Online Appendix:
Explaining Monetary Spillovers: The Matrix Reloaded

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This appendix provides additional information to accompany Research Discussion Paper No 2019-03. Section 1 provides a data overview. Section 2 provides some supplementary figures and tables.

1. Data Overview

## Table A1: List of Recipient Economies

Advanced (27)		Emerging market (20)			
Euro area	Other	Asia	Europe	Latin America	Other
Austria	Australia	China	Poland	Brazil	Nigeria
Belgium	Canada	India	Romania	Chile	Pakistan
Finland	Czech Republic	Indonesia	Turkey	Colombia	Russia
France	Denmark	Malaysia		Mexico	South Africa
Germany	Hong Kong	Philippines		Peru	
Greece	Israel	Thailand		Venezuela	
Ireland	Japan	Vietnam			
Italy	New Zealand				
Netherlands	Norway				
Portugal	Singapore				
Spain	South Korea				
	Sweden				
	Switzerland				
	Taiwan				
	United Kingdom				
	United States				

Table A2: Data Sources

Variable	Description	Source
Interest rates		
1-month and 6-month OIS	Overnight indexed swaps	Bloomberg; Thomson Reuters Tick History
2-year and 10-year bond yields	Sovereign bond yields	Bloomberg; Thomson Reuters Tick History
Global controls		
US 10-year yield	Sovereign benchmark bond yield	
VIX	S&P 500 volatility index	Bloomberg
Economic conditions		
Real GDP	Year-ended growth	BIS; OECD; IMF World Economic Outlook
CPI inflation	Annual rate	BIS; IMF International Financial Statistics
Bilateral trade	Imports and exports of goods and services between originator and recipient economy, ratio to GDP	IMF Direction of Trade Statistics
Common language	Dummy equals one if originator and recipient share a common language	Mayer and Zignago (2011)
Weighted distance	Distance between originator and recipient	Mayer and Zignago (2011)
Time difference	Time difference between originator and recipient	Mayer and Zignago (2011)
Financial openness		
Portfolio equity	Stock of recipient economy (total assets or liabilities) as a ratio to GDP	Lane and Milessi-Ferretti (2017)
Portfolio debt	Stock of recipient economy (total assets or liabilities) as a ratio to GDP	Lane and Milessi-Ferretti (2017)
FDI (foreign direct investment)	Stock of recipient economy (total assets or liabilities) as a ratio to GDP	Lane and Milessi-Ferretti (2017)
Financial derivatives	Stock of recipient economy (total assets or liabilities) as a ratio to GDP	Lane and Milessi-Ferretti (2017)
Bilateral financial openness		
Foreign currency debt	Country debt denominated in USD or EUR as a ratio to GDP	BIS
Portfolio equity	Ratio to recipient economy GDP	IMF Coordinated Portfolio Investment Survey (CPIS)
Portfolio debt	Ratio to recipient economy GDP	IMF CPIS
FDI	Ratio to recipient economy GDP	United Nations Conference on Trade and Development (UNCTAD)
Bank loans	Ratio to recipient economy GDP	BIS International Banking Statistics

Notes: T Mayer and S Zignago (2011), 'Notes on CEPII's Distances Measures: The *GeoDist* Database', Centre d'Études Prospectives et d'Informations Internationales, CEPII Working Paper No 2011 – 25; PR Lane and GM Milesi-Ferretti (2017), 'International Financial Integration in the Aftermath of the Global Financial Crisis', IMF Working Paper No WP/17/115
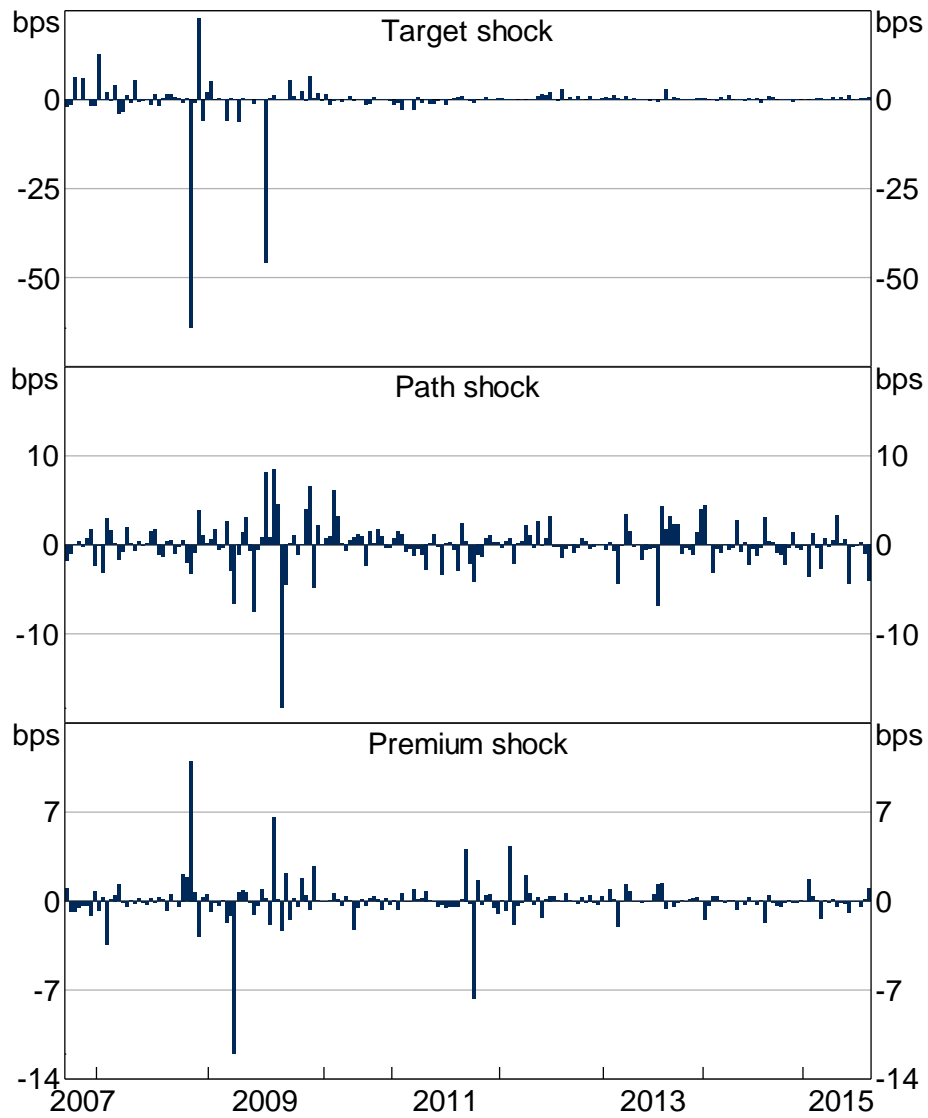
2. Supplementary Figures and Tables

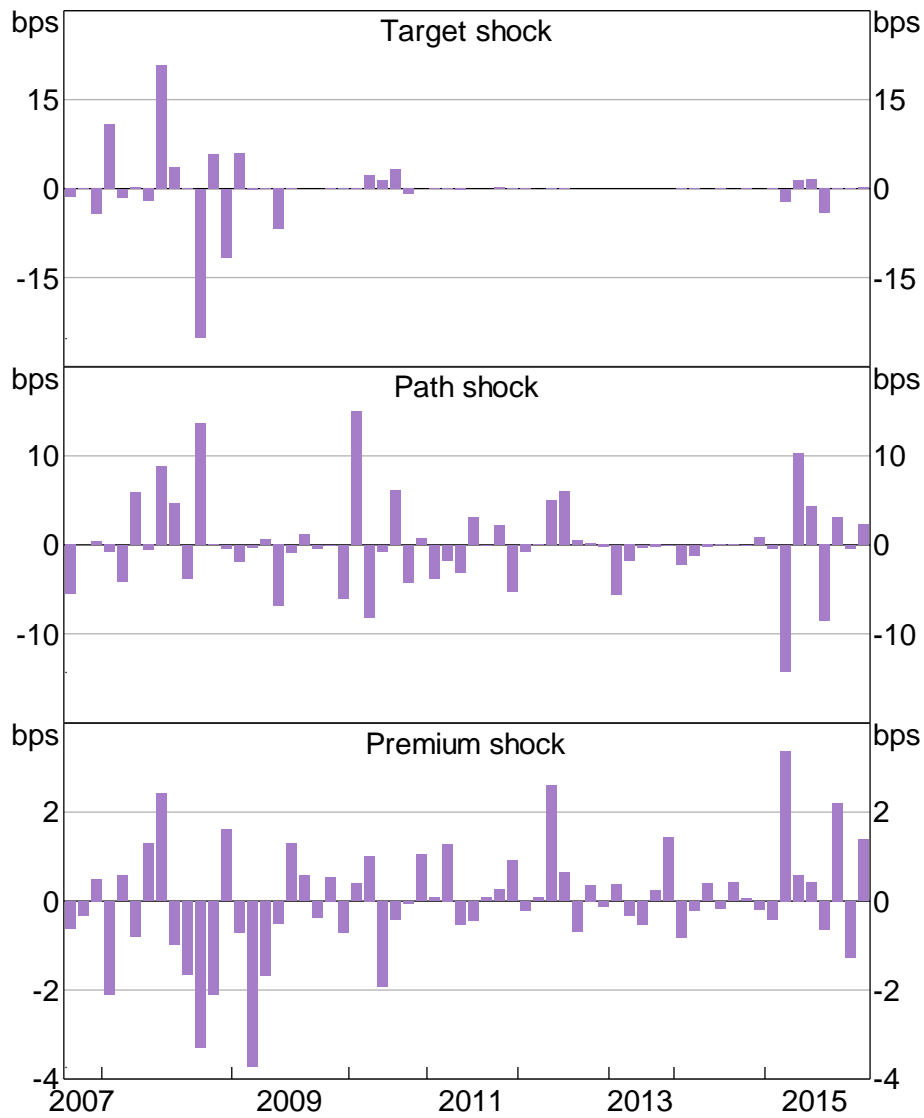**Figure A1: ECB Monetary Policy Shocks**
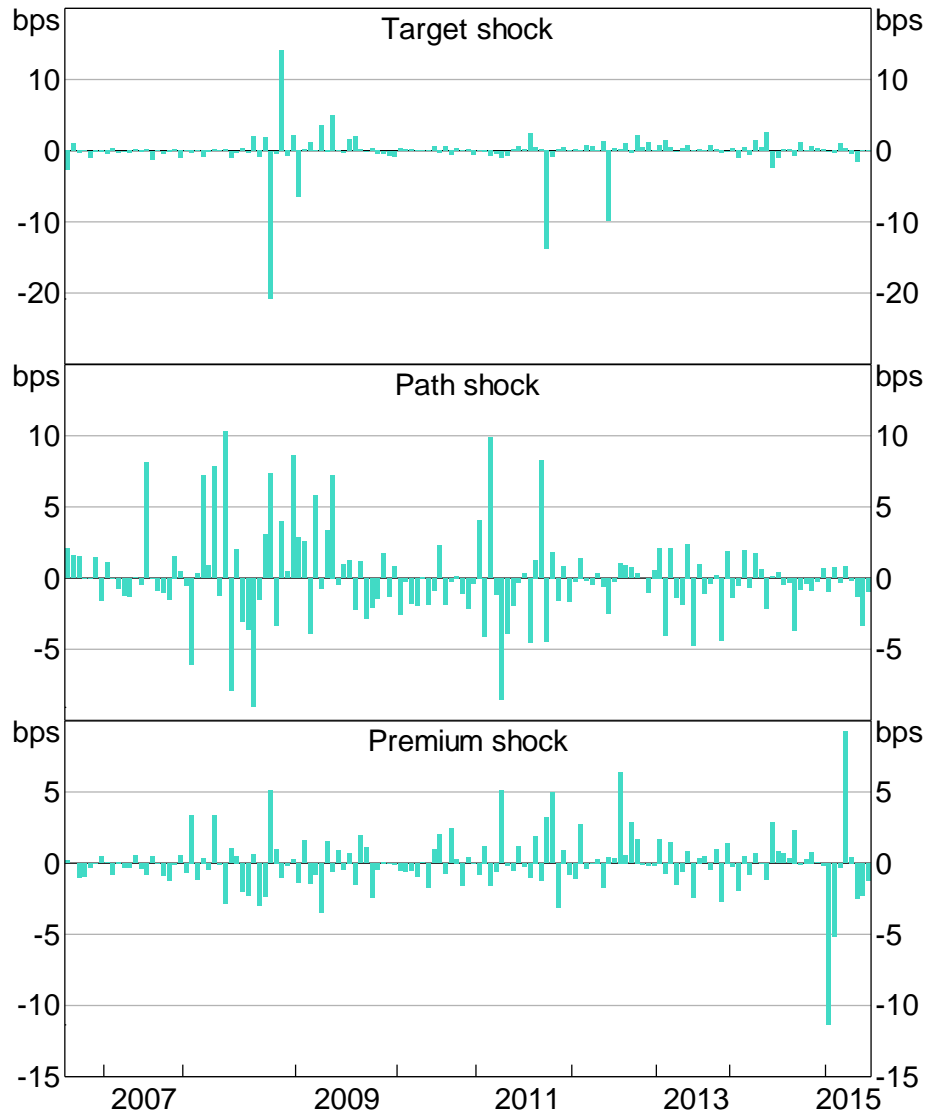
Notes: The figure depicts monetary policy shocks by the European Central Bank, computed based on the repricing of various interest rates on the release of monetary policy news; the top panel shows target shocks as estimated via the change in 1-month OIS rates in a (+/−) 20-minute window around ECB monetary policy announcements; the middle panel shows path shocks as the change in 2-year German government yields orthogonalised against the change in 1-month OIS rates; the bottom panel shows premium shocks as the change in 10-year German government bond yields orthogonalised against the change in 2-year bond yields
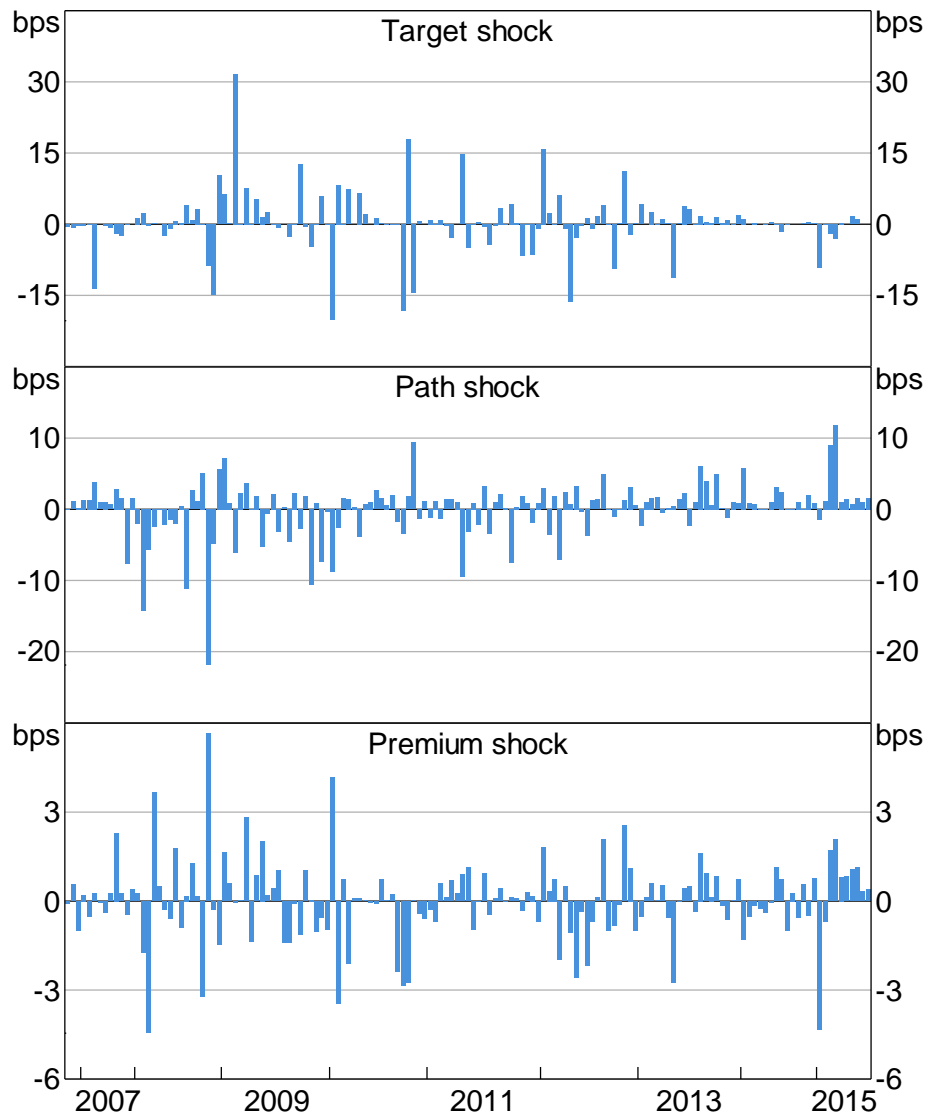
Figure A2: BoJ Monetary Policy Shocks
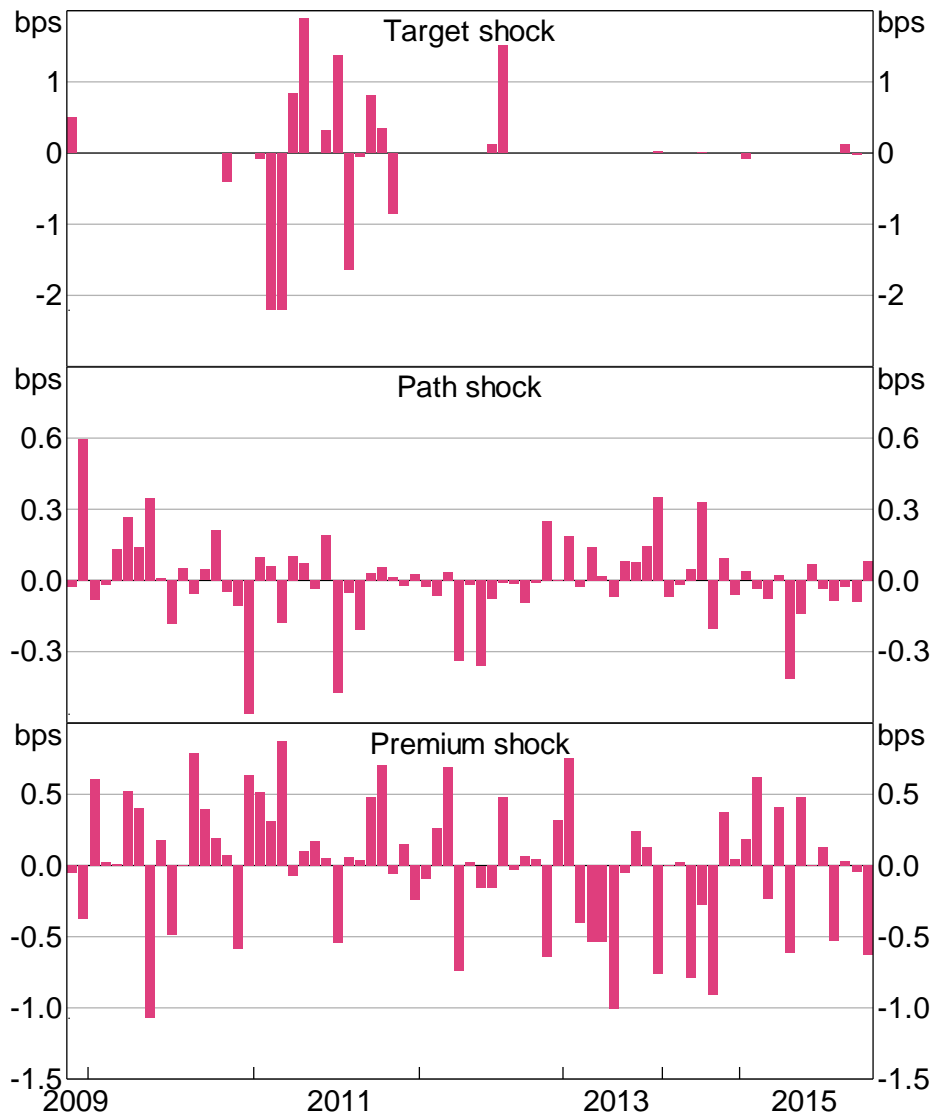
Notes: The figure depicts monetary policy shocks by the Bank of Japan, computed based on the repricing of various interest rates on the release of monetary policy news; the top panel shows target shocks as estimated via the change in 1-month OIS rates in a (+/−) 20-minute window around BoJ monetary policy announcements; the middle panel shows path shocks as the change in 2-year Japanese government yields orthogonalised against the change in 1-month OIS rates; the bottom panel shows premium shocks as the change in 10-year Japanese government bond yields orthogonalised against the change in 2-year bond yields

Figure A3: BoE Monetary Policy Shocks

Notes: The figure depicts monetary policy shocks by the Bank of England, computed based on the repricing of various interest rates on the release of monetary policy news; the top panel shows target shocks as estimated via the change in 1-month OIS rates in a (+/−) 20-minute window around BoE monetary policy announcements; the middle panel shows path shocks as the change in 2-year UK government yields orthogonalised against the change in 1-month OIS rates; the bottom panel shows premium shocks as the change in 10-year UK government bond yields orthogonalised against the change in 2-year bond yields
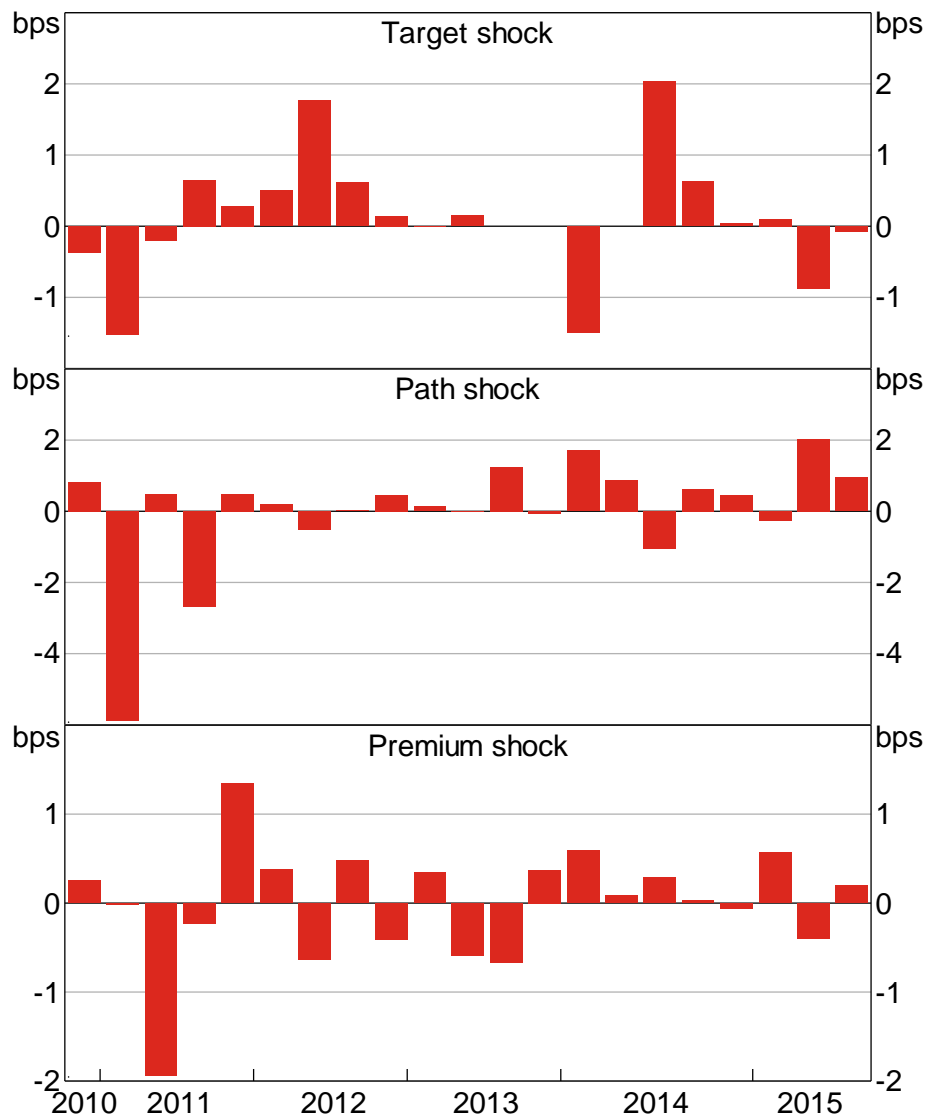
Figure A4: BoC Monetary Policy Shocks

Notes: The figure depicts monetary policy shocks by the Bank of Canada, computed based on the repricing of various interest rates on the release of monetary policy news; the top panel shows target shocks as estimated via the change in 1-month OIS rates in a (+/−) 20-minute window around BoC monetary policy announcements; the middle panel shows path shocks as the change in 2-year Canadian government yields orthogonalised against the change in 1-month OIS rates; the bottom panel shows premium shocks as the change in 10-year Canadian government bond yields orthogonalised against the change in 2-year bond yields

Figure A5: RBA Monetary Policy Shocks

Notes: The figure depicts monetary policy shocks by the Reserve Bank of Australia, computed based on the repricing of various interest rates on the release of monetary policy news; the top panel shows target shocks as estimated via the change in 1-month OIS rates in a (+/−) 20-minute window around RBA monetary policy announcements; the middle panel shows path shocks as the change in 2-year Australian government yields orthogonalised against the change in 1-month OIS rates; the bottom panel shows premium shocks as the change in 10-year Australian government bond yields orthogonalised against the change in 2-year bond yields

Figure A6: SNB Monetary Policy Shocks

Notes: The figure depicts monetary policy shocks by the Swiss National Bank, computed based on the repricing of various interest rates on the release of monetary policy news; the top panel shows target shocks as estimated via the change in 1-month OIS rates in a (+/−) 20-minute window around SNB monetary policy announcements; the middle panel shows path shocks as the change in 2-year Swiss government yields orthogonalised against the change in 1-month OIS rates; the bottom panel shows premium shocks as the change in 10-year Swiss government bond yields orthogonalised against the change in 2-year bond yields

Table A3: Spillovers and Bilateral Financial Openness

		Target	Path	Premia	R^2 (%)
Foreign currency debt	ECB	0.06	0.05	0.13	2.6
		(1.50)	(1.36)	(2.28)	
	ECB (excl EA)	0.00	0.12	0.13	3.6
		(0.04)	(3.57)	(2.39)	
	Fed	0.09	0.05	0.00	5.7
		(2.00)	(1.97)	(0.15)	
Portfolio debt from originator economy	ECB	−0.10	0.09	0.08	2.4
		(−1.50)	(1.81)	(0.98)	
	ECB (excl EA)	0.08	0.13	0.17	3.5
		(1.56)	(3.18)	(3.23)	
	Fed	0.04	0.02	0.10	5.0
		(0.75)	(0.56)	(2.68)	
Portfolio equity from originator economy	ECB	0.00	0.16	0.08	2.4
		(0.06)	(3.77)	(1.86)	
	ECB (excl EA)	0.02	0.06	0.05	3.1
		(0.62)	(2.23)	(1.18)	
	Fed	0.03	0.00	0.12	5.0
		(0.43)	(−0.01)	(2.51)	
Loan from originator economy	ECB	−0.09	0.09	−0.02	2.3
		(−1.94)	(2.34)	(−0.22)	
	ECB (excl EA)	−0.03	0.09	0.10	3.2
		(−0.85)	(2.89)	(1.59)	
	Fed	0.00	−0.02	0.02	4.8
		(0.10)	(−0.77)	(0.67)	
FDI from originator economy	ECB	−0.02	0.06	0.03	3.5
		(−0.61)	(1.95)	(0.63)	
	ECB (excl EA)	−0.08	0.01	−0.05	9.3
		(−2.51)	(0.44)	(−1.05)	
	Fed	0.02	0.00	0.02	9.1
		(0.47)	(0.07)	(0.89)	

Table A3: Spillovers and Bilateral Financial Openness
(*continued*)

		Target	Path	Premia	R^2 (%)
Portfolio debt to originator economy	ECB	0.07	0.14	0.16	2.7
		(1.28)	(3.40)	(2.35)	
	ECB (excl EA)	0.11	0.08	0.15	3.9
		(2.30)	(1.98)	(2.33)	
	Fed	0.02	−0.04	0.01	5.1
		(0.41)	(−1.18)	(0.21)	
Portfolio equity to originator economy	ECB	0.09	0.14	0.15	3.5
		(1.90)	(3.43)	(2.61)	
	ECB (excl EA)	0.08	0.09	0.12	6.8
		(2.24)	(2.62)	(2.04)	
	Fed	0.01	−0.02	0.10	4.9
		(0.09)	(−0.65)	(2.19)	
Loan to originator economy	ECB	0.02	0.09	0.16	3.7
		(0.33)	(2.50)	(2.05)	
	ECB (excl EA)	−0.03	0.08	0.14	3.3
		(−0.93)	(2.51)	(3.03)	
	Fed	−0.01	−0.03	−0.01	8.1
		(−0.36)	(−1.21)	(−0.21)	
FDI to originator economy	ECB	0.04	0.11	0.08	2.5
		(1.20)	(3.74)	(1.73)	
	ECB (excl EA)	0.07	0.06	0.05	3.2
		(2.51)	(2.26)	(1.25)	
	Fed	−0.04	−0.04	0.01	5.5
		(−1.12)	(−2.06)	(0.53)	

Notes: The table reports the results of panel regressions as given by Equation (2) with various recipient-specific conditional variable $X_{i,t-1}$ measuring bilateral financial openness; the dependent variable is the daily change in 10-year bond yields in our set of 47 recipient economies; as regressors, besides the monetary shocks for the ECB and the Fed, specifications also include the daily change in the US Treasury yield and the VIX as global controls; the reported coefficients correspond to $\hat{\gamma}_j$ in Equation (2); *t*-stat from panel-corrected standard errors (PCSE) are given in parentheses; cells coloured red (blue) indicate statistically significant positive (negative) coefficients at a 10 per cent confidence level; financial flows (per cent of GDP) are measured in standard deviations from the mean

Table A4: Spillovers and Financial Openness

		Target	Path	Premium	R^2 (%)
Chinn-Ito index	ECB	−0.09	0.10	0.08	2.7
		(−2.01)	(2.64)	(1.25)	
	Fed	−0.04	−0.04	0.07	5.7
		(−0.54)	(−1.09)	(1.55)	
Debt assets	ECB	−0.02	0.08	0.14	2.5
		(−0.47)	(2.67)	(2.77)	
	Fed	0.02	−0.02	0.02	5.5
		(0.34)	(−0.80)	(0.72)	
Portfolio assets	ECB	0.02	0.09	0.18	2.6
		(0.44)	(2.28)	(3.42)	
	Fed	0.04	0.00	0.10	5.6
		(0.71)	(−0.14)	(2.52)	
FDI assets	ECB	0.00	0.10	0.14	2.6
		(−0.10)	(3.10)	(3.07)	
	Fed	0.03	0.01	0.06	5.5
		(0.55)	(0.26)	(1.94)	
Financial derivatives	ECB	0.00	0.10	0.17	2.6
		(−0.02)	(2.84)	(3.47)	
	Fed	0.00	0.05	0.01	5.5
		(−0.06)	(1.09)	(0.38)	
Debt liabilities	ECB	−0.06	0.10	0.14	2.6
		(−1.33)	(2.64)	(2.08)	
	Fed	0.01	−0.02	0.03	5.5
		(0.18)	(−0.64)	(1.04)	
Portfolio liabilities	ECB	0.00	0.07	0.10	2.5
		(−0.06)	(1.86)	(2.31)	
	Fed	0.04	−0.02	0.06	5.5
		(0.62)	(−0.72)	(1.75)	
FDI liabilities	ECB	−0.01	0.08	0.13	2.5
		(−0.17)	(2.62)	(3.06)	
	Fed	0.03	0.02	0.05	5.5
		(0.77)	(0.64)	(2.06)	
Financial derivative liabilities	ECB	0.00	0.10	0.16	2.6
		(−0.11)	(2.96)	(3.42)	
	Fed	−0.01	0.05	0.01	5.5
		(−0.10)	(1.10)	(0.31)	

Notes: The table reports the results of panel regressions as given by Equation (2) with various recipient-specific conditional variable $X_{i,t-1}$ measuring bilateral financial openness; the dependent variable is the daily change in 10-year bond yields in our set of 47 recipient economies; as regressors, besides the monetary shocks for the ECB and the Fed, specifications also include the daily change in the US Treasury yield and the VIX as global controls; the reported coefficients correspond to $\hat{\gamma}_j$ in Equation (2); t-stat from PCSE are given in parentheses; cells coloured red (blue) indicate statistically significant positive (negative) coefficients at a 10 per cent confidence level; financial stocks (per cent of GDP) are measured in standard deviations from the mean