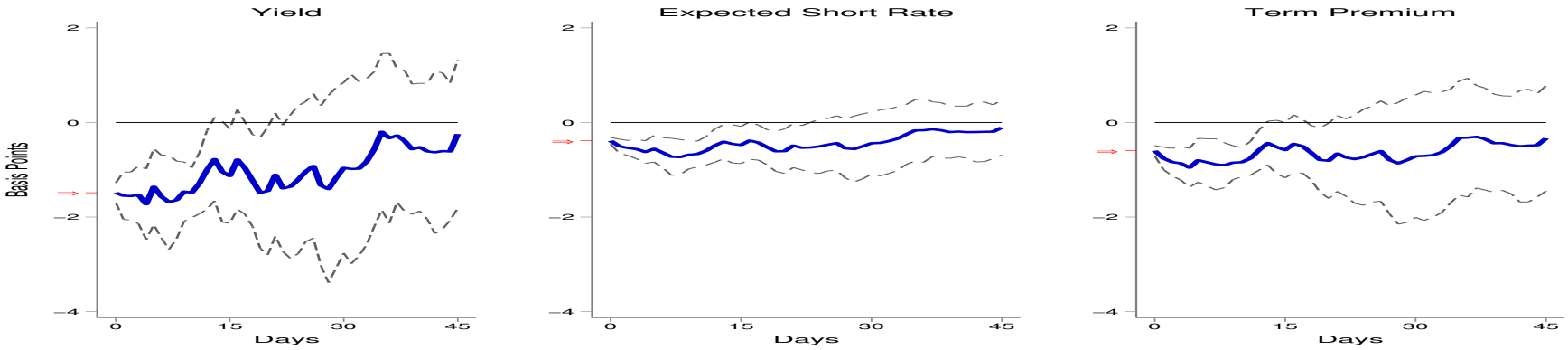
(a) 10-Year Yield



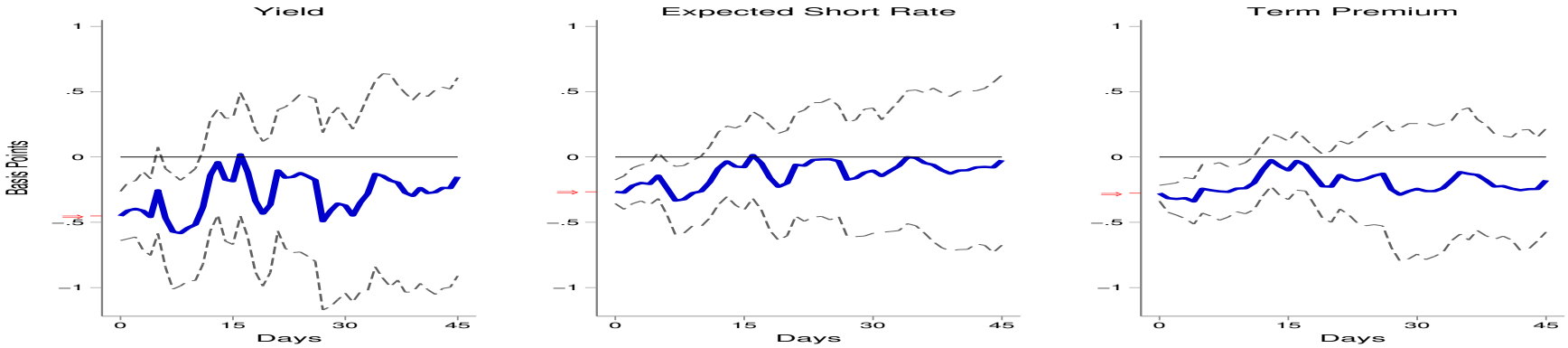
(b) 2-Year Yield

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 easing surprise of 1 basis point. U.S. yields are zero-coupon yields from Gürkaynak et al. (2007), and are 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 2 for details. An arrow indicates the contemporaneous ($h = 0$) effect. The 90% confidence bands are based on Driscoll–Kraay standard errors.

Figure D.7. Response of the U.S. Yield Curve to an Asset Purchase Surprise



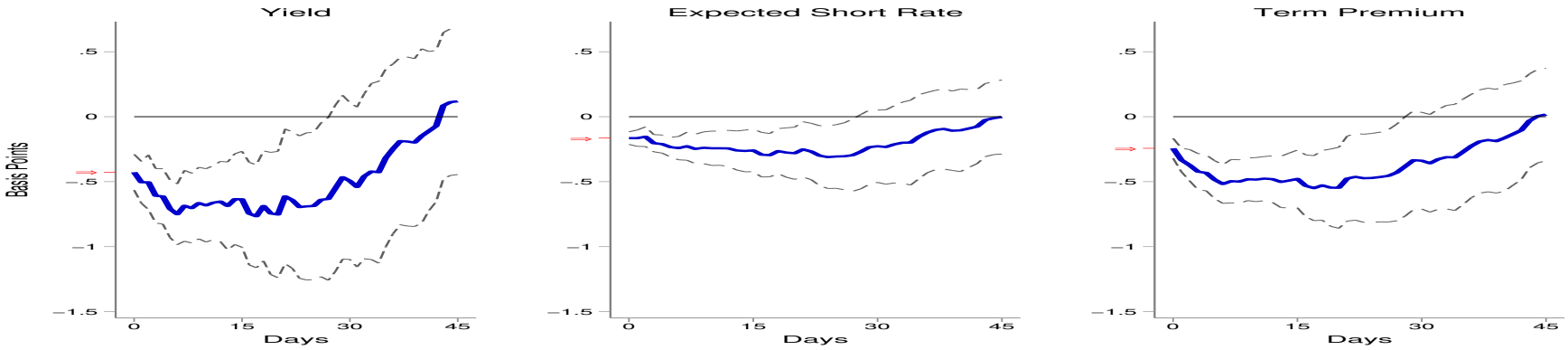
(a) 10-Year Yield



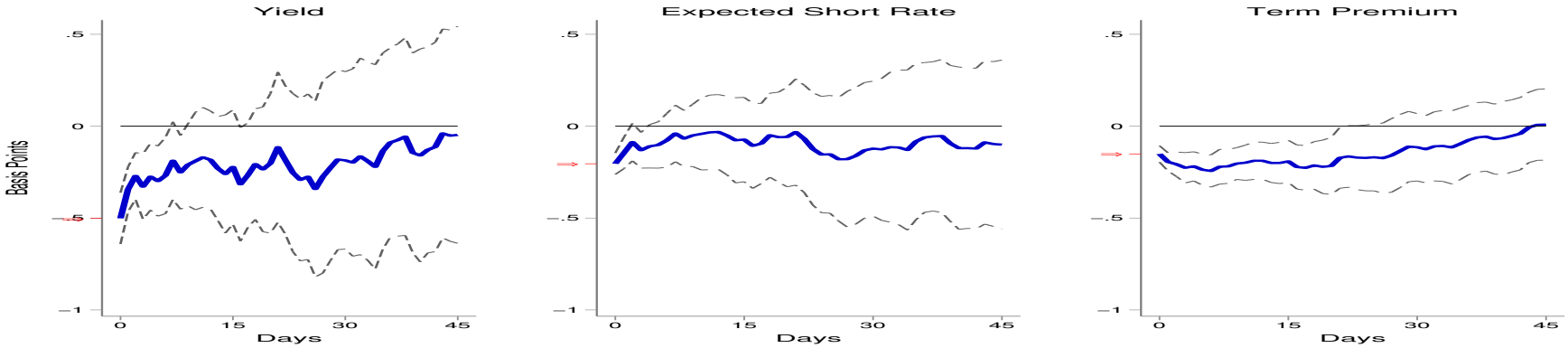
(b) 2-Year Yield

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 easing surprise of 1 basis point. U.S. yields are zero-coupon yields from Gürkaynak et al. (2007), and are 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 2 for details. An arrow indicates the contemporaneous ($h = 0$) effect. 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: 2000-2019



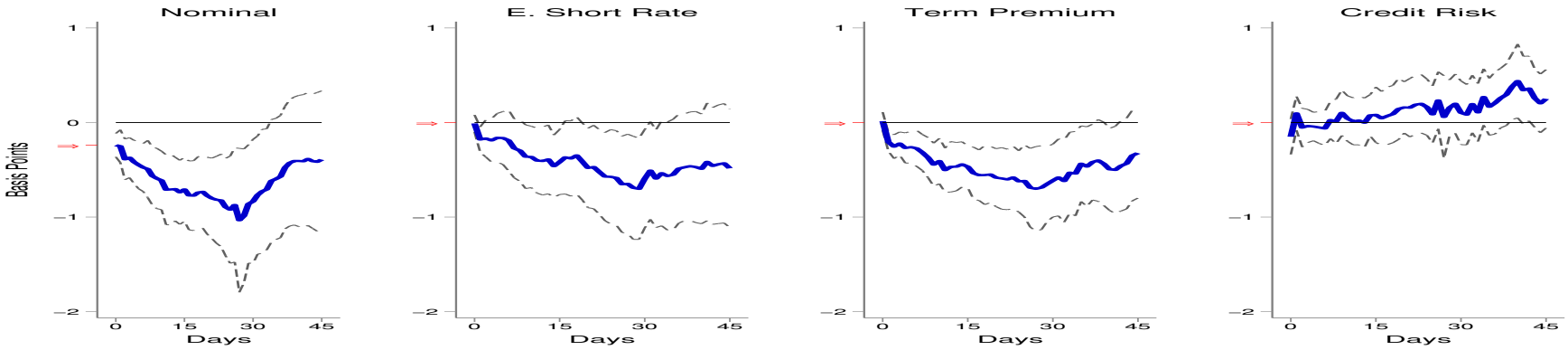
(a) 10-Year Yield



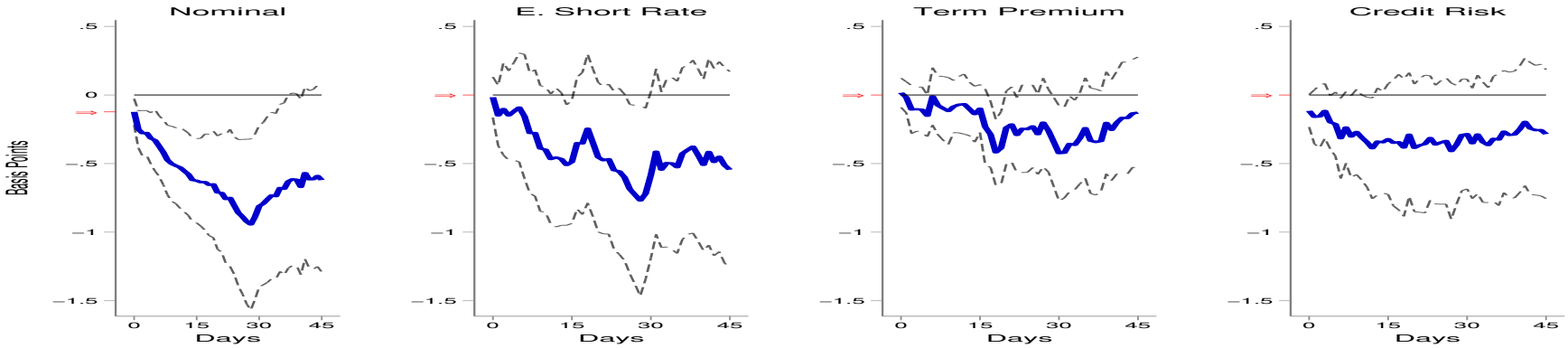
(b) 2-Year Yield

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 easing surprise of 1 basis point. U.S. yields are zero-coupon yields from Gürkaynak et al. (2007), and are 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 2 for details. An arrow indicates the contemporaneous ($h = 0$) effect. The 90% confidence bands are based on Driscoll–Kraay standard errors.

Figure D.9. Response of Emerging Market Yield Curves to a Forward Guidance Surprise: 2000-2019



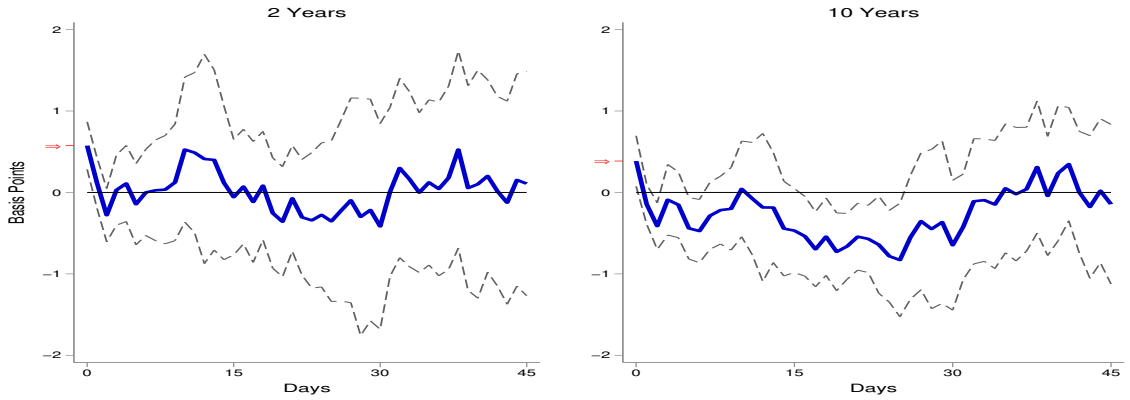
(a) 10-Year Yield



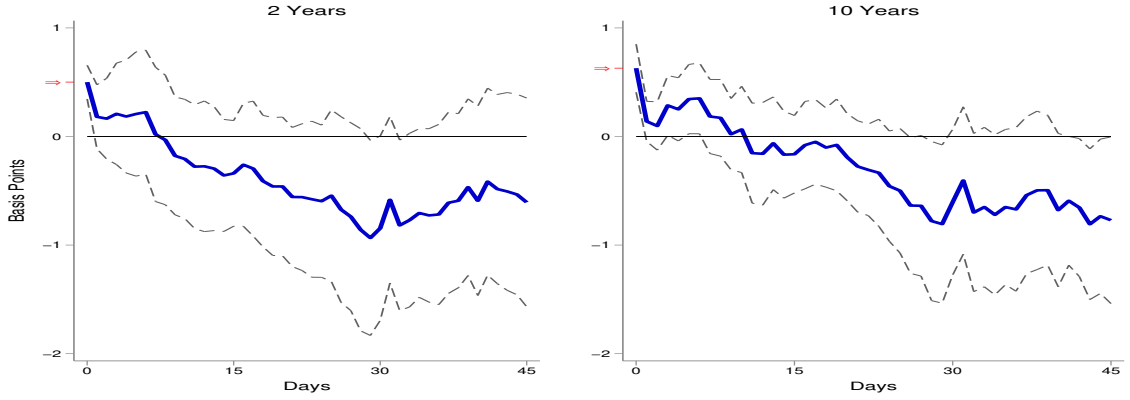
(b) 2-Year Yield

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 easing surprise of 1 basis point. Nominal yields are decomposed into an expected future short-term interest rate, a term premium and credit risk compensation, see section 4 for details. Forward guidance surprises are identified using intraday data around Fed's monetary policy announcements, see section 2 for details. An arrow indicates the contemporaneous ($h = 0$) effect. The 90% confidence bands are based on Driscoll–Kraay standard errors.

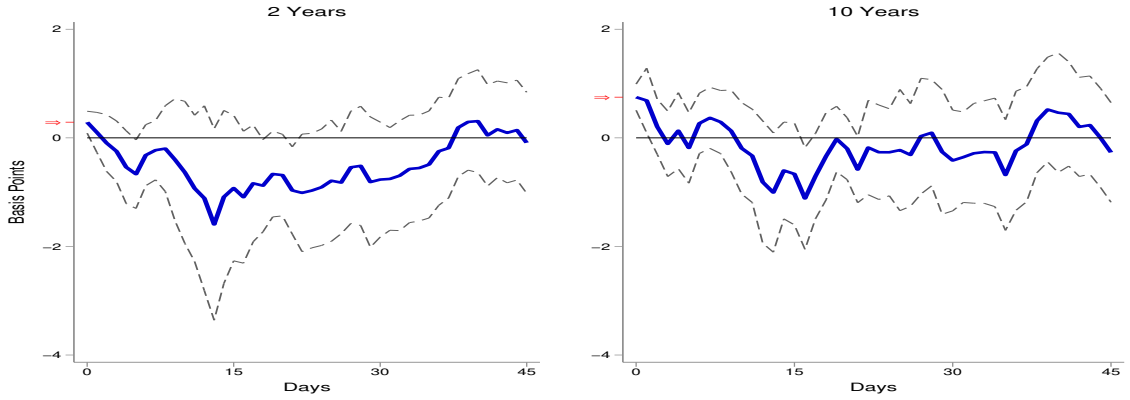
Figure D.10. Response of the Forward Premium to U.S. Monetary Policy Surprises



(a) Target Surprise: 2000-2008



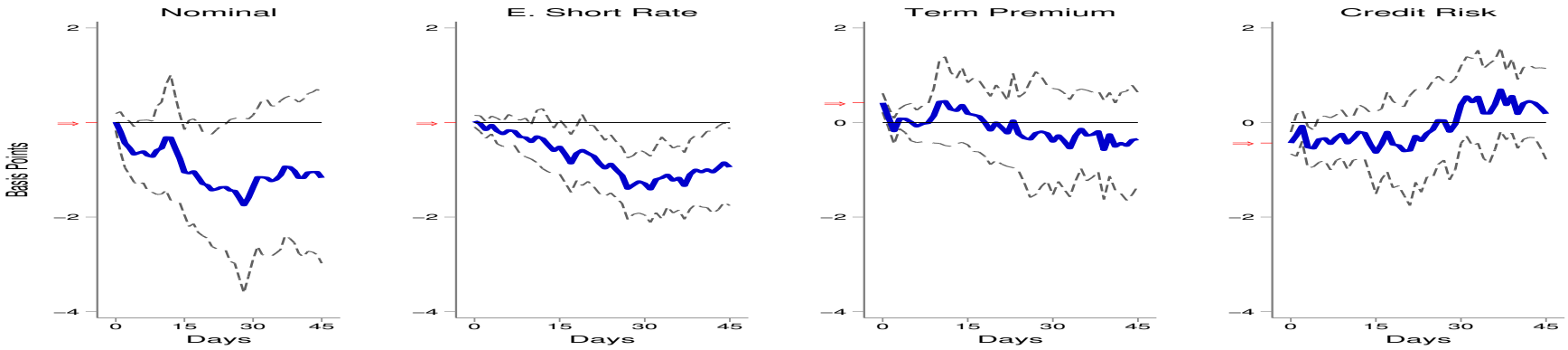
(b) Forward Guidance Surprise: 2000-2019



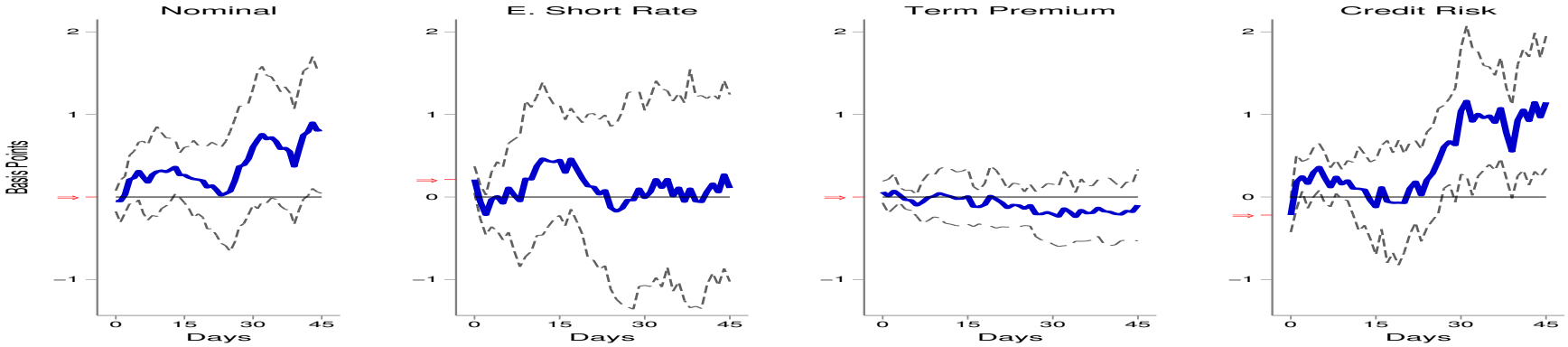
(c) Asset Purchase Surprise: 2009-2019

Notes: This figure shows the response following Jordà (2005) of the 10- and 2-year foreign exchange forward premium of emerging markets to easing surprises in U.S. monetary policy of 1 basis point. 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 3.1 for details. The target, forward guidance and asset purchase surprises are identified using intraday data around Fed's monetary policy announcements, see section 2 for details. An arrow indicates the contemporaneous ($h = 0$) effect. The 90% confidence bands are based on Driscoll–Kraay standard errors.

Figure D.11. Response of the 10-Year Emerging Market Yield by Region to a Target Surprise



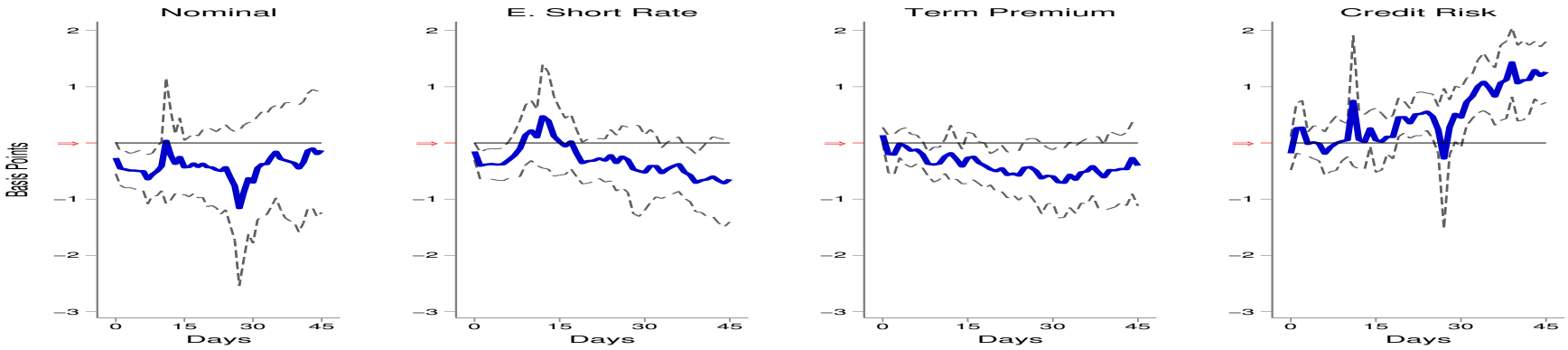
(a) Latin America



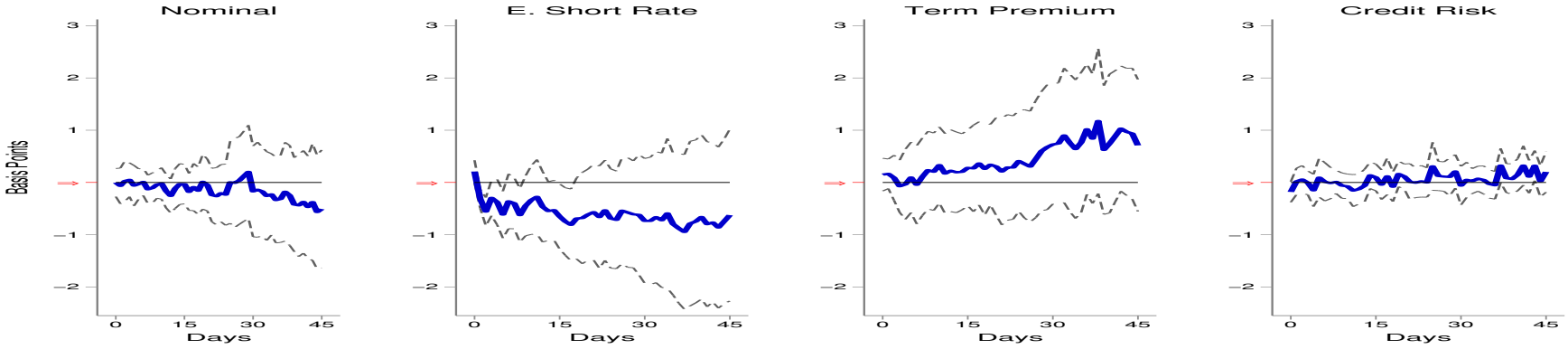
(b) Emerging Europe

Notes: This figure shows the response following Jordà (2005) of the 10-year emerging market nominal yields and their components by region to a target easing surprise of 1 basis point. Nominal yields are decomposed into an expected future short-term interest rate, a term premium and credit risk compensation, see section 4 for details. Target surprises are identified using intraday data around Fed's monetary policy announcements, see section 2 for details. An arrow indicates the contemporaneous ($h = 0$) effect. The 90% confidence bands are based on Driscoll–Kraay standard errors.

Figure D.12. Response of the 10-Year Emerging Market Yield by Region to a Target Surprise (cont.)



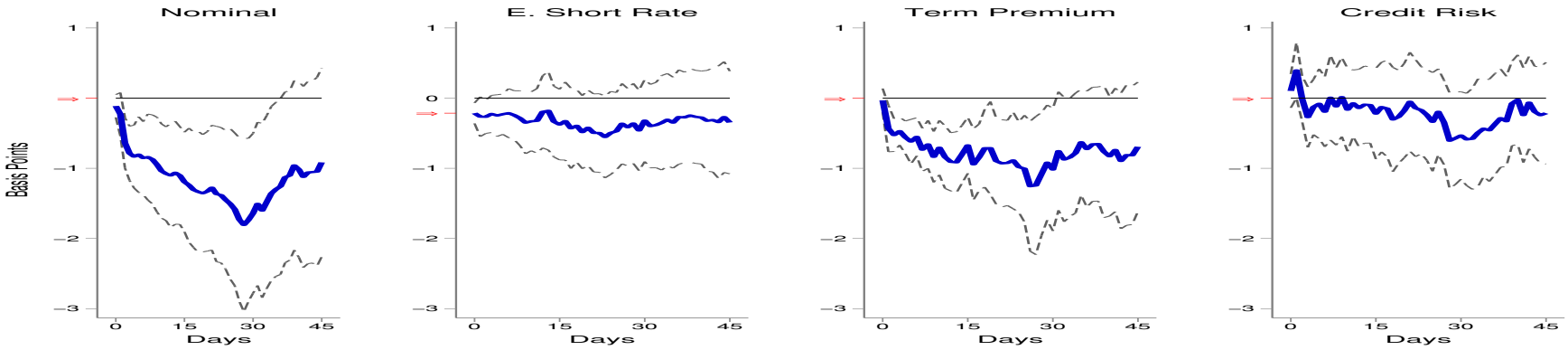
(a) Emerging Asia



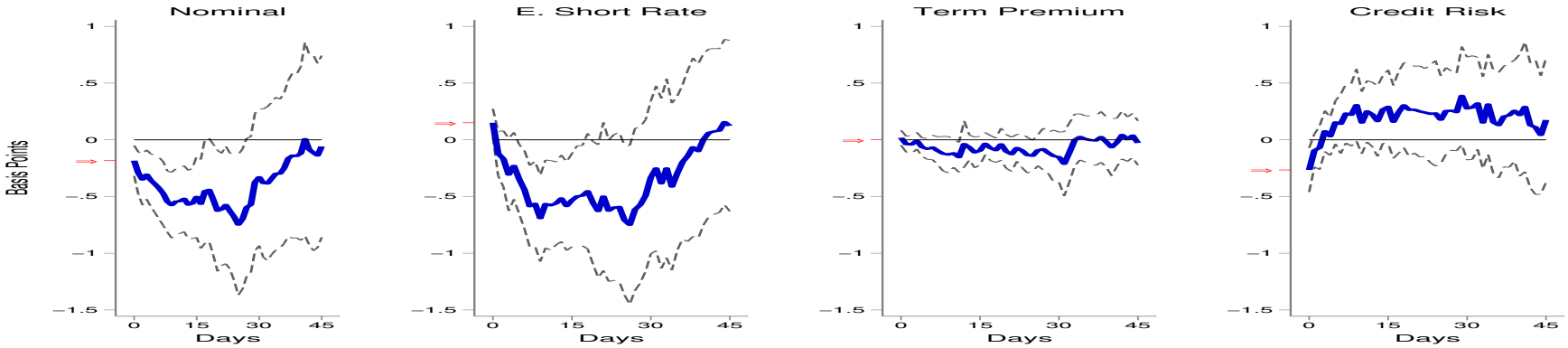
(b) Middle East and Africa

Notes: This figure shows the response following Jordà (2005) of the 10-year emerging market nominal yields and their components by region to a target easing surprise of 1 basis point. Nominal yields are decomposed into an expected future short-term interest rate, a term premium and credit risk compensation, see section 4 for details. Target surprises are identified using intraday data around Fed's monetary policy announcements, see section 2 for details. An arrow indicates the contemporaneous ($h = 0$) effect. The 90% confidence bands are based on Driscoll–Kraay standard errors.

Figure D.13. Response of the 10-Year Emerging Market Yield by Region to a Forward Guidance Surprise: 2000-2019



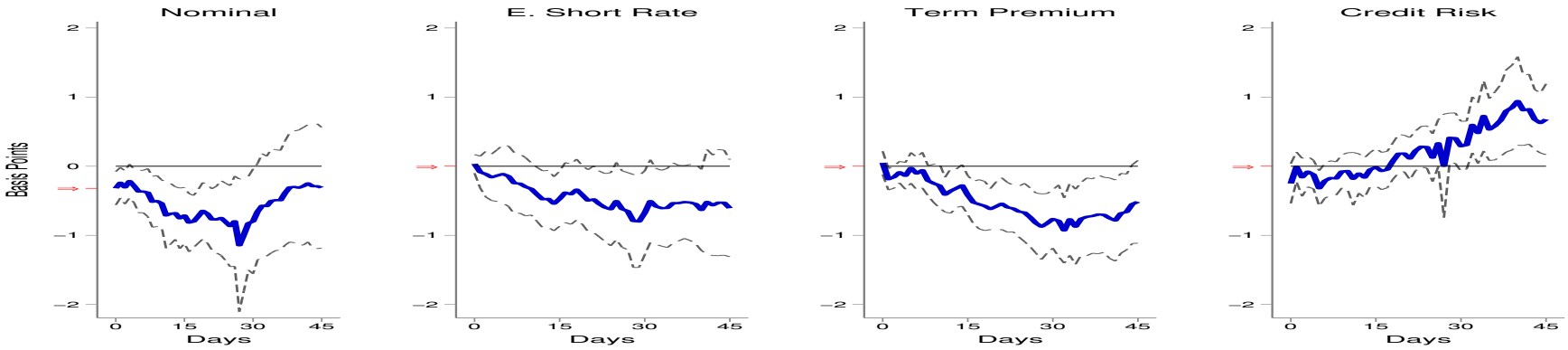
(a) Latin America



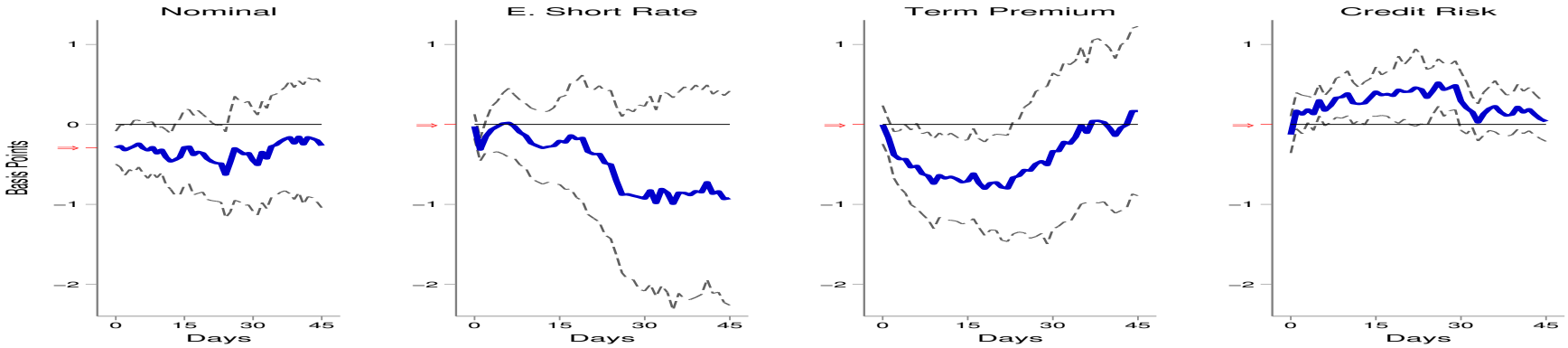
(b) Emerging Europe

Notes: This figure shows the response following Jordà (2005) of the 10-year emerging market nominal yields and their components by region to a forward guidance easing surprise of 1 basis point. Nominal yields are decomposed into an expected future short-term interest rate, a term premium and credit risk compensation, see section 4 for details. Forward guidance surprises are identified using intraday data around Fed's monetary policy announcements, see section 2 for details. An arrow indicates the contemporaneous ($h = 0$) effect. The 90% confidence bands are based on Driscoll–Kraay standard errors.

Figure D.14. Response of the 10-Year Emerging Market Yield by Region to a Forward Guidance Surprise: 2000-2019 (cont.)



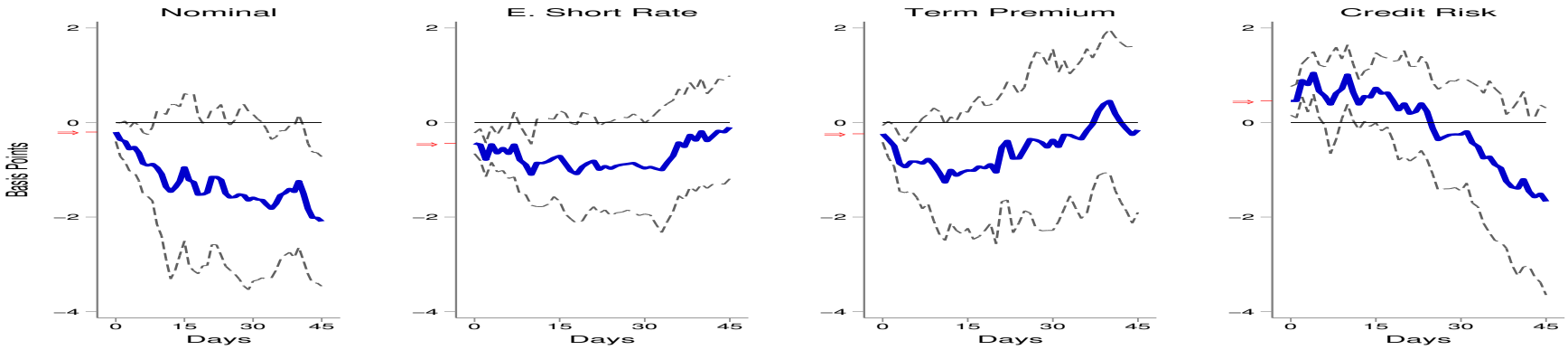
(a) Emerging Asia



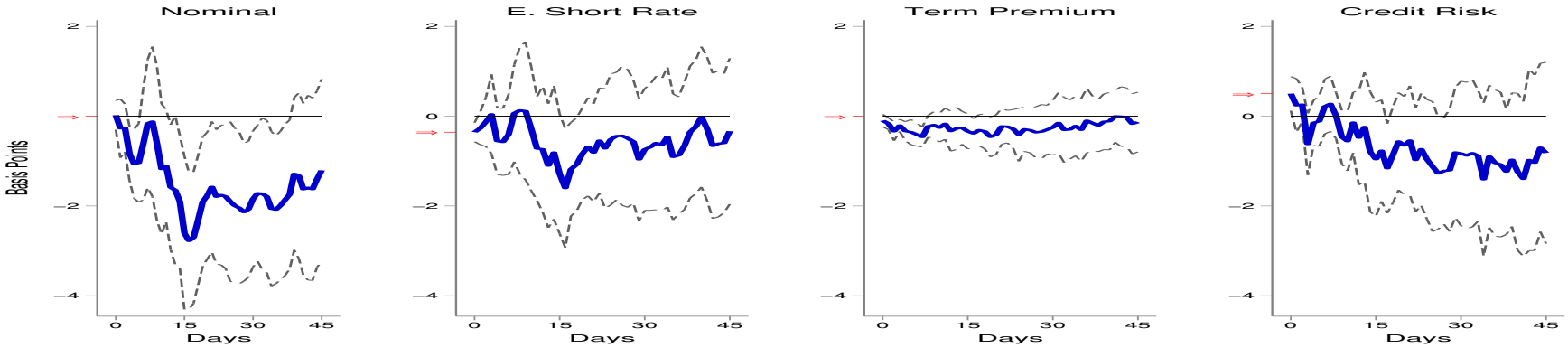
(b) Middle East and Africa

Notes: This figure shows the response following Jordà (2005) of the 10-year emerging market nominal yields and their components by region to a forward guidance easing surprise of 1 basis point. Nominal yields are decomposed into an expected future short-term interest rate, a term premium and credit risk compensation, see section 4 for details. Forward guidance surprises are identified using intraday data around Fed's monetary policy announcements, see section 2 for details. An arrow indicates the contemporaneous ($h = 0$) effect. The 90% confidence bands are based on Driscoll–Kraay standard errors.

Figure D.15. Response of the 10-Year Emerging Market Yield by Region to an Asset Purchase Surprise



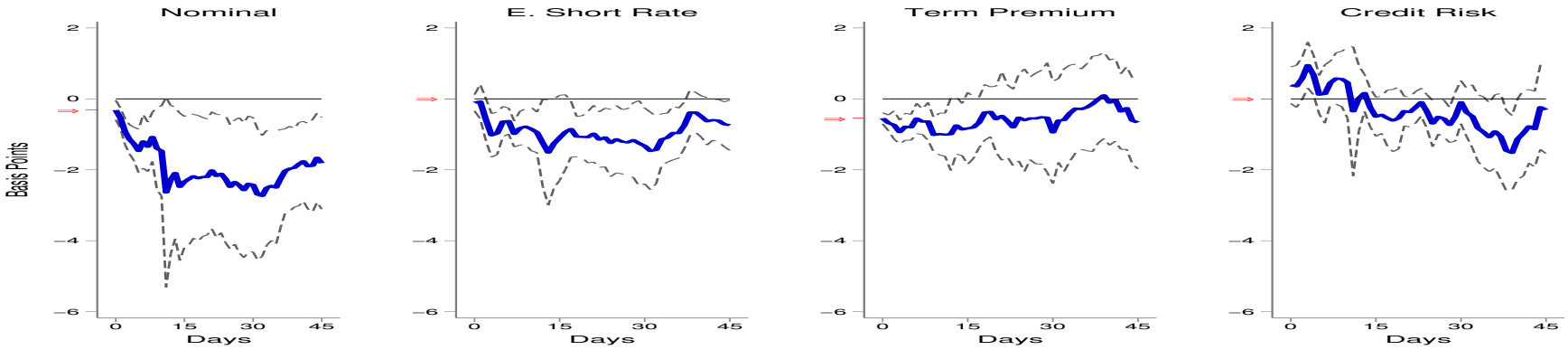
(a) Latin America



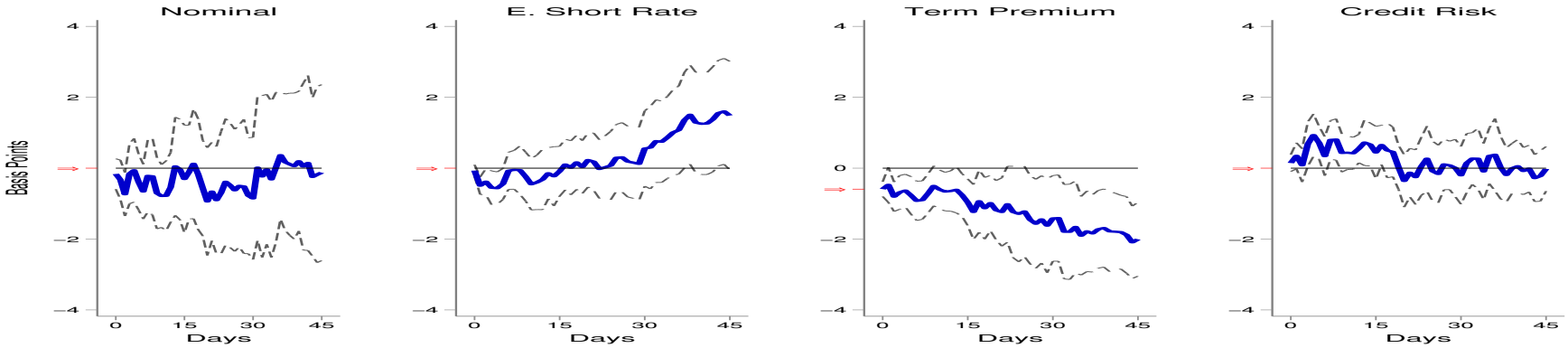
(b) Emerging Europe

Notes: This figure shows the response following Jordà (2005) of the 10-year emerging market nominal yields and their components by region to an asset purchase easing surprise of 1 basis point. Nominal yields are decomposed into an expected future short-term interest rate, a term premium and credit risk compensation, see section 4 for details. Asset purchase surprises are identified using intraday data around Fed's monetary policy announcements, see section 2 for details. An arrow indicates the contemporaneous ($h = 0$) effect. The 90% confidence bands are based on Driscoll–Kraay standard errors.

Figure D.16. Response of the 10-Year Emerging Market Yield by Region to an Asset Purchase Surprise (cont.)



(a) Emerging Asia



(b) Middle East and Africa

Notes: This figure shows the response following Jordà (2005) of the 10–year emerging market nominal yields and their components by region to an asset purchase easing surprise of 1 basis point. Nominal yields are decomposed into an expected future short-term interest rate, a term premium and credit risk compensation, see section 4 for details. Asset purchase surprises are identified using intraday data around Fed's monetary policy announcements, see section 2 for details. An arrow indicates the contemporaneous ($h = 0$) effect. The 90% confidence bands are based on Driscoll–Kraay standard errors.