Internet Appendix for

Stock Market Spillovers via the Global Production Network: Transmission of U.S. Monetary Policy*

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Abstract

We quantify the role of global production linkages in explaining spillovers of U.S. monetary policy shocks to stock returns across countries and sectors using a newly constructed dataset. Our estimation strategy is based on a standard open-economy production network model that delivers a spillover pattern consistent with a spatial autoregression (SAR) process. We use the SAR model to decompose the overall impact of U.S. monetary policy on global stock returns into a direct and a network effect We find that nearly 70% of the total impact of U.S. monetary policy shocks on country-sector stock returns are due to the network effect of global production linkages. Empirical counterfactuals show that shutting down global production linkages would reduce the total global impact of U.S. monetary policy shocks by half. Our results are robust to changes in the definitions of stock returns and monetary policy shocks, to controlling for correlates of the global financial cycle, foreign monetary policy shocks, and to alternative empirical specifications.

Keywords: Global production network, asset prices, monetary policy shocks, spillovers

JEL Codes: G15, F10 , F36

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Appendix IA1 Theoretical Framework

In this section we provide a model to illustrate the conceptual framework for studying the transmission of U.S. monetary policy shocks to stock returns internationally via production linkages. The core model is based on the static closed-economy model of sectoral linkages of Acemoglu et al. (2012). In addition, we incorporate three features in order to study the impact of monetary policy shocks on stock returns, as in Ozdagli and Weber (2017): (i) firms produce with decreasing returns to scale and face fixed costs of production, (ii) wages are preset and do not adjust given monetary shocks, and (iii) consumers have cash-in-advance constraints.

We take the technology and trade structure as fixed since we are studying the short run. We make two further assumptions to solve the model analytically. First, we assume that trade is balanced across countries. Second, we assume that prices in a given sector are equal across countries after adjusting for an iceberg trade cost, which varies at the sector and country-pair level. Note that the this assumption is not crucial for the derivation of the framework and can be easily relaxed to assume that the law of one price holds across countries. See Devereux et al. (2020) who study the cross-country propagation of fiscal shocks in a similar setup.

The world is comprised of N countries and J sectors. Countries are denoted by m and n, and sectors by i and j. The notation follows the convention that for trade between any two country-sectors, the first two subscripts always denote exporting (source) country-sector, and the second subscript the importing (destination) country-sector.

IA1.1 Model Setup

Households. There is a representative household in each country n, which consumes a bundle of goods across all sectors i produced across countries m, and supplies labor in country n, l_n. Its maximization problem is

$$\max_{\{c_{mi,n}\},l_n} \sum_{i=1}^{J}\sum_{m=1}^{N} b_{mi,n} \log c_{mi,n} - l_n$$

$$\text{s.t.}$$

$$\sum_{i=1}^{J}\sum_{m=1}^{N} p_{mi,n}c_{mi,n} = w_n l_n + \pi_n + f_n,$$

where $b_{mi,n}$ is a preference parameter for which we assume $\sum_{i=1}^{J}\sum_{m=1}^{N} b_{mi,n} = 1$. Besides wage income, the domestic household's income includes aggregate profits, π_n and aggregate fixed costs, f_n, which firms must pay to produce. Note that in writing the budget constraint we assume balanced trade. Note that aggregate labor supply, profits, and fixed costs are additive across sectors: $l_n = \sum_{j=1}^{J} l_{nj}$, $\pi_n = \sum_{j=1}^{J} \pi_{nj}$, $f_n = \sum_{j=1}^{J} f_{nj}$. Maximization yields the standard first-order conditions, and the consumption-labor trade off: $b_{mi,n}w_n = p_{mi,n}c_{mi,n}\ \forall\ mi, n$.

Technology. There are $j = 1, \ldots, J$ sectors in each country $n = 1, \ldots, N$. Firms in country-sector nj have the following Cobb-Douglas production function:

$$y_{nj} = z_{nj} l_{nj}^{\alpha_{nj}} X_{nj}^{\lambda_{nj}}, \tag{IA1.1}$$

where z_{nj} is a Hicks-neutral technology term, l_{nj} is labor, X_{nj} is a composite intermediate good, and $\alpha_{nj} + \lambda_{nj} < 1$ implying decreasing returns to scale. Given our focus on monetary policy shocks, we simplify notation by assuming that $z_{nj} = 1 \; \forall \; nj$.

The composite intermediate good is a Cobb-Douglas aggregate of intermediate goods sourced both domestically and abroad from all sectors. Specifically:

$$X_{nj} = \prod_{i=1}^{J} \prod_{m=1}^{N} x_{mi,nj}^{\omega_{mi,nj}}, \tag{IA1.2}$$

where $x_{mi,nj}$ is the amount of sector i's good produced in country m used by country-sector nj in final production, and $\omega_{mi,nj}$ is the associated input-output coefficient for country-sector nj usage of the intermediate good from country-sector mi in the aggregate intermediate good, where $\sum_{i=1}^{J} \sum_{m=1}^{N} \omega_{mi,nj} = 1$.[1]

Given a competitive market structure with wages preset and prices taken as given by each firm, profit maximization for country-sector nj is

$$\max_{l_{nj}, \{x_{mi,nj}\}} \; p_{nj} y_{nj} - \sum_{i=1}^{J} \sum_{m=1}^{N} p_{mi,n} x_{mi,nj} - w_n l_{nj} - f_{nj} \quad \text{s.t. (IA1.1), (IA1.2)},$$

where p_{nj} is the price of the good produced by sector j in country n, $\{p_{mi,n}\}$ is a vector of prices of goods sold in country n, w_n is the wage in country n, and f_{nj} is a fixed cost of production.[2] We do not model these costs but they may include access to credit or bureaucratic costs, for example. Further, we do not differentiate between fixed costs of production and fixed costs of accessing foreign markets, as is common in the international trade literature.l revenue $R_{nj} = p_{nj} y_{nj}$.

Solving the firm's maximization problem we can write profits as

$$\pi_{nj} = (1 - \lambda_{nj} - \alpha_{nj}) R_{nj} - f_{nj}, \tag{IA1.3}$$

where total revenue $R_{nj} = p_{nj} y_{nj}$.

Goods Market Clearing. Global goods market clearing condition for any good mi is given by

$$y_{mi} = \sum_{n=1}^{N} c_{mi,n} + \sum_{j=1}^{J} \sum_{n=1}^{N} x_{mi,nj}, \tag{IA1.4}$$

[1] We have also solved the model assuming a CES production structure in labor and the aggregate intermediate good, as well as as CES aggregator underlying intermediate goods. The main results needed to motivate the empirical approach setup do not change qualitatively. The model solution is available upon request.

[2] These fixed costs are needed given pre-set wages in order to satisfy the firm-entry condition in steady state.

where the first term capture final consumption of good mi across n destination countries, and the second term captures intermediate consumption across nj country-sector destinations. To simplify the market clearing condition we first use the household first-order condition, $\frac{b_{mi,n}}{c_{mi,n}} = \theta p_{mi,n}$ (θ is the Lagrange multiplier), and its budget constraint to express consumption as

$$c_{mi,n} = \frac{b_{mi,n} \sum_{j=1}^{J}(1-\lambda_{nj})p_{nj}y_{nj}}{p_{mi,n}}. \tag{IA1.5}$$

Combining this term and the firm's first-order condition, $\lambda_{nj}\omega_{mi,nj}R_{nj} = p_{mi,n}x_{mi,nj}$, the market clearing condition is

$$y_{mi} = \sum_{j=1}^{J}\sum_{n=1}^{N} \frac{b_{mi,n}(1-\lambda_{nj})R_{nj}}{p_{mi,n}} + \sum_{j=1}^{J}\sum_{n=1}^{N} \frac{\lambda_{nj}\omega_{mi,nj}R_{nj}}{p_{mi,n}}. \tag{IA1.6}$$

Next, multiplying (IA1.6) by p_{mi}, and assuming iceberg trade costs $\tau_{mi,n}$ that vary by sector and country pair ($p_{mi,n} = \tau_{mi,n}p_{mi}$, where $\tau_{mi,n} \geq 1$), we express revenues in country-sector mi as:

$$R_{mi} = \sum_{j=1}^{J}\sum_{n=1}^{N} \frac{b_{mi,n}(1-\lambda_{nj})}{\tau_{mi,n}}R_{nj} + \sum_{j=1}^{J}\sum_{n=1}^{N} \frac{\lambda_{nj}\omega_{mi,nj}}{\tau_{mi,n}}R_{nj}. \tag{IA1.7}$$

The above equation characterizes a recursive relationship between sectors' revenues across countries, as well as the the role of different parameters in the model. Note that we are implicitly assuming that these revenues are denominated in a common currency. While we do not incorporate the exchange rate explicitly in this framework, we address this issue in our regression analysis.

Stacking (IA1.7) across country-sectors leads to a matrix formulation of the global system of country-sector revenues:

$$(I - \widetilde{\mathbf{\Omega}}\mathbf{\Lambda})\mathbf{R} = \sum_{j=1}^{J}\sum_{n=1}^{N} \frac{b_{mi,n}(1-\lambda_{nj})}{\tau_{mi,n}}R_{nj}, \tag{IA1.8}$$

where

$$\begin{aligned}
&\mathbf{R} \equiv (R_{11}, \ldots, R_{NJ})', && NJ \times 1,\\
&\mathbf{\Lambda} \equiv \operatorname{diag}\left(\{\lambda_{nj}\}\right), && NJ \times NJ,\\
&\widetilde{\mathbf{\Omega}} \equiv \tilde{\boldsymbol{\tau}} \circ \mathbf{\Omega}, && NJ \times NJ,\\
&\mathbf{\Omega} \equiv \begin{pmatrix} \omega_{11,11} & \cdots & \omega_{11,NJ} \\ \vdots & \ddots & \vdots \\ \omega_{NJ,11} & \cdots & \omega_{NJ,NJ} \end{pmatrix}, && NJ \times NJ,\\
&\tilde{\boldsymbol{\tau}} \equiv \begin{pmatrix} \left(\frac{1}{\tau_{11,1}}\right) \circ 1_{1\times J} & \cdots & \left(\frac{1}{\tau_{11,N}}\right) \circ 1_{1\times J} \\ \vdots & \ddots & \vdots \\ \left(\frac{1}{\tau_{NJ,1}}\right) \circ 1_{1\times J} & \cdots & \left(\frac{1}{\tau_{NJ,N}}\right) \circ 1_{1\times J} \end{pmatrix}, && NJ \times NJ,
\end{aligned}$$

where $\circ$ represents the Hadamard product, and $\mathbf{\Omega}$ is the global input-output matrix, where each element of the matrix, $\omega_{mi,nj}$, is the associated input-output coefficient for country-sector nj usage of the intermediate good from country-sector mi in nj's aggregate output.

Money Supply. We introduce money by assuming that consumers face a cash-in-advance constraint as in Ozdagli and Weber (2017); they justify this approach by assuming that firms enter into trade credit relationships, and thus there is no such constraint in the trade of intermediate goods.[3] Specifically, for a given economy n total final consumption is given by

$$\sum_{i=1}^{J}\sum_{m=1}^{N} p_{mi,n}c_{mi,n} = \sum_{i=1}^{J}\sum_{m=1}^{N} b_{mi,n}\sum_{j=1}^{J}(1-\lambda_{nj})R_{nj} = \mathcal{M}_n,$$

where $\mathcal{M}_n$ is the domestic money supply in country n and we again see the result of our assumption of balanced trade. Recalling that $\sum_{i=1}^{J}\sum_{m=1}^{N} b_{mi,n} = 1$, we re-write the cash-in-advance constraints for country n as

$$\sum_{j=1}^{J}(1-\lambda_{nj})R_{nj} = \mathcal{M}_n. \tag{IA1.9}$$

Next, substitute (IA1.9) into (IA1.8) to arrive at

$$(I - \widetilde{\mathbf{\Omega}}\mathbf{\Lambda})\mathbf{R} = \tilde{\boldsymbol{b}}\boldsymbol{\mathcal{M}}, \tag{IA1.10}$$

where $\tilde{\boldsymbol{b}}$ is a $NJ \times N$ matrix composed of elements $\{\tilde{b}_{mi,n}\}$, where $\tilde{b}_{mi,n} \equiv \frac{b_{mi,n}}{\tau_{mi,n}}$, and $\boldsymbol{\mathcal{M}} \equiv (\mathcal{M}_1, \ldots, \mathcal{M}_N)'$.

IA1.2 Network Effects of Money Shocks on Global Stock Returns

To determine the impact of money shocks on global stock returns we will examine deviations of firm profits around their deterministic steady state and only consider a shock to the money supply of one country n (the U.S.).[4]

In particular, for any variable x, define the log deviation from steady-state $\widehat{x} = \log(x) - \log(\bar{x})$ so that $x = \bar{x}\exp(\widehat{x}) \approx \bar{x}(1+\widehat{x})$, where $\bar{x}$ is the steady-state value of x. Further define $\boldsymbol{\pi}$ to be a $NJ \times 1$ vector composed of elements $\{\pi_{mi}\}$, $\boldsymbol{\lambda}$ to be a $NJ \times 1$ vector composed of elements $\{\lambda_{mi}\}$, $\boldsymbol{\alpha}$ to be a $NJ \times 1$ vector composed of elements $\{\alpha_{mi}\}$, and $\mathbf{f}$ to be a $NJ \times 1$ vector composed of elements $\{f_{mi}\}$. Stacking country-sector profits in (IA1.3):

$$\boldsymbol{\pi} = (\mathbf{1} - \boldsymbol{\lambda} - \boldsymbol{\alpha}) \circ \mathbf{R} - \mathbf{f}. \tag{IA1.11}$$

[3] This assumption may be more tenuous in the open-economy context given potential frictions in international trade credit. Given the differences in these frictions across sectors and countries, they are partly incorporated in our iceberg trade costs (Antràs and Foley, 2015; Niepmann and Schmidt-Eisenlohr, 2017; Caballero et al., 2018). The remaining part, not reflected in the model, gives us heterogeneity across countries and sectors in our regression analysis.

[4] In equating stock returns with changes in profits, we apply the efficient market hypothesis.

Log-linearizing (IA1.11) and using (IA1.10), we arrive at

$$\widehat{\boldsymbol{\pi}} = \left(I - \widetilde{\boldsymbol{\Omega}}\boldsymbol{\Lambda}\right)^{-1} \boldsymbol{\beta}\widehat{\boldsymbol{\mathcal{M}}}, \tag{IA1.12}$$

where $\boldsymbol{\beta} \equiv \operatorname{diag}\left(\left\{\frac{(1-\lambda_{nj})\bar{\mathcal{M}}_n}{\bar{\pi}_{nj}}\tilde{b}_{mi,n}\right\}\right)$ is a $NJ \times N$ matrix.

Allowing for shocks only to the U.S. monetary supply, write (IA1.12) as

$$\widehat{\boldsymbol{\pi}} = \left(I - \widetilde{\boldsymbol{\Omega}}\boldsymbol{\Lambda}\right)^{-1} \boldsymbol{\beta}_{US}\widehat{\mathcal{M}}_{US}, \tag{IA1.13}$$

where $\boldsymbol{\beta}_{US}$ is a $NJ \times 1$ vector of elements $\left\{\frac{(1-\lambda_{US\,j})\bar{\mathcal{M}}_{US}}{\bar{\pi}_{US\,j}}\tilde{b}_{mi,US}\right\}$.

Appendix IA2 Linking sector classifications

TREIs data are available under Thomson Reuters Business Classification(TRBC), but the World Input-Output Tables (WIOT) have been constructed under ISIC Revision 4.

We take advantage of the fact that TREI reports both 10-digit TRBC activity codes and 6-digit NAICS 2007 codes for all equity prices. With this information one can use a concordance from NAICS 2007 to ISIC Rev. 4 to match each firm's information to WIOT codes. In the next step, one can use the firm-level information from TREI data to construct alternative sector-specific stock price indices that are consistent with WIOT sector definitions.

However, a mapping from NAICS2007 to WIOT16 codes (2-digit ISIC Rev 4) is not perfect, as there can be many-to-many correspondences between NAICS 2007 and ISIC Rev. 4 codes. The following figure shows an example of a possible 'rear' overlapping of NAICS2007 sectors (3-digit code) in a WIOT2016 code.

wiot16code	wiot16 description	naics07_3d	naics07_3d_name	naics07_2d	naics07_2d_name
B	Mining and quarrying	211	Oil and Gas Extraction	21	Mining, Quarrying, and Oil and Gas Extraction
B	Mining and quarrying	212	Mining (except Oil and Gas)	21	Mining, Quarrying, and Oil and Gas Extraction
B	Mining and quarrying	213	Support Activities for Mining	21	Mining, Quarrying, and Oil and Gas Extraction
B	Mining and quarrying	311	Food Manufacturing	31-33	Manufacturing

In this example, the WIOT2016 Code B (Mining and quarrying) besides mining and oil sectors, it also contains the NAICS2007-Food Manufacturing sector. This occurs because the NAICS2007 sector "311942-Spice and Extract Manufacturing" from the Food Manufacturing includes the "mining and processing of table salt" activity, that is classified as a Mining activity in ISIC Rev. 4.

IA2.1 A reduced version of the NAICS 2007 to ISIC Rev. 4 correspondence

To limit similar occurrences as in the one in the previous example, a new version of the NAICS 2007 to ISIC Rev. 4 correspondence is constructed. The objective is to reduce the number of very different 4-digit ISIC Rev. 4 sectors per each 6-digit NAICS 2007 sector. With that in mind, the next steps were followed:

1. Work only on the set of 6-digit NAICS 2007 codes that (i) have more than one 2-digit ISIC Rev. 4 sector, and/or (ii) have more than one WIOT16 sector .

2. For a single 6-digit NAICS 2007 code, compute the frequency of its corresponding multiple 4-digit ISIC Rev. 4 sectors. When possible, the following principles were taken into consideration to assign one single NAICS 2007 code to a single 2-digit sector, the predominant sector.

3. Frequency criteria: If a 2-digit ISIC Rev. 4 sector represents more than 60 percent of the 6-digit NAICS 2007 sector in consideration, it is the called the predominant sector.

Example: The following example shows the corresponding multiple ISIC Rev. 4 codes for the single 6-digit NAICS 2007 sector "Paper (except Newsprint) Mill":

naics2007	naics2007_name	type_match	isic4	isic4_name
322121	Paper (except Newsprint) Mills	keep	1709	Manufacture of other articles of paper and paperboard
		keep	1701	Manufacture of pulp, paper and paperboard
		keep	1702	Manufacture of corrugated paper and paperboard and of containers of paper and paperboard
		delete	~~2399~~	~~Manufacture of other non-metallic mineral products n.e.c. (tar paper made in paper mills)~~

The frequency of the 2-digit ISIC Rev. 4 sector "17-Manufacture of paper and paper products" is 75 percent and it is the predominant sector. The other 2-digit ISIC Rev. 4 sector, "23- Manufacture of other non-metallic mineral products", is not predominant and its deleted from the concordance. Note that for this sector its 2-digit ISIC Rev. 4 meaning is very different from the 3-digit NAICS 2007 meaning too ("322-Paper Manufacturing").

Closest sector criteria: When the frequency criteria is not sufficient, the predominant sector is chosen by a comparison of meanings between the single 6-digit NAICS 2007 code and its corresponding 4-digit ISIC Rev. 4 codes. Then, the ISIC Rev. 4 sector with the closest meaning to the NAICS 2007 sector is selected as the predominant sector. The meaning of aggregate codes (3-digit NAICS 2007 and 2-digit ISIC Rev. 4) helped also to decide, when the comparison of 6-digit NAICS and 4-digits ISIC Rev. 4 meanings were not clear enough to reach a decision.

Example: The following example shows the corresponding multiple 4-digit ISIC Rev. 4 codes for the single 6-digit NAICS 2007 sector "Carbon and Graphite Product Manufacturing"

naics2007		isic4		naics2007_3digit	isic4_2digit
335991	Carbon and Graphite Product Manufacturing	~~2790~~	~~Manufacture of other electrical equipment~~	Electrical Equipment, Appliance, and Component Manufacturing	~~Manufacture of electrical equipment~~
		2399	Manufacture of other non-metallic mineral products n.e.c.	Electrical Equipment, Appliance, and Component Manufacturing	Manufacture of other non-metallic mineral products

Although by frequency the two 4-digit (and 2-digit) ISIC Rev. 4 sectors are equally representative for this NAICS 2007 code, their sector meanings are different. In fact, the 6-digit NAICS 2007 "335991-Carbon and Graphite Product Manufacturing" is closest to the 4-digit ISIC Rev. 4 "2399-Manufacture of other non-metallic mineral products n.e.c." than to the 4-digit ISIC Rev. 4 "2790-Manufacture of other electrical equipment" sector. Then, the 2-digit ISIC Rev. 4 "27-Manufacture of electrical equipment" is denominated the predominant sector.

There was only one exception, NAICS 2007 "337920-Blind and Shade Manufacturing". As it can be observed below, none of the previous criteria worked; and it was hard coded arbitrarily based on its 3-digit NAICS 2007 meaning, "Furniture and Related Product Manufacturing", to the 2-digit ISIC Rev. 4 "3100-Manufacture of furniture" sector.

naics2007	isic4	isic4_name	naics2007_3digit	isic4_2digit
337920 Blind and Shade Manufacturing	1392	Manufacture of made-up textile articles, except apparel	Furniture and Related Product Manufacturing	"Manufacture of textiles"
	1629	Manufacture of other products of wood; manufacture of articles of cork, straw and plaiting materials		"Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials"
	2220	Manufacture of plastics products		"Manufacture of rubber and plastics products"
	2593	Manufacture of cutlery, hand tools and general hardware		"Manufacture of fabricated metal products, except machinery and equipment"
	2599	Manufacture of other fabricated metal products n.e.c.		"Manufacture of fabricated metal products, except machinery and equipment"

Once this new NAICS 2007 to ISIC Rev. 4 concordance was finished, it was easy to go from NAICS 2007 to WIOT16. In the final NAICS 2007-WIOT16 concordance:

- 1020 correspondences were tagged based on the official NAICS 2007-ISIC Rev. 4 concordance.
- 37 correspondences were tagged based on the frequency criteria.
- 122 correspondences were tagged based on the closest sector criteria.
- 1 correspondence was arbitrarily hard coded.

Table IA1 presents cross-country sector coverage of monthly returns for the months where there are monetary surprise shocks over 2000–14. Given cross-country differences in size, industrial specialization patterns, and stock market depth we see that larger countries (e.g., the United States) have a larger coverage of sectors, while some countries only cover a few sectors (e.g., Portugal and Russia). These differences motivate a flexible empirical approach, where we allow for country-sector fixed effects as well as country-sector specific coefficients for the effect of monetary policy surprise variable.

Table IA2 presents coverage of of monthly returns for the months where there are monetary surprise shocks along the sector dimension. This table shows how the distribution of sector returns varies across countries. For example, all countries have returns for the 'Construction,' 'Telecommunication,' and 'Financial service activities, except insurance and pension funding' sectors. Meanwhile, sectors like 'Forestry and logging,' 'Fishing and aquaculture,' and 'Repair and installation of machinery and equipment' have sparse stock returns coverage across countries.

Table IA1. Monthly Country Stock Return Coverage for Months with Monetary Surprise Shocks

This table presents information on the number of sectors and observation of monthly sector returns per country for dates where there are monetary surprise shocks (FOMC meetings or off-cycle meetings) over 2000–16. The data are constructed by merging stock returns data from TREI with the WIOD classification of sectors.

Country	No. Industries	Observations
Australia	38	5,893
Austria	15	2,477
Brazil	17	3,781
Canada	38	5,803
China	47	6,735
Germany	28	4,841
Denmark	17	2,525
Spain	24	3,783
Finland	22	3,410
France	38	5,542
United Kingdom	40	5,954
Greece	10	1,943
Indonesia	18	3,220
India	40	5,690
Italy	22	4,370
Japan	45	6,706
Korea	34	6,108
Mexico	14	2,401
Netherlands	20	2,895
Poland	17	3,266
Portugal	8	1,209
Russia	5	1,419
Sweden	29	4,584
Turkey	21	3,887
Taiwan	29	4,675
United States	50	6,982

Table IA2. Monthly Sector Stock Return Coverage for Months with Monetary Surprise Shocks

This table presents information on the number of sectors and observation of monthly sector returns per sector for dates where there are monetary surprise shocks (FOMC meetings or off-cycle meetings) over 2000–16. The data are constructed by merging stock returns data from TREI with the WIOD classification of sectors.

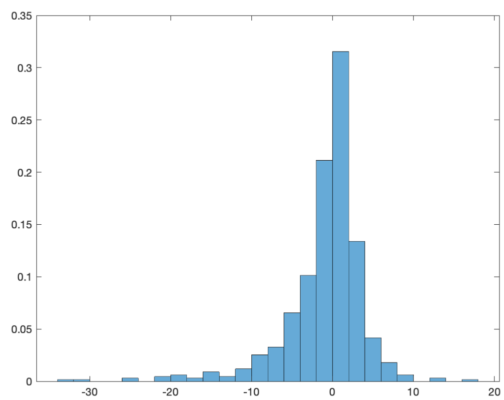
Industry	WIOD code	No. countries	Observations
Crop and animal production, hunting and related service activities	A01	13	1,614
Forestry and logging	A02	3	348
Fishing and aquaculture	A03	6	626
Mining and quarrying	B	19	2,593
Manufacture of food products, beverages and tobacco products	C10-C12	23	3,174
Manufacture of textiles, wearing apparel and leather products	C13-C15	16	2,167
Manufacture of wood and of products of wood and cork, etc	C16	10	1,196
Manufacture of paper and paper products	C17	19	2,504
Printing and reproduction of recorded media	C18	8	1,034
Manufacture of coke and refined petroleum products	C19	20	2,623
Manufacture of chemicals and chemical products	C20	25	3,251
Manufacture of basic pharmaceutical products and pharmaceutical preparations	C21	20	2,513
Manufacture of rubber and plastic products	C22	18	2,370
Manufacture of other non-metallic mineral products	C23	18	2,488
Manufacture of basic metals	C24	24	3,129
Manufacture of fabricated metal products, except machinery and equipment	C25	14	1,724
Manufacture of computer, electronic and optical products	C26	22	3,036
Manufacture of electrical equipment	C27	16	2,044
Manufacture of machinery and equipment n.e.c.	C28	19	2,519
Manufacture of motor vehicles, trailers and semi-trailers	C29	20	2,708
Manufacture of other transport equipment	C30	17	2,181
Manufacture of furniture; other manufacturing	C31-C32	17	2,219
Repair and installation of machinery and equipment	C33	1	84
Electricity, gas, steam and air conditioning supply	D35	22	2,874
Water collection, treatment and supply	E36	6	740
Sewerage; waste collection, treatment and disposal activities; etc	E37-E39	9	1,111
Construction	F	26	3,526
Wholesale and retail trade and repair of motor vehicles and motorcycles	G45	12	1,522
Wholesale trade, except of motor vehicles and motorcycles	G46	19	2,537
Retail trade, except of motor vehicles and motorcycles	G47	24	3,136
Land transport and transport via pipelines	H49	17	1,957
Water transport	H50	9	1,138
Air transport	H51	19	2,318
Warehousing and support activities for transportation	H52	19	2,245
Postal and courier activities	H53	8	796
Accommodation and food service activities	I	19	2,483
Publishing activities	J58	18	2,358
Motion picture, video and television programme production, etc	J59-J60	16	2,104
Telecommunications	J61	26	3,563
Computer programming, consultancy and related activities; info; etc	J62-J63	21	2,794
Financial service activities, except insurance and pension funding	K64	26	3,508
Insurance, reinsurance and pension funding, except compulsory social security	K65	21	2,613
Activities auxiliary to financial services and insurance activities	K66	22	2,491
Real estate activities	L68	23	2,930
Legal and accounting activities; activities of head offices; etc	M69-M70	10	1,036
Architectural and engineering activities; technical testing and analysis	M71	16	2,004
Scientific research and development	M72	13	1,575
Advertising and market research	M73	10	1,182
Other professional, scientific and technical activities; veterinary activities	M74-M75	7	848
Administrative and support service activities	N	18	2,248
Education	P85	7	831
Human health and social work activities	Q	13	1,445
Other service activities	R-S	17	2,037

Appendix IA3 Full Regression Tables and Additional Charts

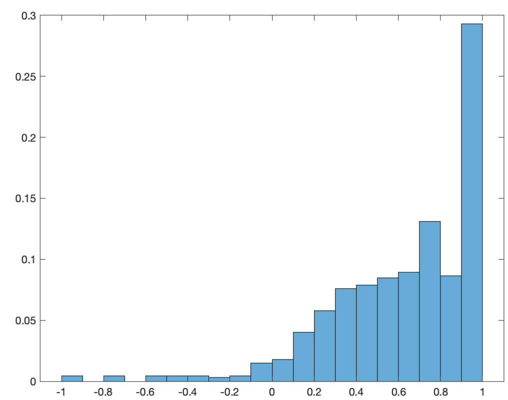
Here we report additional information about our baseline estimation as well as tables will full estimation results for all the tables in the paper.

Figure IA1. Distributions of $\boldsymbol{\beta}$ and $\boldsymbol{\rho}$ across Country-Sectors

This figure plots the distribution of $\boldsymbol{\beta}$ and $\boldsymbol{\rho}$ across mi from the estimation of Equation (13) in the paper for 2000–07, using Jarociński and Karadi (2020) monetary policy shocks for $\widehat{\mathcal{M}}_{US}$. The averages of these distributions are reported in Table 3 in the paper.



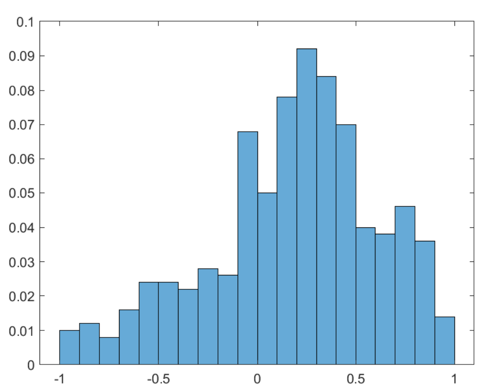
(a) β_{mi}



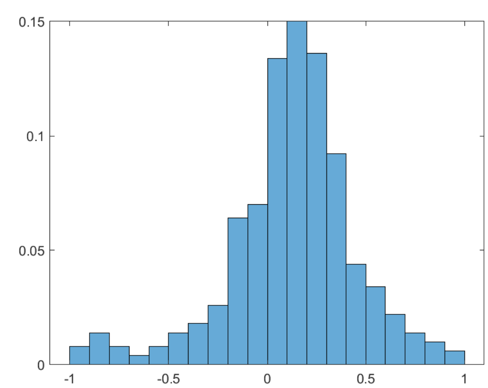
(b) ρ_{mi}

Figure IA2. Placebo analysis

This figure plots the distribution of the share of the network effect across 500 randomizations of $\mathbf{W}$ in panel (a), and $\mathbf{q}$ in panel (b) for the benchmark SAR model reported in Table 3 in the paper.



(a) $\mathbf{W}$ randomization



(b) $\mathbf{q}$ randomization for each t

Table IA3. Homogeneous Spatial Autoregression Panel Estimation: Baseline Specification

This table reports results from heterogeneous coefficient spatial panel autoregressions where the dependent variable is the annualized U.S. dollar country-sector monthly stock return over 2000–07 over months with FOMC announcements, and the independent variable is the measure of the monetary policy shock taken from Jarociński and Karadi (2020). There are 44,286 total observations comprised of 671 country-sectors over 66 months. Standard errors (in parentheses) are obtained via wild bootstrap with 500 repetitions. All coefficients are significant at the 1% confidence level.

$$\widehat{\boldsymbol{q}}_t = \boldsymbol{\alpha} + (I - \rho\,\mathbf{W})^{-1}\,\beta\,\widehat{\mathcal{M}}_{US,t} + \boldsymbol{\varepsilon}_t$$

Panel A. Coefficient Estimates

	Average β	Average ρ	Observations
No Fixed effects	-2.049	0.656	44,286
	(0.465)	(0.066)	
Fixed effects	-1.183	0.568	44,286
	(0.237)	(0.030)	

Panel B. Total Effect Decomposition

	Avg. **Direct**	Avg. **Network**	**Network/Total**
Decomposition 1 (AAK16)			
No Fixed effects	-2.049	-3.906	0.656
	(0.465)	(0.400)	(0.002)
Fixed effects	-1.183	-1.556	0.568
	(0.237)	(0.182)	(0.002)
Decomposition 2 (LP09)			
No Fixed effects	-2.649	-3.306	0.555
	(0.353)	(0.273)	(0.004)
Fixed effects	-1.454	-1.285	0.469
	(0.225)	(0.153)	(0.003)

Table IA4. Heterogeneous Spatial Autoregression Panel Estimation: Varying Sample Period and Weighting Matrix

This table presents full regression results for the regressions reported in Table 6 in the paper. See notes to Table 6.

$$\widehat{\boldsymbol{q}}_t = \boldsymbol{\alpha} + (I - \mathrm{diag}(\boldsymbol{\rho})\,\mathbf{W})^{-1}\,\boldsymbol{\beta}\,\widehat{\mathcal{M}}_{US,t} + \boldsymbol{\varepsilon}_t$$

	Avg. β (1)	Avg. ρ (2)	Avg. **Direct** (3)	Avg. **Network** (4)	**Network/Total** (5)
			Panel A. Full Sample		
2000-2007, avg. W	-0.885	0.631	-0.885	-1.783	0.668
	(0.096)	(0.024)	(0.272)	(0.313)	(0.056)
2000-2016, 2000 W	-0.554	0.719	-0.554	-1.644	0.748
	(0.067)	(0.013)	(0.251)	(0.274)	(0.056)
2000-2016, avg. W	-0.500	0.728	-0.500	-1.628	0.765
	(0.055)	(0.015)	(0.242)	(0.260)	(0.050)
2000-2016, 2000 W, no 2008	-0.795	0.712	-0.795	-2.069	0.723
	(0.085)	(0.016)	(0.297)	(0.324)	(0.051)
2000-2016, avg. W, no 2008	-0.713	0.722	-0.713	-2.102	0.747
	(0.093)	(0.015)	(0.304)	(0.335)	(0.052)
2000-2016, 2000 W, no 2009	-0.658	0.696	-0.658	-1.902	0.743
	(0.065)	(0.013)	(0.225)	(0.246)	(0.044)
2000-2016, avg. W, no 2009	-0.603	0.706	-0.603	-1.902	0.759
	(0.068)	(0.023)	(0.293)	(0.315)	(0.062)
			Panel B. International Sample		
2000-2007, avg. W	-0.815	0.634	-0.815	-1.725	0.679
	(0.103)	(0.025)	(0.103)	(0.318)	(0.060)
2000-2016, 2000 W	-0.519	0.725	-0.519	-1.624	0.758
	(0.073)	(0.014)	(0.073)	(0.280)	(0.059)
2000-2016, avg. W	-0.472	0.734	-0.472	-1.593	0.772
	(0.060)	(0.015)	(0.060)	(0.265)	(0.054)
2000-2016, 2000 W, no 2008	-0.736	0.719	-0.736	-2.033	0.734
	(0.091)	(0.017)	(0.091)	(0.329)	(0.054)
2000-2016, avg. W, no 2008	-0.661	0.729	-0.661	-2.050	0.756
	(0.100)	(0.015)	(0.100)	(0.338)	(0.055)
2000-2016, 2000 W, no 2009	-0.633	0.700	-0.633	-1.879	0.748
	(0.070)	(0.014)	(0.070)	(0.247)	(0.046)
2000-2016, avg. W, no 2009	-0.584	0.709	-0.584	-1.865	0.762
	(0.071)	(0.023)	(0.072)	(0.313)	(0.064)
			Panel C. USA Sample		
2000-2007, avg. W	-1.744	0.603	-1.744	-2.489	0.588
	(0.277)	(0.046)	(0.277)	(0.491)	(0.068)
2000-2016, 2000 W	-0.972	0.639	-0.972	-1.893	0.661
	(0.080)	(0.013)	(0.080)	(0.222)	(0.034)
2000-2016, avg. W	-0.852	0.655	-0.852	-2.061	0.707
	(0.078)	(0.013)	(0.078)	(0.234)	(0.032)
2000-2016, 2000 W, no 2008	-1.504	0.624	-1.504	-2.509	0.625
	(0.135)	(0.020)	(0.136)	(0.299)	(0.041)
2000-2016, avg. W, no 2008	-1.348	0.640	-1.348	-2.730	0.670
	(0.128)	(0.019)	(0.129)	(0.336)	(0.043)
2000-2016, 2000 W, no 2009	-0.961	0.655	-0.961	-2.174	0.693
	(0.163)	(0.034)	(0.164)	(0.324)	(0.059)
2000-2016, avg. W, no 2009	-0.838	0.673	-0.838	-2.350	0.737
	(0.175)	(0.035)	(0.176)	(0.431)	(0.073)

Table IA5. Heterogeneous Spatial Autoregression Panel Estimation: Robustness to Returns and Shock Measures

This table presents full regression results for the regressions reported in Table 7 in the paper. See notes to Table 7.

$\widehat{\boldsymbol{q}}_t = \boldsymbol{\alpha} + (I - \text{diag}(\boldsymbol{\rho})\,\mathbf{W})^{-1}\,\boldsymbol{\beta}\,\widehat{\mathcal{M}}_{US,t} + \boldsymbol{\varepsilon}_t$

	Avg. β (1)	Avg. ρ (2)	Avg. **Direct** (3)	Avg. **Network** (4)	**Network/Total** (5)
			Panel A. Full Sample		
Excess returns	-0.467	0.824	-0.467	-1.859	0.799
	(0.106)	(0.013)	(0.486)	(0.532)	(0.107)
Domestic currency returns	-1.018	0.595	-1.018	-2.147	0.678
	(0.112)	(0.043)	(0.365)	(0.408)	(0.060)
Real domestic currency returns	-0.926	0.605	-0.926	-1.841	0.665
	(0.103)	(0.065)	(0.383)	(0.428)	(0.084)
USD returns, OW shock	-1.053	0.635	-1.053	-2.070	0.663
	(0.073)	(0.033)	(0.252)	(0.282)	(0.050)
USD returns, NS shock	-1.446	0.634	-1.446	-2.963	0.672
	(0.116)	(0.036)	(0.452)	(0.507)	(0.060)
USD returns, BRW shock	-0.845	0.633	-0.845	-1.319	0.609
	(0.122)	(0.036)	(0.343)	(0.380)	(0.102)
			Panel B. International Sample		
Excess returns	-0.418	0.823	-0.418	-1.815	0.813
	(0.117)	(0.014)	(0.117)	(0.540)	(0.119)
Domestic currency returns	-0.970	0.594	-0.970	-2.100	0.684
	(0.113)	(0.044)	(0.113)	(0.408)	(0.062)
Real domestic currency returns	-0.853	0.602	-0.853	-1.776	0.675
	(0.098)	(0.066)	(0.098)	(0.419)	(0.087)
USD returns, OW shock	-1.033	0.639	-1.033	-2.077	0.668
	(0.076)	(0.034)	(0.076)	(0.287)	(0.052)
USD returns, NS shock	-1.405	0.638	-1.405	-2.954	0.678
	(0.125)	(0.037)	(0.125)	(0.516)	(0.063)
USD returns, BRW shock	-0.864	0.636	-0.864	-1.331	0.606
	(0.131)	(0.037)	(0.131)	(0.387)	(0.104)
			Panel C. United States Sample		
Excess returns	-1.064	0.834	-1.064	-2.403	0.693
	(0.111)	(0.008)	(0.111)	(0.463)	(0.046)
Domestic currency returns	-1.603	0.603	-1.603	-2.723	0.629
	(0.255)	(0.048)	(0.255)	(0.540)	(0.074)
Real domestic currency returns	-1.772	0.634	-1.772	-2.591	0.594
	(0.296)	(0.067)	(0.296)	(0.614)	(0.082)
USD returns, OW shock	-1.290	0.581	-1.290	-1.984	0.606
	(0.275)	(0.043)	(0.275)	(0.400)	(0.103)
USD returns, NS shock	-1.950	0.587	-1.950	-3.073	0.612
	(0.292)	(0.037)	(0.292)	(0.564)	(0.074)
USD returns, BRW shock	-0.620	0.593	-0.620	-1.179	0.655
	(0.177)	(0.044)	(0.177)	(0.371)	(0.122)

Table IA6. Least-squares Regression Estimation: Controlling for Foreign Monetary Policy Shocks

This table reports the least-squares regression including foreign monetary shocks, where the dependent variable is the annualized U.S. dollar country-sector monthly stock return over 2000–07 over month with FOMC announcements, and the independent variables are measures of the monetary policy shocks. There are 44,286 total observations comprised of 671 country-sectors over 66 months. Robust clustered standard errors are in parenthesis. Country-sector fixed effects are included in all regression. The effect of the U.S. monetary policy shock (Fed shock) is significant at (at least) 10% confidence level in all regression.

$$\widehat{q}_{mi,t} = \alpha_{mi} + \beta^{LS}_{MP}\,\widehat{\mathcal{M}}_{US,t} + \mathbf{X}_t\,\boldsymbol{\beta'}^{LS}_{X} + \varepsilon_{mi,t}$$

	(1)	(2)	(3)
Panel A. Full Sample			
Fed shock	-2.738	-2.741	-2.731
	(1.320)	(1.299)	(1.305)
ECB shock	-0.055		-0.756
	(1.430)		(1.537)
BOE shock		-0.691	-0.225
		(1.518)	(1.460)
R^2	0.060	0.060	0.060
Panel B. International Sample			
Fed shock	-2.623	-2.625	-2.616
	(1.396)	(1.374)	(1.380)
ECB shock	-0.030		-0.826
	(1.472)		(1.592)
BOE shock		-0.763	-0.215
		(1.570)	(1.505)
R^2	0.060	0.060	0.060
Panel C. United States Sample			
Fed shock	-4.290	-4.307	-4.292
	(0.728)	(0.720)	(0.733)
ECB shock	-0.396		0.222
	(1.136)		(1.031)
BOE shock		0.325	-0.347
		(1.030)	(1.148)
R^2	0.060	0.060	0.060

IA3.1 Heterogeneity of Estimates

Table IA7. Definitions and Sources of Additional Variables

This table presents definitions and sources of variables used in all regressions. The control variables, which vary at the country or sector level, are sourced as the average over 2000–07. The 0/1 ("low"/"high") dummies are defined based on whether a country (sector) variable's value is below/above the cross-section mean of the variable's distribution. Country variables are denoted by m and sector variables by i.

Variable	Definition	Source
MP_{US}	Baseline U.S. FFR monetary policy shock	Jarociński and Karadi (2020)
GDP_m	country 0/1 dummy log(GDP) bin	World Bank WDI
Debt_m	country 0/1 dummy foreign debt/GDP bin	World Bank WDI
$\mathrm{FinFric}_m$	country 0/1 dummy financial friction (1 − private credit/GDP) bin	World Bank WDI
$\mathrm{FinOpen}_m$	country 0/1 dummy financial openness (External assets + liabilities/GDP) bin	Lane and Milesi-Ferretti (2007)
RZ_i	sector 0/1 dummy financial dependence bin	Catão et al. (2009)
$\mathrm{PrSticky}_i$	sector 0/1 dummy price stickiness bin	Pasten et al. (2017)
$\mathrm{USDshIM}_m$	country 0/1 dummy U.S. dollar invoiced import share bin	Boz et al. (2020)
$\mathrm{USDshEX}_m$	country 0/1 dummy U.S. dollar invoiced export share bin	Boz et al. (2020)

All OLS interaction regressions are included in Table IA8, where we include country×sector fixed effects in all specifications, with benchmark results reported in column (1) for convenience. All country or sector interaction variables are defined as 0/1 indicators for "low" or "high," where the cutoff is based on the median of the distribution of each variable.[5] Further, all data are based on the average of 2000-07 values, so we only rely on the cross-section variation in these variables for identification. We continue to use 0/1 indicators of high and low values for each variable i n the analysis of the cross-section distribution of the network share of the total effect, and do not include any additional controls.[6] The results of these cross-section regressions are reported in Internet Appendix Table IA9.

Country size: looking at columns (2) and(3) of Table IA8, we see that the coefficient on the interaction of country size and the monetary policy shock (MP) is negative, implying that larger countries may be more affected by an unexpected U.S. monetary policy loosening (or tightening). However, neither coefficient is significant. Further, the coefficient for the main effect of MP in column (2) is similar in magnitude to the baseline estimate of column (1), and remains significant. Turning to the cross-section heterogeneity regressions for the network share in Table IA9, column (1), we find that the country size indicator variable has a coefficient of almost zero and is not statistically significant.

[5] We also experimented with continuous variables, but results were qualitatively similar.

[6] Using continuous variables, including log of GDP to control for country size, or country and sector fixed effects, when possible, does not change the bottom line.

External debt: the literature, most recently Wiriadinata (2021), shows that the impact of U.S. monetary policy shocks is associated with a country's external debt. We investigate this channel by including countries' external debt as a share of GDP, from the World Bank World Development Indicators. First, in the panel regressions with interactions of Table IA8, we see that the coefficients on the interaction of *Debt* and MP in both columns (4) and (5) are positive, indicating that the transmission of U.S. monetary policy shock is in fact dampened in countries with larger external debt positions. However, neither of these coefficients are statistically significant, and the main effect of the monetary policy shock that is identified in column (4) where we exclude time effects is similar to the baseline estimate. The cross-section regression of the network share in Table IA9 yields similar results as the interaction estimates. In particular, the coefficient on the Debt variable in column (2) is negative but is not statistically significant.[7]

Financial frictions: we use a measure of external financial dependence by sector, using the Catão et al. (2009) update to the Rajan and Zingales (1998) methodology. We chose the Catão et al. (2009) measure because this metric covers sectors outside of manufacturing. Given that this Rajan-Zingales (RZ) measure only exploits differences across sectors, we also create a country-sector measure of financial frictions by interacting the RZ sectoral measure (expressed as a binary low/high indicator) with a low/high indicator of a country-level measure of financial frictions ($FinFric$). The FinFric indicated is based on a country's private credit-to-GDP ratio (sourced from the World Bank), which is a commonly used indicator of the level of financial development. We generate the FinFric indicator as one minus the indicator of financial development, so that "low/high" means a country has a low/high level of financial frictions. The coefficient on the double interaction of RZ with $FinFric$ and MP in our panel regression would then capture whether a sector that is highly dependent on external financing situated in a high financial friction country (a "high/high" regime) is more/less affected by MP relative to other country-sectors.

Columns (6) and (7) of Table IA8 present the regressions interacting financial development or the Rajan-Zingales measure with MP, respectively. We again omit time-varying fixed effects in order to estimate a coefficient on MP. Neither interaction coefficient is significant. Next, we include the double interaction term in column (8), where we now control for both country and sector time-varying fixed effects. The coefficient on the double-interaction term is negative, indicating that U.S. monetary policy may have a larger impact on stock returns in more financially dependent sectors in higher friction economies (less financially developed), but the coefficient is not significant. We also did not find significance when excluding time-varying fixed effects.

We next include measures of financial frictions ($FinFric$), financial dependence (RZ) and their interaction in our analysis of cross-section differences of the network share of the total effect

[7] We also run the same regressions replacing the external debt measure with one based on countries' U.S. dollar debt positions, using data from Bénétrix et al. (2019), and estimates are still insignificant.

using our baseline estimates in columns (3)-(5) of Table IA9. We find that individually these variables have no effect on the share of the network in the total monetary policy shock propagation. The interaction effect is positive, suggesting that financially dependent sectors in countries with larger financial frictions experience more shock transmission through trade linkages. However, the difference between the groups of country-sectors is not statistically significant. Moreover, the R^2 is very low in all three regressions, indicating that these variables do not provide a good explanation for heterogeneity of our estimates of the network effect.

Financial openness: we construct a measure of financial openness of a country by a 0/1 indicator of high and low level of the ratio of the sum of total external assets and liabilities to GDP ($FinOpen$). As with financial frictions, we interact this country-level measure with the sector-level indicator of financial dependence. This interaction would then capture whether a sector that is highly dependent on external financing situated in a high financial openness country (a "high/high" regime) is more/less impacted relative to other country-sectors.

Column (9) in Table IA8 includes the interaction of the country-level $FinOpen$ and MP without including any time effects in order to keep the coefficient on MP. The main effect remains negative and significant, while the interaction of $FinOpen$ and MP is insignificant. Next, column (10) includes the double interaction of the financial dependence and financial openness measures with MP. This specification includes both time-varying country and sector effects, so only the interaction coefficient can be identified. The coefficient is negative, indicating that sectors that are more dependent on external finance in more open (financially connected) economies are more affected by U.S. monetary policy shocks. However, the coefficient on this variable is insignificant.

Finally, turning to the cross-section heterogeneity regressions for the network share in Table IA9, we find that financial openness does not explain the differences between countries (columns (6) and (7)). When we interact the country-level financial openness indicator with the sector-level financial dependence measure, we continue to find that there is no statistically significant difference between the share of network effects across the resulting four categories.

Price stickiness: we assemble measures of price rigidities from Pasten et al. (2017), which are based on detailed U.S. pricing data. We aggregate up (via simple averages) these measures to the WIOD sector-level. We prefer this measure to the one used by Zhang (2020) – who constructs a measure of price rigidity based on the Rauch (1999) classification – for two reasons. First, the Zhang (2020) measure only exploits information on tradeable sector goods and thus excludes several interesting sectors in the WIOD. Second, the Rauch (1999) classification is very coarse relative to the measures Pasten et al. (2017) create using detailed micro pricing data.

We interact the price stickiness measure ($PrSticky'$) with our baseline monetary policy shock variable in column (11) of Table IA8, which excludes time fixed effects so that we can still identify a main effect of MP. As it can be seen, the coefficient on the price stickiness interaction terms is not significant. This result holds when controlling for country×time effects.[8] Column (8) of Table IA9 shows that the distribution of the network share of the total effect of the U.S. monetary policy on stock returns across sectors is not explained by price stickiness: the coefficient is not statistically different from zero and the R^2 is very low.

Currency invoicing: a natural question to ask is whether U.S. monetary policy shock transmission is stronger for countries that rely more on the U.S. dollar for their trade invoicing. We collect data on the share of U.S. dollar invoicing of exports and imports by country from Boz et al. (2020). We first run simple interactions with the indicators of low/high export and import shares invoiced in U.S. dollars in columns (12) and (13) of Table IA8.[9] As expected, the coefficients are negative, indicating that country-sector stock returns in economies with more dollarized trade are more sensitive to U.S. monetary policy shocks, but the estimated coefficients are not significant. Next, following the model of Zhang (2020), we interact these indicators with the price stickiness measure. These regressions are estimated with time-varying fixed effects in columns (14) and (15) of Table IA8. The coefficients on the double interacted variables are negative, consistent with Zhang (2020). However, unlike that paper the coefficients are not significant.[10]

We include measures of dollar invoicing share in the analysis of the heterogeneity of the network share of the effect of U.S. monetary policy on stock returns across countries and sectors in columns (9) and (10) of Table IA9. Regressions show that a higher share of dollar invoicing is associated with a higher share of the network in the shock transmission, but the differences are not statistically significant. We then interact these measures with the indicator of price stickiness, but still do not find statistically significant differences between country and sector groups (columns (11) and (12)).

Overall, both the analysis of variable interactions in the panel regressions and the cross-section regressions of Tables IA8 and IA9 generally deliver coefficient estimates with expected signs, but none of them are statistically significant. Thus, the heterogeneity of the estimated direct and network effects is not driven by variables that might capture alternative shock transmission channels.

[8] In the interest of space, this result is not reported but is available from the authors upon request.

[9] Note that the split of countries into "low" and "high" bins are identical for import and export shares, so the coefficients are identical, but we report both estimations for completeness.

[10] While we cannot pinpoint precisely why this is the case, it is worth noting that our sample is much broader, both across sectors and countries, than the data used in Zhang (2020).

Table IA8. OLS Interaction Regressions of Total Effect

This table reports coefficients from linear regressions where the dependent variable $\widehat{q}_{mi,t}$ is the annualized U.S. dollar country-sector monthly stock return, over 2000–07 in months with FOMC announcements. All control variables are defined in Table IA7. Robust standard errors, clustered at the time level, are in parentheses. Country variables are denoted by m and sector variables by i.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
MP shock	-2.740	-2.578		-2.885		-2.578	-3.275		-3.022		-3.599	-2.301	-2.301		
	(1.311)	(1.541)		(1.336)		(1.090)	(1.652)		(1.630)		(1.374)	(1.469)	(1.469)		
$GDP_m \times MP$		-0.257	-0.499												
		(0.731)	(0.762)												
$Debt_m \times MP$				0.380	0.134										
				(0.804)	(0.936)										
$FinFric_m \times MP$						0.155									
						(0.742)									
$RZ_i \times MP$							0.990								
							(0.673)								
$FinFric_m \times RZ_i \times MP$								-1.272							
								(1.300)							
$FinOpen_m \times MP$									0.576						
									(1.286)						
$FinOpen_m \times RZ_i \times MP$										-0.109					
										(0.831)					
$PrSticky_i \times MP$											1.431				
											(0.971)				
$USDshIM_m \times MP$												-1.644			
												(1.249)			
$USDshEX_m \times MP$													-1.644		
													(1.249)		
$USDshIM_m \times PrSticky_i \times MP$														-1.999	
														(2.078)	
$USDshEX_m \times PrSticky_i \times MP$															-1.999
															(2.078)
Country×sector FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector×time FE	No	No	Yes	No	Yes	No	No	Yes	No	Yes	No	No	No	Yes	Yes
Country×time FE	No	No	No	No	No	No	No	Yes	No	Yes	No	No	No	Yes	Yes
Observations	49,667	49,667	49,465	49,667	49,465	44,375	35,796	31,295	49,667	35,728	32,386	30,158	30,158	19,344	19,344
R-squared	0.064	0.064	0.199	0.064	0.199	0.067	0.064	0.341	0.064	0.345	0.059	0.068	0.068	0.366	0.366

Table IA9. OLS Cross-section Regressions for Network/Total Effect

This table reports the least-squares regression of the estimated direct and network effect estimates obtained from the baseline regression equation reported in Table 3 in the paper, using Acemoglu et al. (2016) decomposition. The unit of observation is country-sector cell, with 25 countries, 52 industries, 615 observations in all regressions. All control variables are defined in Table IA7. Robust standard errors are in parentheses. Country variables are denoted by m and sector variables by i.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
GDP_m	0.856											
	(1.008)											
$Debt_m$		-0.963										
		(0.973)										
$FinFric_m$			0.317		-0.281							
			(0.417)		(0.754)							
RZ_i				-0.638	0.203		1.152					
				(1.343)	(0.789)		(1.839)					
$FinFric_m \times RZ_i$					1.087							
					(1.073)							
$FinOpen_m$						-1.237	0.436					
						(0.972)	(1.873)					
$FinOpen_m \times RZ_i$							-3.778					
							(2.689)					
$PrSticky_i$								-0.904			-11.50	-11.50
								(1.485)			(7.763)	(7.763)
$USDshIM_m$									3.800		0.158	
									(3.753)		(7.677)	
$USDshEX_m$										3.800		0.158
										(3.753)		(7.677)
$USDshIM_m \times PrSticky_i$											12.63	
											(11.23)	
$USDshEX_m \times PrSticky_i$												12.63
												(11.23)
Observations	647	672	404	469	281	672	469	438	164	164	110	110
R-squared	0.001	0.001	0.001	0.000	0.012	0.002	0.007	0.001	0.006	0.006	0.030	0.030

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