US sneezing and Australian colds: economic spillovers in both conventional and unconventional monetary policy times

Supplementary Appendix

This appendix presents additional robustness results, demonstrating that our choice of a 100-day rolling window for the main DY estimations is robust across different rolling window sizes. We also present results from applying the TVP-VAR approach of Antonakakis et al. (2020), which eliminates the need for a rolling window.

A1. Choice of different rolling windows for DY

The choice of rolling-window length may govern a bias–variance trade-off; hence, we re-estimate the time-varying connectedness measures of DY using 60-, 150-, and 200-day windows in addition to the baseline 100-day window.

To quantify comparability across window choices, we compute the pairwise correlations of the Total Spillover Index (TSI) series. As shown in Table A1, the TSI series are highly correlated across all window lengths (e.g., $\rho(\text{TSI}_{100}, \text{TSI}_{150}) = 0.928$ and $\rho(\text{TSI}_{150}, \text{TSI}_{200}) = 0.954$), indicating that our central inferences are not driven by the baseline 100-day choice. Shorter windows (60 days) preserve more high-frequency variation but exhibit greater short-run volatility, while longer windows (150–200 days) smooth the series; importantly, the timing and relative magnitude of major connectedness episodes remain stable.

Table A1: Pairwise correlations of the Total Spillover Index (TSI) across rolling-window lengths

	TSI_{60}	TSI_{100}	TSI_{150}	TSI_{200}
TSI_{60}	1.000			
TSI_{100}	0.885	1.000		
TSI_{150}	0.811	0.928	1.000	
TSI_{200}	0.765	0.877	0.954	1.000

A2. Robustness: Time-varying parameter VAR (TVP-VAR analysis)

As robustness checks, we present the results for the TVP-VAR analysis. As indicated earlier, the TVP-VAR approach of Antonakakis et al. (2020) combines the TVP-VAR model introduced by Koop and Korobilis (2014) and the dynamic connectedness approach of (Diebold and Yilmaz, 2012; Diebold and Yılmaz, 2014). Unlike the approach of (Diebold and Yilmaz, 2012; Diebold and Yılmaz, 2014) that requires setting a rolling window size, the TVP-VAR approach is an improvement of (Diebold and Yilmaz, 2012; Diebold and Yılmaz, 2014) as it does not require setting an arbitrary rolling window size, hence preventing the loss of data and avoiding erratic or flattened parameters, making this approach insensitive to outliers. Here, through Kalman filter estimation, which relies on decay factors, the variances are allowed to vary over time. Based on the Bayesian information criterion (BIC), a TVP-VAR(1) model is selected.

In Table A2, the average dynamic total spillovers are presented. The results are generally qualitatively similar to those of the DY(12,14) results. From Table A2, the total spillover index among the variables is 60.90%, slightly lower than the 64.72% from the DY(12,14) analysis. This shows high spillovers among the US monetary policy, Australia's domestic monetary policy, and financial markets. Again, we still see the US as the dominant net transmitter of monetary policy spillovers compared to Australia's own monetary policy. Overall, US monetary policy is a net contributor to spillovers of about 11.58%, while Australia's monetary policy is a net recipient of spillovers of about 11%. Consistent with earlier results, the main transmission channel is the interest rate channel, followed by the asset price and foreign exchange channels. Similar to the earlier results, U.S. transmits net monetary policy spillover of about 6% to Australia's monetary policy (i.e. 17.18%-10.71%). The net transmission of US monetary policy to the sectoral equities is 4.18%, with the consumer discretionary sector as the dominant net receiver of US monetary policy spillovers, at about 0.93% (i.e., 2.1%-1.17%). The exchange rate is a net receiver of 1.16% (i.e. 2.14%-0.98%) spillovers from US monetary policy. The results further show that the industrial sector is the dominant transmitter of spillovers among the sectors, followed by the materials and financial sectors. These

results are consistent with the DY(12,14) approach.

Again, looking at the dynamic spillover plots, Figure A1 shows heterogeneous total spillovers over the sample period, with the highest spillover observed during the COVID-19 pandemic, followed by the ESDC and the GFC, respectively. From Figure A2, we also observe that over the sample period, US monetary policy is generally a net contributor of spillovers to the Australian economy, while Australia's monetary policy is generally a net receiver of spillovers. In particular, we observe that, throughout the GFC, US monetary policy was a net transmitter of spillovers to Australia's market, whereas Australia's monetary policy was a net receiver of spillovers during the entire crisis period. The monetary policies of both countries were generally net receivers of spillovers during the COVID-19 pandemic. We again find that FX is a net receiver of spillovers in almost the entire period, while US stock market is a dominant net transmitter of spillovers to Australia's economy in the entire period, except at the onset of the COVID-19 pandemic, where it received spillovers briefly. Regarding the sectors, we see from Figure A3 that the industrial sector is the dominant contributor of net spillovers in most periods, followed by the materials and financial sectors. The consumer discretionary sector is generally a net transmitter of spillovers. The IT, communication services, health, and utilities sectors are generally net recipients of spillovers. These results are generally consistent with the DY(12,14) results.

Table A2: Average dynamic spillovers: TVP-VAR

Variable	US_SSR	US_MSCI	FX	Australia_SSR	ENERGY	MATERIALS	INDUS	CONSDESC	CONSSTAPLES	HEALTH	FINEXAREIT	REIT	IT	COMMSVS	UTILITIES	REALESTATE	METALS	Spillovers FROM Others
US_SSR	**66.44**	8.24	0.98	10.71	1.34	1.53	0.95	1.17	0.65	0.71	1.42	0.85	1.16	0.85	0.63	0.89	1.48	33.56
US_MSCI	8.01	**63.43**	1.35	3.24	2.18	2.36	2.28	2.53	1.33	1.34	2.7	1.3	1.74	1.38	1.17	1.41	2.26	36.57
FX	2.14	6.18	**59.2**	3.94	3.59	4.33	2.33	2.15	1.58	1.19	2.39	1.59	1.1	1.02	1	1.72	4.55	40.8
Australia_SSR	17.18	5.71	3.15	**59.91**	1.3	1.49	1.08	1.29	0.81	0.73	1.32	1.04	0.83	0.7	0.99	0.96	1.5	40.09
ENERGY	1.78	5.61	2	1.07	**33.31**	9.83	5.87	4.54	4.16	3.01	5.8	2.64	2.63	1.92	3.44	3.26	9.12	66.69
MATERIALS	1.6	7.22	2.11	0.98	8.18	**25.36**	5.23	4.18	3.35	1.99	4.89	1.75	2.55	1.72	2.15	2.02	24.72	74.64
INDUS	1.39	6.16	1.15	0.81	4.84	5.1	**26**	7.81	6.3	5.44	7.8	4.89	4.69	3.03	4.77	5.67	4.14	74
CONSDESC	2.1	9.98	1.04	1	4.02	4.38	8.22	**27.56**	6.03	5.05	6.95	3.81	4.83	3.26	3.8	4.38	3.59	72.44
CONSSTAPLES	0.92	3.88	0.95	0.6	4.31	4.15	7.85	7.28	**31.51**	5.78	8.05	4.1	4.22	3.71	4.73	4.63	3.34	68.49
HEALTH	1.26	5.1	0.82	0.63	3.57	2.83	7.42	6.83	6.64	**36.48**	5.84	3.63	5.09	3.17	4.3	4.21	2.16	63.52
FINEXAREIT	1.71	5.82	1.14	0.89	5.04	5.03	8.21	7.02	6.88	4.34	**27.07**	5.36	3.92	3.2	4.1	6.23	4.03	72.93
REIT	0.86	3.2	0.85	0.89	2.69	2.1	5.72	4.38	3.93	3.03	5.98	**29.22**	2	2.46	4.04	26.98	1.67	70.78
IT	1.77	7	0.81	0.88	3.38	3.82	6.97	6.58	5.12	5.19	5.45	2.58	**37.79**	3.13	3.29	3.1	3.14	62.21
COMMSVS	0.98	3.67	0.68	0.68	2.6	2.74	5.04	4.96	5.07	3.62	5.08	3.3	3.63	**48.42**	3.43	3.75	2.36	51.58
UTILITIES	0.95	3.43	0.62	0.93	4.43	3.15	7.16	5.44	5.7	4.44	5.97	5.2	3.26	2.92	**38.1**	5.7	2.61	61.9
REALESTATE	0.91	3.44	0.87	0.78	2.99	2.31	6.26	4.77	4.16	3.31	6.55	25.35	2.31	2.61	4.19	**27.36**	1.82	72.64
METALS	1.58	6.83	2.34	1	8.23	26.78	4.56	3.65	2.87	1.6	4.22	1.47	2.21	1.56	1.9	1.68	**27.51**	72.49
Spillovers TO Others	45.15	91.47	20.86	29.03	62.67	81.95	85.16	74.59	64.58	50.76	80.41	68.87	46.18	36.66	47.93	76.59	72.48	
Net Spillover/Spillback	***11.58***	***54.90***	***-19.94***	***-11.06***	***-4.02***	***7.31***	***11.16***	***2.14***	***-3.90***	***-12.76***	***7.48***	***-1.92***	***-16.03***	***-14.92***	***-13.97***	***3.95***	***-0.01***	TSI = 60.90%
Sectoral equity analysis																		
Spillovers to Sectoral Indices	*17.81*	*71.34*	*15.38*	*11.14*	*54.28*	*72.22*	*78.51*	*67.44*	*60.21*	*46.80*	*72.58*	*64.08*	*41.34*	*32.69*	*44.14*	*71.61*	*62.70*	
Spillovers From Sectoral Indices	13.63	23.98	28.54	14.04	56.22	62.73	64.48	58.32	62.15	55.69	63.36	64.98	51.75	45.58	55.98	66.63	60.73	
Net Spillovers/Spillback to Sectoral Indices	***4.18***	***47.36***	***-13.16***	***-2.90***	***-1.94***	***9.49***	***14.03***	***9.12***	***-1.94***	***-8.89***	***9.22***	***-0.90***	***-10.41***	***-12.89***	***-11.84***	***4.98***	***1.97***	

Note: All Variables are as defined in the main text.

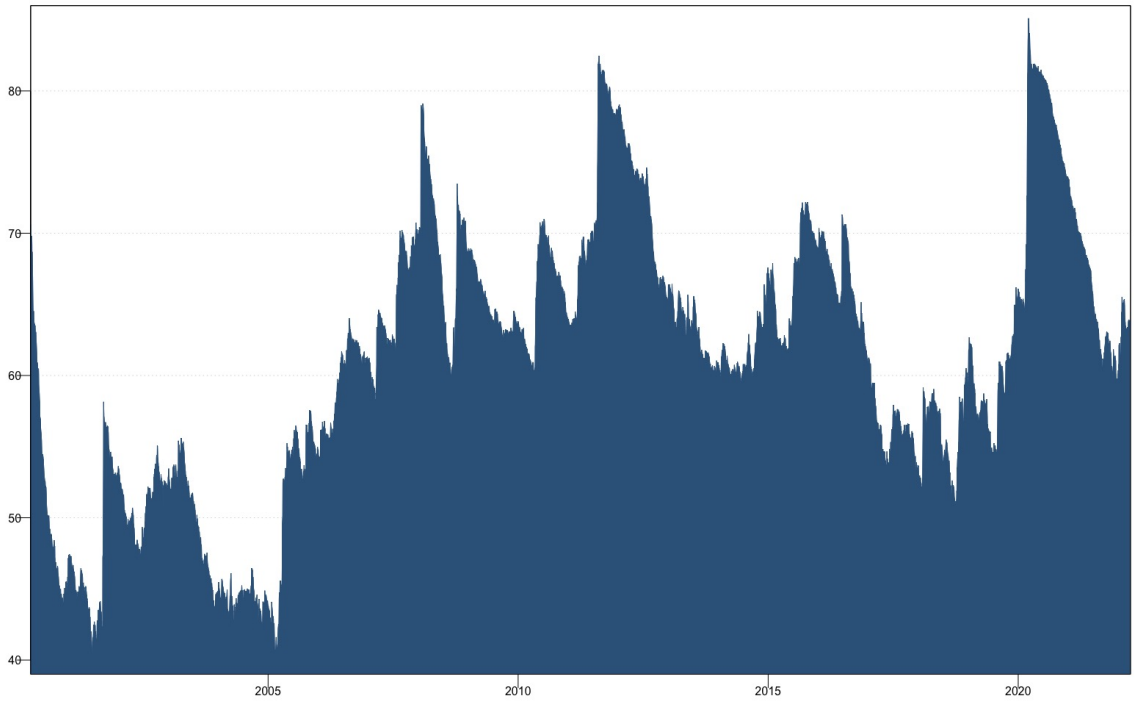

Figure A1: Dynamic total spillovers (TSI)

Note: Results are based on TVP-VAR technique with lag length of order one (Bayesian information criterion, BIC) and a 10-step-ahead generalised forecast error variance decomposition.

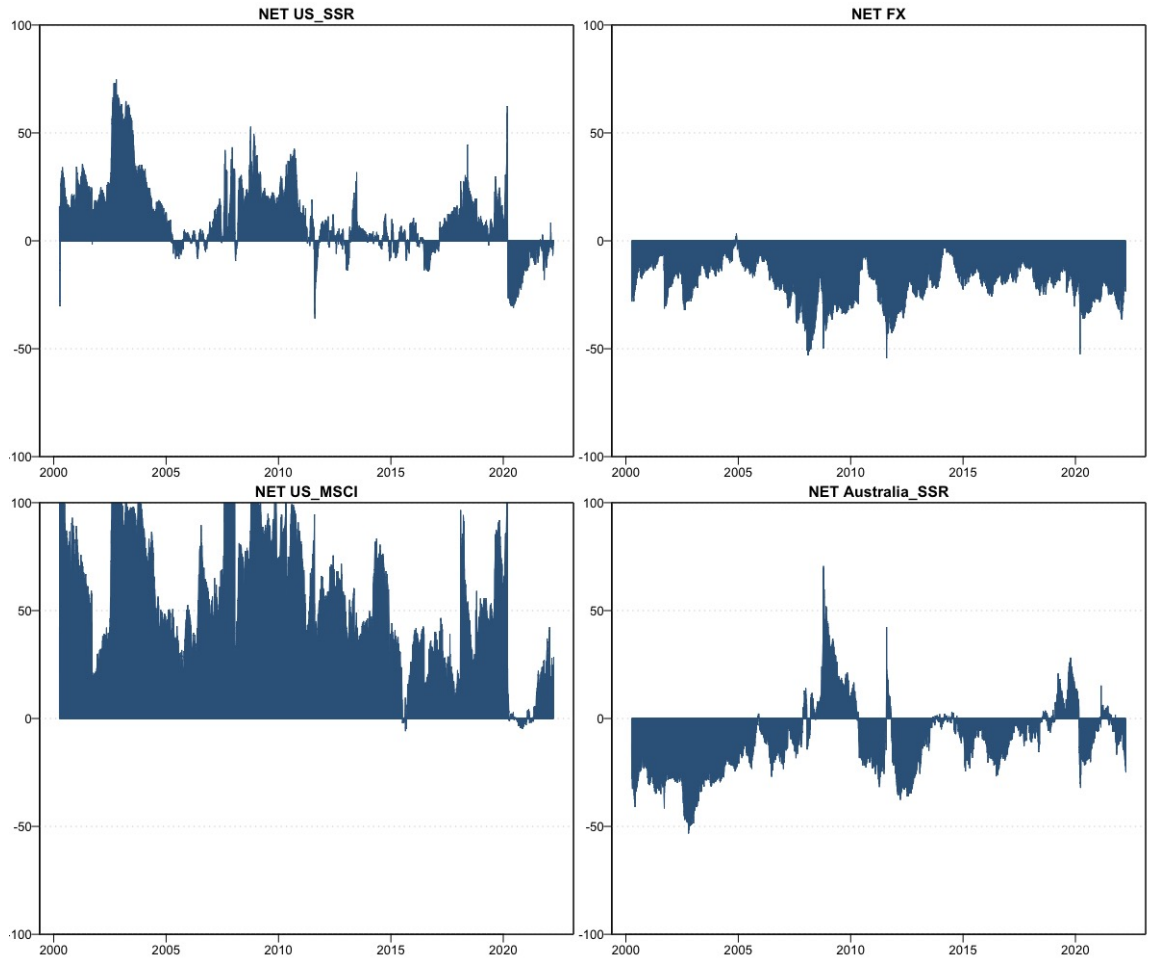

Figure A2: Dynamic net spillovers/spillbacks (NSI) – interest rate, FX and MSCI-US

Note: Results are based on TVP-VAR technique with lag length of order one (Bayesian information criterion, BIC) and a 10-step-ahead generalised forecast error variance decomposition.

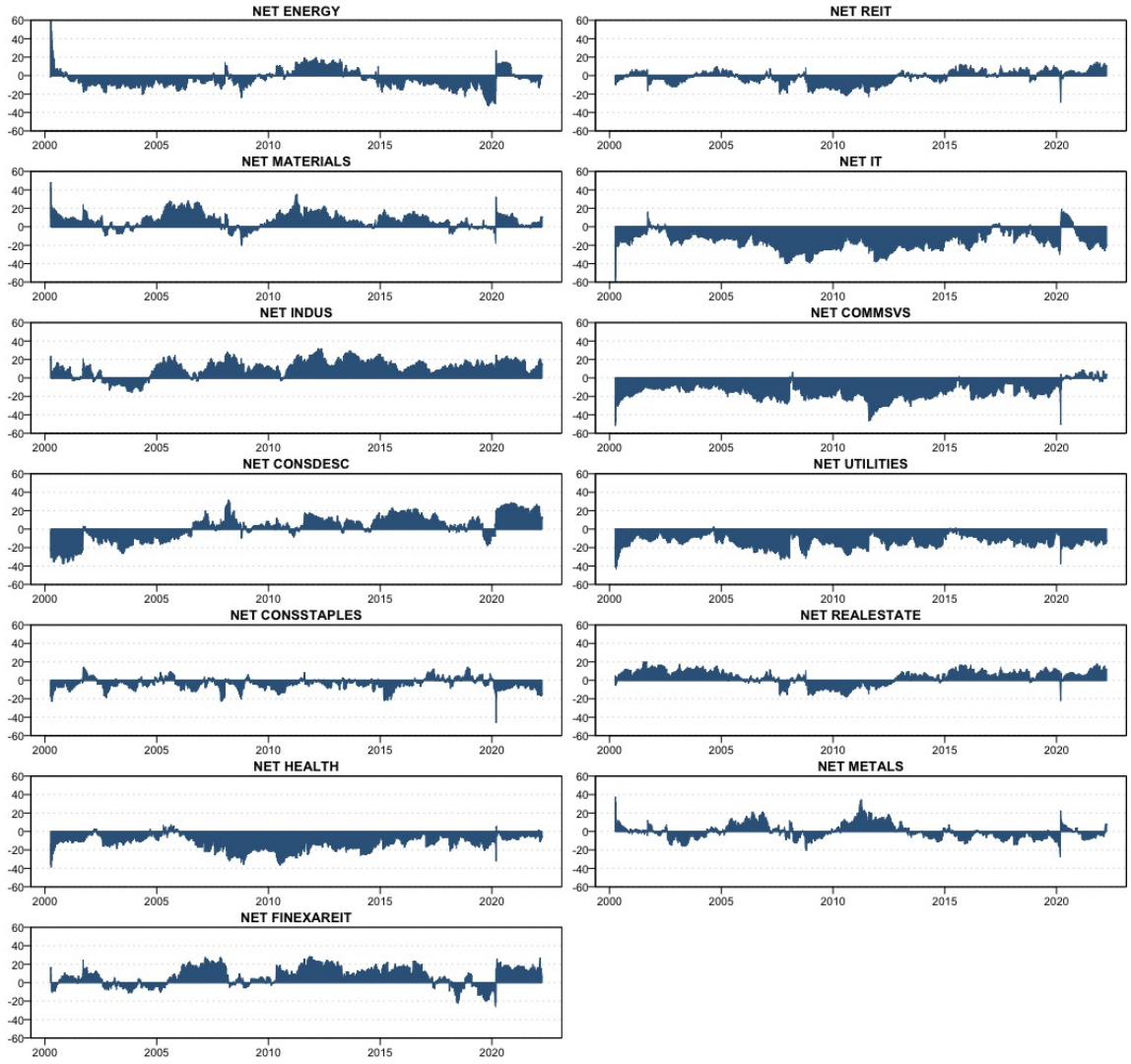

Figure A3: Dynamic net spillovers/spillbacks (NSI) – Australia's sectoral indices

Note: Results are based on TVP-VAR technique with lag length of order one (Bayesian information criterion, BIC) and a 10-step-ahead generalised forecast error variance decomposition.

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