Online Appendix B

Table B1: Bilateral International Knowledge Spillovers from Individual G7 Countries to Emerging Countries in the Panel (Domestically Filed Patents)

$$\ln \dot{A}_{d,i,t} = \alpha_i + \varphi_t + \lambda \ln L_{A,i,t} + \phi \ln A_{d,i,t} + \beta \ln A_{i,t-1}^{f,\omega_1} + e_{i,t}$$

Between-dimension (Group) FMOLS estimates

	$L_{A,i,t}$	$A_{d,i,t}$	$A_{i,t}^{f,tm}$	$A_{i,t}^{f,mm}$	$A_{i,t}^{f,FDI}$	$A_{i,t}^{G-prox}$	$A_{i,t}^{f,\text{sci}}$	$A_{i,t}^{f,\text{uw}}$	OBS
Canada	0.327 (0.000) [a]	1.873 (0.000) [a]	0.066 (0.122)						561
	0.015 (0.851)	1.712 (0.000) [a]		-0.007 (0.735)					561
	0.236 (0.003) [a]	1.456 (0.000) [a]			0.616 (0.020) [b]				423
	0.031 (0.659)	1.879 (0.000) [a]				0.365 (0.121)			561
	0.395 (0.000) [a]	1.883 (0.000) [a]					0.055 (0.023) [b]		322
	-0.024 (0.771)	1.827 (0.000) [a]						0.399 (0.078) [c]	586
Germany	0.339 (0.000) [a]	1.967 (0.000) [a]	-0.054 (0.351)						561
	0.248 (0.000) [a]	1.810 (0.000) [a]		-0.005 (0.913)					561
	0.286 (0.001) [a]	1.725 (0.000) [a]			0.481 (0.008) [a]				463
	0.097 (0.213)	2.186 (0.000) [a]				0.495 (0.002) [a]			561
	0.421 (0.000) [a]	1.728 (0.000) [a]					-0.067 (0.003) [a]		338
	0.009 (0.909)	2.092 (0.000) [a]						0.566 (0.000) [a]	586
France	0.035 (0.613)	2.063 (0.000) [a]	-0.079 (0.053) [b]						586
	0.048 (0.465)	1.800 (0.000) [a]		0.003 (0.915)					561
	0.256 (0.002) [a]	1.544 (0.000) [a]			0.473 (0.166)				463
	0.086 (0.260)	1.938 (0.000) [a]				0.557 (0.066) [c]			561
	1.981 (0.000) [a]	1.712 (0.000) [a]					0.052 (0.081) [c]		306
	0.022 (0.770)	1.717 (0.000) [a]						0.681 (0.012) [a]	583
Italy	0.203 (0.006) [a]	1.919 (0.000) [a]	-0.201 (0.000) [a]						586
	0.204 (0.008) [a]	2.042 (0.000) [a]		-0.119 (0.001) [a]					586
	0.214 (0.007) [a]	2.004 (0.000) [a]			0.902 (0.002) [a]				438
	0.103 (0.179)	2.100 (0.000) [a]				0.683 (0.007) [a]			561
	n.a.	n.a.					n. a.		n. a.
	-0.005 (0.947)	2.015 (0.000) [a]						-0.156 (0.489)	561
Japan	0.206 (0.010) [a]	1.833 (0.000) [a]	-0.026 (0.499)						561
	0.174 (0.012) [a]	2.120 (0.000) [a]		-0.037 (0.163)					530
	0.339 (0.000) [a]	1.985 (0.000) [a]			0.865 (0.116)				423
	0.244 (0.001) [a]	2.240 (0.000) [a]				1.315 (0.005) [a]			530
	0.363 (0.000) [a]	1.730 (0.000) [a]					0.048 (0.177)		306
	0.030 (0.708)	2.075 (0.000) [a]						1.529 (0.000) [a]	586
UK	0.160 (0.035) [b]	1.938 (0.000) [a]	-0.021 (0.635)						561
	0.316 (0.000) [a]	2.123 (0.000) [a]		0.078 (0.043) [b]					561
	0.371 (0.000) [a]	1.590 (0.000) [a]			0.514 (0.089) [c]				463
	0.243 (0.002) [a]	1.993 (0.000) [a]				0.765 (0.004) [a]			561
	0.581 (0.000) [a]	1.621 (0.000) [a]					0.130 (0.000) [a]		338
	0.089 (0.298)	1.905 (0.000) [a]						0.705 (0.008) [a]	586
US	0.341 (0.000) [a]	2.172 (0.000) [a]	-0.226 (0.000) [a]						561
	0.244 (0.001) [a]	2.135 (0.000) [a]		-0.008 (0.871)					561
	0.368 (0.000) [a]	1.488 (0.000) [a]			0.785 (0.046) [b]				463
	0.226 (0.002) [a]	1.678 (0.000) [a]				1.160 (0.004) [a]			561
	0.208 (0.033) [b]	1.652 (0.000) [a]					0.065 (0.069) [c]		338
	0.093 (0.246)	1.509 (0.000) [a]						0.733 (0.103) [c]	586

Each of our 31 sample countries is paired with each industrialized trading partner country listed in the first column. Hence, all spillover pools are the relevant bilateral measures for each sample country. For example, $A_{i,t}^{f,tm}$, in the row Canada, is the total import ratio weighted knowledge spillover pool relevant for each of our sample countries, originating in Canada. Since each sample country trades differently, the relevant spillover pool differs across countries. Estimates are bilateral spillover parameters from each of these industrialized countries. Six spillover pools pertain to the six conduits discussed in the paper. OBS = total observations in each estimation. All models show very high $\bar{R}^2$ ranging from 0.950 to 0.980. All other variables' definitions are given in Table 2 of the main text. (.) denotes P-values. Superscripts 'a', 'b' and 'c' respectively denote significance at 1%, 5% and 10%. Also refer to footnote 17 in the paper regarding these $\bar{R}^2$ statistics.

Table B2: Bilateral Knowledge Spillovers from Individual G7 Countries to Emerging Countries in the Panel (Patents Filed at the USPTO)

$$\ln \dot{A}_{d,i,t} = \alpha_i + \varphi_t + \lambda \ln L_{A,i,t} + \phi \ln A_{d,i,t} + \beta \ln A_{i,t-1}^{f,\omega_1} + e_{i,t}$$

Between-dimension (Group) FMOLS estimates

	$L_{A,i,t}$	$A_{d,i,t}$	$A_{i,t}^{f,tm}$	$A_{i,t}^{f,mm}$	$A_{i,t}^{f,FDI}$	$A_{i,t}^{G-prox}$	$A_{i,t}^{f,\text{sci}}$	$A_{i,t}^{f,\text{uw}}$	OBS
Canada	0.764 (0.000) [a]	1.864 (0.000) [a]	-0.123 (0.009) [a]						665
	0.573 (0.000) [a]	1.784 (0.000) [a]		-0.015 (0.598)					665
	0.443 (0.002) [a]	1.628 (0.000) [a]			1.778 (0.005) [a]				516
	0.545 (0.000) [a]	1.719 (0.000) [a]				2.348 (0.000) [a]			665
	0.941 (0.000) [a]	1.720 (0.000) [a]					-0.226 (0.000) [a]		361
	0.618 (0.000) [a]	1.721 (0.000) [a]						2.022 (0.000) [a]	688
Germany	0.669 (0.000) [a]	1.861 (0.000) [a]	-0.019 (0.825)						665
	0.643 (0.000) [a]	1.858 (0.000) [a]		0.055 (0.393)					665
	0.759 (0.000) [a]	1.645 (0.000) [a]			0.123 (0.690)				563
	0.743 (0.000) [a]	1.666 (0.000) [a]				0.820 (0.010) [a]			665
	0.504 (0.001) [a]	1.781 (0.000) [a]					-0.152 (0.000) [a]		380
	0.840 (0.000) [a]	1.746 (0.000) [a]						0.508 (0.065) [c]	688
France	0.293 (0.011) [a]	1.933 (0.000) [a]	0.210 (0.001) [a]						665
	0.559 (0.000) [a]	1.810 (0.000) [a]		0.150 (0.000) [a]					665
	0.648 (0.000) [a]	1.819 (0.000) [a]			0.010 (0.977)				563
	0.807 (0.000) [a]	1.905 (0.000) [a]				0.427 (0.236)			665
	0.529 (0.000) [a]	1.624 (0.000) [a]					-0.101 (0.011) [a]		342
	0.861 (0.000) [a]	1.949 (0.000) [a]						0.286 (0.379)	688
Italy	0.797 (0.000) [a]	1.729 (0.000) [a]	0.086 (0.243)						665
	0.873 (0.000) [a]	1.865 (0.000) [a]		-0.057 (0.257)					665
	0.770 (0.000) [a]	1.959 (0.000) [a]			-0.002 (0.996)				535
	0.933 (0.000) [a]	1.968 (0.000) [a]				0.252 (0.566)			665
	n.a.	n.a.					n.a.		n.a.
	0.964 (0.000) [a]	2.016 (0.000) [a]						0.122 (0.746)	688
Japan	0.593 (0.000) [a]	1.774 (0.000) [a]	-0.014 (0.778)						665
	0.747 (0.000) [a]	1.924 (0.000) [a]		0.042 (0.317)					665
	0.468 (0.001) [a]	1.622 (0.000) [a]			0.267 (0.639)				543
	0.543 (0.000) [a]	1.707 (0.000) [a]				0.688 (0.235)			665
	0.201 (0.231)	1.622 (0.000) [a]					0.096 (0.068) [c]		342
	0.604 (0.000) [a]	1.690 (0.000) [a]						0.530 (0.331)	668
UK	0.513 (0.000) [a]	1.770 (0.000) [a]	0.322 (0.000) [a]						665
	0.731 (0.000) [a]	1.956 (0.000) [a]		0.151 (0.003) [a]					665
	0.594 (0.000) [a]	1.669 (0.000) [a]			0.294 (0.338)				563
	0.656 (0.000) [a]	1.712 (0.000) [a]				1.089 (0.001) [a]			665
	0.477 (0.001) [a]	1.704 (0.000) [a]					-0.043 (0.258)		380
	0.744 (0.000) [a]	1.759 (0.000) [a]						0.680 (0.016) [b]	688
US	0.893 (0.000) [a]	1.863 (0.000) [a]	-0.163 (0.009) [a]						665
	0.542 (0.000) [a]	1.782 (0.000) [a]		-0.055 (0.274)					665
	0.570 (0.000) [a]	1.780 (0.000) [a]			1.631 (0.000) [a]				563
	0.637 (0.000) [a]	1.852 (0.000) [a]				1.893 (0.000) [a]			665
	0.609 (0.000) [a]	1.611 (0.000) [a]					0.004 (0.950)		380
	0.714 (0.000) [a]	1.876 (0.000) [a]						1.747 (0.000) [a]	688

Please refer to the notes to Table B1 for variable definitions and other details. All models show very high $\bar{R}^2$ ranging from 0.960 to 0.980.

Table B3: Bilateral Knowledge Spillovers from Individual E7 Countries to Emerging Countries in the Panel (Domestically Filed Patents)

$$\ln \dot{A}_{d,i,t} = \alpha_i + \varphi_t + \lambda \ln L_{A,i,t} + \phi \ln A_{d,i,t} + \theta \ln A_{i,t-1}^{f,\omega_2} + e_{i,t}$$

Between-dimension (Group) FMOLS estimates

	$L_{A,i,t}$	$A_{d,i,t}$	$A_{i,t}^{f,tm}$	$A_{i,t}^{f,mm}$	$A_{i,t}^{G-prox}$	$A_{i,t}^{f,uw}$	OBS
China	-0.044 (0.666)	2.033 (0.000) [a]	0.009 (0.775)				555
	0.027 (0.751)	2.071 (0.000) [a]		0.061 (0.004) [a]			561
	-0.094 (0.219)	2.673 (0.000) [a]			-0.097 (0.044) [b]		563
	-0.052(0.454)	2.575(0.000) [a]				-0.092(0.467)	539
India	0.116 (0.163)	2.090 (0.000) [a]	0.011 (0.709)				561
	0.142 (0.085) [c]	2.204 (0.000) [a]		0.066 (0.003) [a]			561
	-0.007 (0.934)	2.120 (0.000) [a]			-0.303 (0.019) [b]		561
	0.153 (0.032) [b]	2.153 (0.000) [a]				-0.524 (0.000) [a]	536
Malaysia	-0.131 (0.113)	1.854 (0.000) [a]	0.107 (0.000) [a]				568
	0.018 (0.823)	2.263 (0.000) [a]		-0.007 (0.671)			568
	0.030 (0.723)	1.704 (0.000) [a]			-0.110 (0.248)		568
	0.077(0.340)	1.962(0.000) [a]				-0.127 (0.183)	544
Mexico	0.253 (0.002) [a]	1.851 (0.000) [a]	-0.028 (0.100) [c]				561
	0.139 (0.110)	1.599 (0.000) [a]		0.021 (0.267)			539
	0.013 (0.872)	2.486 (0.000) [a]			-0.278 (0.043) [b]		561
	0.129(0.067) [c]	2.430(0.000) [a]				-0.390(0.004) [a]	536
Russian Federation	0.142 (0.077) [c]	1.825 (0.000) [a]	-0.058 (0.212)				510
	0.092 (0.230)	1.870 (0.000) [a]		-0.060 (0.023) [b]			510
	-0.086 (0.213)	2.414 (0.000) [a]			0.315 (0.005) [a]		510
	-0.058 (0.361)	2.400 (0.000) [a]				0.237 (0.034)[b]	489
Thailand	0.050 (0.575)	1.987 (0.000) [a]	-0.007 (0.818)				561
	0.069 (0.374)	2.153 (0.000) [a]		-0.020 (0.363)			561
	-0.120 (0.133)	2.134 (0.000) [a]			0.204 (0.000) [a]		561
	-0.030 (0.707)	2.153 (0.000) [a]				0.151(0.007)[a]	536
Turkey	0.004 (0.964)	2.243 (0.000) [a]	0.008 (0.731)				561
	-0.015 (0.858)	1.983 (0.000) [a]		0.010 (0.534)			561
	-0.077 (0.354)	2.294 (0.000) [a]			-0.052 (0.231)		561
	0.107 (0.136)	2.268 (0.000) [a]				-0.118 (0.004) [a]	536

Each of our 30 sample countries is paired with each of the emerging trading partner countries listed in the first column. Hence, all spillover pools are the relevant bilateral measures for each sample country. For example, $A_{i,t}^{f,tm}$, in the row China, is the total import ratio weighted knowledge spillover pool relevant for each of our sample countries, originating from China. Each model, reported in each row, contains only (at max) 30 of the 31 countries, because the trading partner (listed in the first column) becomes the source of spillover. Since each sample country trades differently, the relevant spillover pool differs across countries. Estimates are the bilateral spillover parameters from each of these selected emerging countries. Four spillover pools pertain to the four conduits discussed in the paper. Please refer to the notes to Table B1 for variable definitions and further details. All models show very high $\bar{R}^2$ ranging from 0.960 to 0.980.

Table B4: Bilateral Spillovers from Individual E7 Countries to Emerging Countries in the Panel (Patents Filed at the USPTO)

$$\ln \dot{A}_{d,i,t} = \alpha_i + \varphi_t + \lambda \ln L_{A,i,t} + \phi \ln A_{d,i,t} + \theta \ln A_{i,t-1}^{f,\omega_2} + e_{i,t}$$

Between-dimension (Group) FMOLS estimates

	$L_{A,i,t}$	$A_{d,i,t}$	$A_{i,t}^{f,tm}$	$A_{i,t}^{f,mm}$	$A_{i,t}^{G-prox}$	$A_{i,t}^{f,uw}$	OBS
China	0.661 (0.000) [a]	1.946 (0.000) [a]	-0.100 (0.000) [a]				633
	0.657 (0.000) [a]	1.913 (0.000) [a]		-0.077 (0.001) [a]			638
	1.017 (0.000) [a]	2.228 (0.000) [a]			-0.215 (0.001) [a]		641
	1.020 (0.000) [a]	2.228 (0.000) [a]				-0.211 (0.000) [a]	640
India	0.521 (0.000) [a]	1.776 (0.000) [a]	-0.048 (0.282)				638
	0.684 (0.000) [a]	1.814 (0.000) [a]		-0.032 (0.253)			637
	0.598 (0.000) [a]	1.669 (0.000) [a]			0.183 (0.009) [a]		638
	0.598 (0.000) [a]	1.672 (0.000) [a]				0.189 (0.007)[a]	637
Malaysia	0.489 (0.000) [a]	1.826 (0.000) [a]	0.112 (0.001) [a]				645
	0.720 (0.000) [a]	2.065 (0.000) [a]		0.109 (0.000) [a]			643
	0.693 (0.000) [a]	1.796 (0.000) [a]			0.369 (0.000) [a]		644
	0.690(0.000) [a]	1.794(0.000) [a]				0.364(0.000) [a]	638
Mexico	0.677 (0.000) [a]	1.777 (0.000) [a]	-0.014 (0.639)				612
	0.740 (0.000) [a]	1.923 (0.000) [a]		-0.118 (0.000) [a]			638
	0.634 (0.000) [a]	1.740 (0.000) [a]			0.869 (0.001) [a]		637
	0.632(0.000) [a]	1.739(0.000) [a]				0.871(0.001) [a]	580
Russian Federation	0.613 (0.000) [a]	1.857 (0.000) [a]	0.069 (0.054) [b]				578
	0.701 (0.000) [a]	1.841 (0.000) [a]		0.069 (0.001) [a]			580
	0.494 (0.000) [a]	1.879 (0.000) [a]			0.704 (0.001) [a]		580
	0.557 (0.000) [a]	1.974 (0.000) [a]				0.553 (0.006) [a]	600
Thailand	0.605 (0.000) [a]	1.774 (0.000) [a]	0.070 (0.014) [a]				638
	1.003 (0.000) [a]	1.974 (0.000) [a]		0.058 (0.002) [a]			633
	0.598 (0.000) [a]	1.935 (0.000) [a]			0.178 (0.008) [a]		638
	0.598 (0.000) [a]	1.937 (0.000) [a]				0.183 (0.007)	637
Turkey	0.669 (0.000) [a]	1.885 (0.000) [a]	-0.053 (0.167)				638
	0.668 (0.000) [a]	1.806 (0.000) [a]		0.121 (0.004) [a]			637
	0.689 (0.000) [a]	1.684 (0.000) [a]			0.218 (0.009) [a]		638
	0.762 (0.000) [a]	1.806 (0.000) [a]				0.096 (0.255)	637

All models show very high $\bar{R}^2$ ranging from 0.960 to 0.970. Please refer to the notes to Table B3.

Table B5: Ideas Production and International Knowledge Spillovers: Excluding China (Domestically Filed Patents)

$$\ln \dot{A}_{d,i,t} = \alpha_i + \varphi_t + \lambda \ln L_{A,i,t} + \phi \ln A_{d,i,t} + \beta \ln A_{oecd,i,t-1}^{f,\omega_1} + \theta \ln A_{eme,i,t-1}^{f,\omega_2} + e_{i,t} \quad (7)$$

Between-dimension (Group) FMOLS estimates

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]
$L_{A,i,t}$	0.266 [a] (0.001)	0.237[a] (0.001)	0.229[a] (0.005)	0.165[b] (0.051)	0.189 [b] (0.033)	0.169[b] (0.025)	0.079 (0.300)	0.149[c] (0.099)	0.173[b] (0.022)	0.045 (0.535)	0.250[a] (0.002)	0.177[b] (0.019)	0.147[b] (0.048)	0.150[b] (0.036)
$A_{d,i,t}$	2.185 [a] (0.000)	2.088 [a] (0.000)	1.893 [a] (0.000)	2.036 [a] (0.000)	2.031 [a] (0.000)	1.682 [a] (0.000)	2.016 [a] (0.000)	1.803[a] (0.000)	1.687 [a] (0.000)	2.065 [a] (0.000)	2.258[a] (0.000)	2.420 [a] (0.000)	2.180 [a] (0.000)	2.280 [a] (0.000)
$A_{oecd,i,t}^{f,tm}$	-0.097[c] (0.090)										-0.017 (0.772)			
$A_{oecd,i,t}^{f,mm}$		-0.022 (0.585)										0.058 (0.208)		
$A_{eme,i,t}^{f,tm}$			0.004 (0.945)								0.056 (0.340)			
$A_{eme,i,t}^{f,mm}$				0.035 (0.137)								0.008 (0.746)		
$A_{oecd,i,t}^{f,FDI}$					0.221 (0.534)									
$A_{oecd,i,t}^{G-prox}$						0.059 (0.141)							2.510[a] (0.000)	
$A_{eme,i,t}^{G-prox}$							0.045 (0.160)						0.066[c] (0.104)	
$A_{oecd,i,t}^{f,sci}$								1.488[a] (0.000)						
$A_{oecd,i,t}^{f,uw}$									0.066 (0.134)					2.696[a] (0.000)
$A_{eme,i,t}^{f,uw}$										0.059 [b] (0.057)				0.053 (0.225)
$\bar{R}^2$	0.985	0.984	0.984	0.984	0.987	0.985	0.985	0.984	0.986	0.984	0.985	0.985	0.985	0.984
OBS	540	540	540	540	442	540	540	540	540	540	540	540	540	540

China is excluded from these estimations. Complete definitions of variables, descriptions of test statistics and other details are given in the notes to Table 2 in the paper. P-values are within parentheses. Cointegration tests (t_{adf} and t_{pp}) reject the null of non-cointegration in all cases at very high precision levels. For conciseness, we do not report the results of cointegration tests. Superscripts 'a', 'b' and 'c' respectively denote significance at 1%, 5% and 10%.

Table B6: Ideas Production and International Knowledge Spillovers: Excluding China (Patents Filed at the USPTO)

$$\ln \dot{A}_{d,i,t} = \alpha_i + \varphi_t + \lambda \ln L_{A,i,t} + \phi \ln A_{d,i,t} + \beta \ln A_{oecd,i,t-1}^{f,\omega_1} + \theta \ln A_{eme,i,t-1}^{f,\omega_2} + e_{i,t} \quad (7)$$

Between-dimension (Group) FMOLS estimates

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]
$L_{A,i,t}$	0.654[a] (0.000)	0.617[a] (0.000)	0.716[a] (0.000)	0.737[a] (0.000)	0.777[a] (0.000)	0.553[a] (0.000)	1.071[a] (0.000)	0.830[a] (0.000)	0.520[a] (0.000)	1.072[a] (0.000)	0.975[a] (0.000)	1.138[a] (0.000)	1.239[a] (0.000)	1.231[a] (0.000)
$A_{d,i,t}$	1.844[a] (0.000)	1.902[a] (0.000)	1.891[a] (0.000)	1.824[a] (0.000)	1.782[a] (0.000)	1.740[a] (0.000)	2.188[a] (0.000)	1.717[a] (0.000)	1.730[a] (0.000)	2.168[a] (0.000)	2.101[a] (0.000)	2.202[a] (0.000)	2.285[a] (0.000)	2.295[a] (0.000)
$A_{oecd,i,t}^{f,tm}$	0.010 (0.911)										0.078 (0.439)			
$A_{oecd,i,t}^{f,mm}$		0.100 (0.133)										0.205[a] (0.006)		
$A_{eme,i,t}^{f,tm}$			-0.195[b] (0.025)								-0.135 (0.168)			
$A_{eme,i,t}^{f,mm}$				-0.023 (0.572)								-0.098[b] (0.054)		
$A_{oecd,i,t}^{f,FDI}$					0.165 (0.694)									
$A_{oecd,i,t}^{G-prox}$						1.038[b] (0.047)							1.245[b] (0.019)	
$A_{eme,i,t}^{G-prox}$							-0.279[b] (0.017)						-0.185 (0.125)	
$A_{oecd,i,t}^{f,sci}$								-0.703 (0.240)						
$A_{oecd,i,t}^{f,uw}$									1.418[a] (0.006)					1.182[b] (0.022)
$A_{eme,i,t}^{f,uw}$										-0.273[b] (0.029)				-0.262[b] (0.029)
$\bar{R}^2$	0.963	0.964	0.964	0.964	0.968	0.964	0.964	0.962	0.964	0.964	0.964	0.964	0.964	0.964
OBS	641	641	641	610	539	641	641	428	641	641	641	640	641	641

For variable definitions and other details, please refer to notes to Table 2 in the Paper. Some countries do not have a complete dataset for bilateral FDI flows and scientists' mobility, hence the low number of observations. Please refer to notes to Table B5 for further details.