Internet Appendix to

Ripples into Waves: Trade Networks, Economic Activity, and Asset Prices

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I. Variance Decomposition

We follow di Giovanni et al. (2017) and decompose the variance of global SCDS returns as a way to differentiate between the theories of Gabaix (2011) and Acemoglu et al. (2012) in this context. In particular, we treat our SCDS returns in an analogous way as they treat their firm-specific shocks. We measure the variance of the aggregate monthly SCDS return,

$$Ret_{g,\tau} = \sum_i \; w_{i,\tau-1} * Ret_{i,t}.$$

over our sample period. We fix the weights so that the variance of $Ret_{g,\tau}$, $\sigma^2_{g,\tau}$ is not affected by variation associated with changes in portfolio weights over time. As in Carvalho and Gabaix (2013), we decompose $\sigma^2_{g,\tau}$ as follows,

$$\sigma^2_{g,\tau} = \underbrace{\sum_i \; w^2_{i,\tau-1} * Var\left(Ret_{i,t}\right)}_{DIRECT_\tau} + \underbrace{\sum_{i \neq j} \sum_{j \neq i} w_{i,\tau-1} w_{j,\tau-1} Cov\left(Ret_{i,t}, Ret_{j,t}\right)}_{LINK_\tau} \qquad (1)$$

As the above equation shows, at each time τ, the variance of $Ret_{g,\tau}$ can be decomposed into two components, $DIRECT_\tau$ and $LINK_\tau$, where $DIRECT_\tau$ measures the volatility of each country's SCDS returns and $LINK_\tau$ measures the comovement of SCDS returns that may in part be driven by the trade links in which we are interested.

These two components can be computed directly using trade data and SCDS returns. We first compute the variance of SCDS returns for each country to obtain $Var\left(Ret_{i,t}\right)$. We then compute the covariance of SCDS return for any given pair of countries to obtain $Cov\left(Ret_{i,t}, Ret_{j,t}\right)$. Finally, we compute the portfolio weights as the ratio of country exports to the aggregate exports of our sample. This procedure allows us to compute both $DIRECT_\tau$ and $LINK_\tau$ and thus their contribution to total volatility. We can compute similar analogues, $DIRECT_{R,\tau} = \sum_{i \in R} w^2_{i,\tau-1} * Var\left(Ret_{i,t}\right)$, for countries in a particular geographic region R and measure their contribution to $DIRECT_\tau$.

We first find that 92% of the global variance is contributed by the second term in equation (1), consist with the mechanism in Acemoglu et al. (2012) being more important in our context. We then turn to understanding the economic drivers of cross-sectional variation in each of those two terms. Appendix Figure A1 examines the variance terms at the regional level by linking the regional share of the first set of terms on the right-hand side of equation (1) to the Herfindahl Index of the export weights in each region.[1] Consistent with the mechanism in Gabaix (2011), we find that a region's weight concentration is positively associated with its contribution to global variance with an adjusted R^2 over 60%.

Table VII then examines the way the covariance terms in equation (1) vary with export activity.[2] In particular, we estimate a regression explaining the pairwise correlation of SCDS returns using $ExpShare_{i,j,t-1}^{AVG}$, the average fraction of country *i* and *j*'s total exports that are accounted for by their bilateral trade in the previous year. We first focus on explaining the correlation component of the second term in equation (1) as that component is at the heart of the Acemoglu et al. (2012) mechanism. The estimate is strongly statistically significant with a *t*-statistic of 2.91. This finding is robust to controlling for distance, language, and colony—pairwise characteristics often used to identify similar countries. In results not reported, if we instead forecast weighted covariances (i.e., the full second term in equation (1)), the resulting *t*-statistic increases to 8.49 and the R^2 nearly triples to 30.8%.

II. Identification through Heteroscedasticity

The results in Table VII represent an improvement on those in di Giovanni et al. (2017) as we use returns instead of sales. Returns primarily reflect news about all future fundamentals of a country while accounting variables such as sales only directly reflect information from the period in question and typically contain a large predictable component.[3] However, like the results in di Giovanni et al. (2017), the findings in Section I are subject to endogeneity concerns. Trade links may not cause countries to move together; instead, countries which are similar for other reasons (and hence comove as a consequence) may choose to trade with each other.

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[1] Appendix Table A1 Panel B provides a detailed list of which countries comprise each region.

[2] Anton and Polk (2014) introduce this approach to link pairwise return correlation to common institutional ownership.

[3] Though the literature has focused on accounting information such as sales, recent work by di Giovanni and Hale (2020) links U.S. monetary policy shocks to country-sector stock returns using the network of global production linkages.

In this section, we trace the propagation of shocks reflected in weekly SCDS returns through trade links using the Identification Through Heteroscedasticity (ITH) method of (Rigobon, 2003). First, for each country i, we calculate its idiosyncratic SCDS return (labeled $R_{i,t}$) by purging out the part of the return that is correlated with the export-weighted global SCDS return. For each country pair, we then model the joint dynamics of the two countries' idiosyncratic SCDS returns with a system of two simultaneous equations:

$$R_{i,t} = \rho_i R_{i,t-1} + \beta_{i,j} R_{j,t} + \eta_{i,t}$$

$$R_{j,t} = \rho_j R_{j,t-1} + \beta_{j,i} R_{i,t} + \eta_{j,t},$$

where $\eta_{i,t}$ and $\eta_{j,t}$ are the shocks originating from countries i and j in period t. It is clear that OLS estimates are biased. However, it is easy to show that the SCDS returns of the two countries in each period can be characterized by a simple structural VAR with a one-period lag:

$$\begin{bmatrix} R_{i,t} \\ R_{j,t} \end{bmatrix} = \begin{bmatrix} \frac{\rho_i}{1-\beta_{i,j}\beta_{j,i}} & \frac{\beta_{i,j}\rho_j}{1-\beta_{i,j}\beta_{j,i}} \\ \frac{\beta_{j,i}\rho_i}{1-\beta_{i,j}\beta_{j,i}} & \frac{\rho_j}{1-\beta_{i,j}\beta_{j,i}} \end{bmatrix} \times \begin{bmatrix} R_{i,t-1} \\ R_{j,t-1} \end{bmatrix} + \underbrace{\begin{bmatrix} \frac{1}{1-\beta_{i,j}\beta_{j,i}} & \frac{\beta_{i,j}}{1-\beta_{i,j}\beta_{j,i}} \\ \frac{\beta_{j,i}}{1-\beta_{i,j}\beta_{j,i}} & \frac{1}{1-\beta_{i,j}\beta_{j,i}} \end{bmatrix}}_{Transmission\ Matrix\ B} \times \begin{bmatrix} \eta_{i,t} \\ \eta_{j,t} \end{bmatrix}.$$

The transmission matrix B captures the way shocks to one country affect the return of itself as well as the return of the other country. The objective of our empirical analysis is to estimate the matrix B for each country pair and to relate the off-diagonal terms B_{12} and B_{21} to bilateral trade flows. Intuitively, the off-diagonal terms reflect how much one country's idiosyncratic SCDS returns react to the other country's shocks. More specifically, suppose that there is structural shock to country j, then the off-diagonal term $B_{12} = \frac{\beta_{i,j}}{1-\beta_{i,j}\beta_{j,i}}$ captures the variation in country i's SCDS return due to the shock to country j.

II.A. Structural VAR estimation with Identification through Heteroscedasticity

We can rewrite the above system of equations in matrix form:

$$\boldsymbol{R}_t' = \boldsymbol{\Upsilon}\boldsymbol{R}_{t-1}' + \boldsymbol{\mu}_t',$$

where

$$\boldsymbol{\mu}_t' = \boldsymbol{B} * \boldsymbol{\eta}_t' = \underbrace{\begin{bmatrix} \frac{1}{1-\beta_{i,j}\beta_{j,i}} & \frac{\beta_{i,j}}{1-\beta_{i,j}\beta_{j,i}} \\ \frac{\beta_{j,i}}{1-\beta_{i,j}\beta_{j,i}} & \frac{1}{1-\beta_{i,j}\beta_{j,i}} \end{bmatrix}}_{Transmission\ Matrix\ B} \times \begin{bmatrix} \eta_{i,t} \\ \eta_{j,t} \end{bmatrix}.$$

A standard VAR estimation produces estimates for matrix $\boldsymbol{\Upsilon}$, but $\boldsymbol{B}$ is not identified since we have four unknowns $\left(\beta_{i,j}, \beta_{j,i}, \sigma_\eta^i, \sigma_\eta^j\right)$ but only three empirical moments $\left(\sigma_\mu^i, \sigma_\mu^j, Cov_\mu^{i,j}\right)$. Following Rigobon (2003), for each pair, we split each year of the sample into two regimes (high vs. low volatility), with the assumption that the model parameters stay constant across the two regimes. With this additional assumption, the proposed VAR model now has six unknowns,

$$\left(\beta_{i,j}, \beta_{j,i}, \sigma_\eta^{i,high}, \sigma_\eta^{j,high}, \sigma_\eta^{i,low}, \sigma_\eta^{j,low}\right),$$

along with six empirical moments,

$$\left(\sigma_\mu^{i,high}, \sigma_\mu^{j,high}, Cov_\mu^{i,j,high}, \sigma_\mu^{i,low}, \sigma_\mu^{j,low}, Cov_\mu^{i,j,low}\right).$$

and the model becomes exactly identified.

We estimate this simple two-regime VAR model for each country-pair/year using weekly SCDS returns in that year. We use T to denote a year in our sample and t to index a week in that year. We then sort each of the 52 weeks in the year into two halves based on the realized SCDS return volatility of the shock-originating country in the past 26 weeks (e.g., week t is sorted based on the realized volatility in weeks t-26 to t-1).

II.B The Relation between the matrix B and bilateral trade flows

After estimating the time-series of the B matrix, we conduct a panel regression where the dependent variable is a vector containing the relevant off-diagonal terms of the asymmetric B matrix,

$$\hat{B}_{i,j,T} = \alpha_{i,j} + \alpha_T + \beta_{exp} ExpShare_{i,j,T} + \beta_{imp} ImpShare_{i,j,T} + CONTROL + \epsilon_{i,j,T}.$$

Our main independent variables of interest are $ExpShare_{i,j,T}$ and $ImpShare_{i,j,T}$, the bilateral exports and imports from country i to country j, divided by the combined GDP of the two countries, respectively. We also control for country-pair fixed effects and year fixed effects to account for unobserved but time-invariant pairwise heterogeneity as well as common shocks to all country-pairs.

The regression results, shown in Appendix Table A3, suggest that shock propagation in SCDS returns is strongly related to export links but not to import links. For example, with the full set of controls, the coefficient on $ExpShare$ is 0.445 (t-statistic = 3.52). Since all the independent variables are standardized, a one-standard-deviation increase in $ExpShare$ leads to an increase of a 0.0045 increase in $B_{i,j}$; for reference, the standard deviation of $B_{i,j}$ is 0.048, so an increase of nearly 10% of the standard deviation. In contrast, the coefficient on $ImpShare$ is indistinguishable from zero.

II.C. Shock transmission from export destinations to exporters

We now exploit our composite measure of export destination news to not only increase the power of our test but also facilitate the measurement of intuitive heterogeneity in the magnitude of the effect. Therefore, for each exporting country, we first collapse all its export destinations into one portfolio and measure $ExpRet$, the export-weighted average SCDS returns across all export destination countries. As in the analysis of Table A3, we then split the 52 weeks in each year into two regimes based on the realized volatilities of $ExpRet$ in the past 26 weeks and estimate the transmission coefficient from the export destination portfolio to the exporting country using ITH. One can think of this exercise as a simple extension of the basic two country ITH as described in Section II. For each country in our sample, instead of focusing on individual trading partners, we create one "composite trading partner" whose SCDS return is $ExpRet$. Therefore, we have only 88 country pairs and the estimated coefficient in the transmission matrix can be interpreted as how much a shock to $ExpRet$ affects a country's SCDS return.

We estimate a panel regression of the resulting shock transmission coefficients on an export country's characteristics. The main independent variables of interest are the eigenvector centrality of the export country in the trade network and its vulnerability index (the rank average of the export country's credit rating and its external debt to GDP ratio). Countries with relatively poor credit quality and/or relatively high external debt are likely more vulnerable to bad news about fundamentals. Similarly, as transmission of information is facilitated by investors' attention, one would expect that more central countries in the network, such as Singapore, Hong Kong, China, United States, and the United Kingdom, would experience stronger effects as investors are likely more attentive to trade information for these countries. We measure a country's "centrality" using the most widely used eigen-centrality measure in network analysis (see, for example, Allen and Babus (2008), Acemoglu, Ozdaglar and Tahbaz-Salehi (2010, 2013)). Specifically, the eigen-centrality is the corresponding eigenvalue calculated by applying the standard eigenvalue decomposition on the export destination matrix $Trade$ in year t in a way similar to Richmond (2016).

For ease of interpretation, both measures of vulnerability and centrality are converted to zero-one dummies using the cross-sectional median as the threshold. Other control variables include the logarithm of GDP and the logarithm of total export. Column 1 of Appendix Table A4 shows the results for the full sample, while Columns 2-7 report the results based on various subsamples. As is evident in the table, export countries that are more central in the trade network and more vulnerable are more likely to be affected by shocks to their export destinations in the contemporaneous period.

In summary, our novel use of weekly SCDS returns and identification through heteroskedasticity provides causal evidence that country-level shocks propagate through the trade network, in contrast to the alternative view that countries simply have common exposures to aggregate shocks.

III. Linking Variation in the Global SCDS Return to Macroeconomic Quantities: Further Evidence

Appendix Figure A2 explores the predictive relation between the global SCDS return and subsequent global equity volatility. As the figure shows, the lagged global SCDS return is positively correlated (0.44) with global equity volatility. We confirm this relation in Appendix Table A5. Column (1) of the table documents that the lagged global SCDS return forecasts subsequent global equity volatility with a *t*-statistic of 3.29. Column (2) of Appendix Table A5 highlights that the global SCDS return continues to forecast equity volatility even after adding six lags of equity volatility to the regression.

Appendix Table A1: Sample of Countries

Panel A: SCDS and Stock Index Start Dates

Country	SCDS Starting Date	Stock Index	Stock index Starting Date
Algeria	Sep-08		
Angola	Oct-09		
Argentina	Apr-01	MERVAL	Apr-01
Australia	Oct-03	AS51	Oct-03
Austria	Jul-01	ATX	Jul-01
Bahrain	Aug-04	BHSEASI	Aug-04
Barbados	Jul-06		
Belgium	Mar-01	BEL20	Mar-01
Belize	Jan-10		
Brazil	Feb-01	IBOV	Feb-01
Bulgaria	May-01	SOFIX	May-01
Canada	Oct-03	SPTSX	Oct-03
Chile	Mar-02	IGPA	Mar-02
China	Feb-01	SHSZ300	Feb-01
Colombia	Apr-01	COLCAP	Apr-01
Costa Rica	Sep-03	CRSMBCT	Sep-03
Croatia	Feb-01	CRO	Feb-01
Cyprus	Aug-02	CYSMMAPA	Aug-02
Czech	Apr-01	PX	Apr-01
Denmark	Dec-02	KFX	Dec-02
Dominica	Aug-03		
Ecuador	Jul-03		
Egypt	Apr-02	HERMES	Apr-02
El Salvador	Jul-03		
Estonia	Jul-04	TALSE	Jul-04
Fiji	Jul-07		
Finland	Aug-02	HEX	Aug-02
France	May-02	CAC	May-02
Georgia	Jul-15		
Germany	Nov-02	DAX	Nov-02
Ghana	Jun-08	GGSECI	Jun-08
Greece	Feb-01	ASE	Feb-01
Guatemala	Sep-03		
Hong Kong	Sep-04	HSCI	Sep-04
Hungary	Apr-01	BUX	Apr-01
Iceland	Apr-04		
India	Aug-03	SENSEX	Aug-03

Indonesia	Jan-02	JCI	Jan-02
Iraq	Mar-06		
Ireland	Feb-03	ISEQ	Feb-03
Israel	May-01	TA-25	May-01
Italy	Mar-01	FTSEMIB	Mar-01
Jamaica	Oct-03	JMSMX	Oct-03
Japan	Feb-01	TPX	Feb-01
Jordan	Oct-03	JOSMGNFF	Oct-03
Kazakhstan	Feb-04	KZKAK	Feb-04
Latvia	Sep-04	RIGSE	Sep-04
Lebanon	Apr-03	BLOM	Apr-03
Lithuania	May-02	VILSE	May-02
Macedonia	Oct-11	MCTSTAT	Oct-11
Malaysia	May-01	FBMKLCI	May-01
Malta	Aug-04	MALTEX	Aug-04
Mexico	Feb-01	MEXBOL	Feb-01
Morocco	May-01	MCSINDEX	May-01
Netherlands	Sep-03	AEX	Sep-03
New Zealand	Jan-04	NZSE50FG	Jan-04
Nigeria	Jan-07	NGSEINDX	Jan-07
Norway	Nov-03	OBX	Nov-03
Oman	Dec-08	MSM30	Dec-08
Pakistan	Aug-04	KSE100	Aug-04
Panama	Mar-02	BVPSBVPS	Mar-02
Peru	Mar-02	SPBLPGPT	Mar-02
Philippines	Apr-01	PCOMP	Apr-01
Poland	Feb-01	WIG	Feb-01
Portugal	Mar-02	BVLX	Mar-02
Qatar	Oct-01	DSM	Oct-01
Romania	Apr-02	BET	Apr-02
Russia	Oct-01	INDEXCF	Oct-01
Saudi Arabia	Mar-07	SASEIDX	Mar-07
Serbia	Jul-06	BELEXLN	Jul-06
Singapore	Aug-03	STI	Aug-03
Slovakia	Jun-01	SKSM	Jun-01
Slovenia	Mar-02		
South Africa	Feb-01	TOP40	Feb-01
South Korea	May-01	KRX100	May-01
Spain	Mar-01	IBEX	Mar-01
Sri Lanka	Jan-08	CSEALL	Jan-08
Sweden	Jul-01	OMX	Jul-01
Switzerland	Jul-07	SMI	Jul-07
Taiwan	Sep-06	TWSE	Sep-06

Thailand	Apr-01	SET	Apr-01
Trinidad and Tobago	Dec-04		
Tunisia	Dec-03	TUSISE	Dec-03
Turkey	Feb-01	XU100	Feb-01
UAE	Mar-07	DFMGI	Mar-07
Ukraine	Oct-02	UX	Oct-02
United Kingdom	Apr-06	UKX	Apr-06
Uruguay	Jun-02		
US	Jan-04	SPX	Jan-04
Venezuela	Mar-01		
Vietnam	Sep-02	VNINDEX	Sep-02

Panel B: List of Countries in Each Region	
Africa:	Algeria, Angola, Egypt, Ghana, Morocco, Nigeria, South Africa, Tunisia
Americas:	Argentina, Barbados, Belize, Brazil, Canada, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Jamaica, Mexico, Panama, Peru, Trinidad and Tobago, United States, Uruguay, Venezuela
Eastern Europe:	Bulgaria, Czech Republic, Hungary, Poland, Russia, Slovak Republic, Ukraine
Northern Europe	Denmark, Estonia, Finland, Iceland, Ireland, Latvia, Lithuania, Norway, Sweden, United Kingdom
South Asia	Australia, Fiji, India, Kazakhstan, New Zealand, Pakistan, Sri Lanka
Southeastern Asia	China, Hong Kong, Indonesia, Japan, Korea, Malaysia, Philippines, Singapore, Thailand, Vietnam
Southern Europe	Croatia, Greece, Italy, Malta, North Macedonia, Portugal, Slovenia, Spain
Western Asia	Bahrain, Cyprus, Georgia, Iraq, Israel, Jordan, Lebanon, Oman, Qatar, Turkey, Saudi Arabia, United Arab Emirates
Western Europe	Austria, Belgium, France, Germany, Netherlands, Switzerland

Appendix Table A2: Forecasting SCDS Returns in Various Subsamples

This table reports calendar-time portfolio returns of sovereign CDS (SCDS) contracts. At the end of each month, SCDS contracts are sorted into five groups (P1 to P5) based on $ExpRet$, the weighted average SCDS return on a country's export destinations over the past three months, where the weights are proportional to how much the country exported to its export destinations in the prior year. All countries are equally weighted within each quintile and the portfolios are held for one month. The long/short strategy is constructed by going long SCDS in quintile P5 and selling short SCDS in quintile P1. In all specifications, we control for the sovereign CDS momentum factor ($OwnRet$, constructed based on a 3-month forming period and a one-month holding period), the equal-weighted global SCDS factor ($MktRet$), the global momentum (MOM_EW) and value factors ($Value\_EW$) (as in Asness, Moskowitz and Pedersen, 2013), the US equity market factor ($US\ RMRF$), as well as commodity market momentum (CM_MKT) and carry factors ($CM\ CARRY$). Column 1 of Panel A reports the full sample result; Column 2 reports portfolio alpha using market-adjusted SCDS returns of export destination countries in the construction of $ExpRet$; Column 3 reports portfolio alpha by scaling the long/short portfolio to have constant volatility following Barroso and Santa Clara (2015). Panel B reports portfolio alpha based on various subsamples. We report *t*-statistics based on standard errors with Newey-West adjustments of up to 12 lags in parentheses with *, **, and *** indicating statistical significance at the 10%, 5%, and 1% levels, respectively.

	Panel A		
	(1)	(2)	(3)
	Full Sample	SCDS Market adjusted Portfolio	Constant Volatility Portfolio
$Alpha$	0.0021***	0.0022**	0.0024***
	(2.64)	(2.41)	(2.71)
$OwnRet$	0.3626***	0.0901	0.3774***
	(5.11)	(0.70)	(5.79)
$MktRet$	0.1582	0.0406	-0.0432
	(1.18)	(0.20)	(-0.30)
$Value\_EW$	0.1510	-0.0704	0.1871
	(1.44)	(-0.46)	(1.50)
MOM_EW	0.0591	-0.219	0.0753
	(1.38)	(-0.37)	(1.13)
$US\ RMRF$	0.0002	0.0006**	-6.08e-06
	(0.66)	(2.11)	(-0.02)
CM_MKT	0.0541***	0.0140	0.0480**
	(2.96)	(0.47)	(2.32)
$CM\ CARRY$	-0.0367	-0.0704**	-0.0387**
	(-1.43)	(-2.18)	(-1.97)
No. of Obs.	173	173	173

Panel B							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Drop China	Drop Safe Haven	Drop G20	Drop EU	Drop 10% Smallest Countries	Drop 10% Illiquid Countries	Drop OPEC
Alpha	0.0018**	0.0024***	0.0030***	0.0037***	0.0023***	0.0021**	0.0026***
	(2.26)	(2.81)	(3.15)	(2.57)	(2.74)	(2.49)	(3.13)
OwnRet	0.3526***	0.3378***	0.3056***	0.1900***	0.3619***	0.3721***	0.3055***
	(4.78)	(4.74)	(3.35)	(2.99)	(4.52)	(5.82)	(4.20)
MktRet	0.1931	0.1725	0.0929	0.3834	0.1307	0.1834	0.1984
	(1.29)	(1.31)	(0.69)	(-1.65)	(0.78)	(1.41)	(1.20)
Value_EW	0.1322	0.1518	0.0717	0.2387	0.1562	0.1644*	0.1513
	(1.18)	(1.41)	(0.67)	(1.41)	(1.61)	(1.67)	(1.51)
MOM_EW	0.0503	0.0578	0.0543	0.0495	-0.0267	0.0584	0.0565
	(1.04)	(1.27)	(1.12)	(0.70)	(-0.53)	(1.39)	(1.17)
US RMRF	0.0002	0.0002	0.0003	0.0004	0.0002	0.0002	0.00004
	(0.79)	(0.66)	(1.03)	(1.20)	(0.68)	(0.67)	(0.15)
CM MKT	0.0541***	0.0541***	0.0111	0.0755***	0.0667***	0.0568	0.0469**
	(3.09)	(2.94)	(0.39)	(2.82)	(2.71)	(3.02)	(2.63)
CM CARRY	-0.0296	-0.0452*	-0.0262	-0.0223	-0.0592*	-0.0408	-0.0196
	(-1.04)	(-1.71)	(-0.83)	(-0.76)	(-1.90)	(-1.61)	(-0.62)
No. of Obs.	173	173	173	173	173	173	173

Appendix Table A3: Shock Transmission between Country Pairs

This table reports panel regressions of estimated pairwise shock transmission coefficients, using the Identification Through Heteroscedasticity (ITH) approach of Rigobon (2003), on export/import shares. We obtain the pairwise shock transmission coefficient by estimating a structural VAR for each pair of the G20 member countries in each year using their weekly idiosyncratic SCDS returns. More specifically, following Rigobon (2003), we divide the 52 weeks in each year into two halves based on realized volatility to solve the simultaneous equations. In each column, the estimated pairwise shock transmission coefficient is regressed on two main variables, $ExpShare$ and $ImpShare$, measured as the total export or import divided by the total GDP for each pair of country. For ease of interpretation, both $ExpShare$ and $ImpShare$ are standardized to have a standard deviation of one. Other control variables include the log GDP in the shock originator country, log GDP in the shock destination country, as well as the pairwise difference between the two. We also include year and country pair fixed effects. We report t-statistics based on standard errors double-clustered at the year and country-pair level in parentheses with *, **, and *** indicating statistical significance at the 10%, 5%, and 1% levels, respectively.

	Depvar = Pairwise Shock Transmission Coefficient (in %)					
	(1)	(2)	(3)	(4)	(5)	(6)
$ExpShare$	0.5391***	0.4986**			0.4655***	0.4451***
	(2.64)	(2.40)			(5.20)	(3.52)
$ImpShare$			-0.4709	-0.4299	-0.0901	-0.0655
			(-1.60)	(-1.46)	(-0.23)	(-0.17)
GDP_{Origin}		-0.2504		-0.2624		-0.2514
		(-0.43)		(-0.45)		(-0.44)
GDP_{Dest}		-0.0644		-0.0712		-0.0662
		(-0.13)		(-0.15)		(-0.14)
GDP_{Diff}		0.0534		0.0080		0.0475
		(0.19)		(0.03)		(0.16)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Country Pair FE	Yes	Yes	Yes	Yes	Yes	Yes
No. of Obs	2,442	2,442	2,442	2,442	2,442	2,442
Adj. R^2	0.15	0.15	0.15	0.15	0.15	0.15

Appendix Table A4: Shock Transmission from Export Destinations to Exporters

This table reports panel regressions of shock transmission coefficients using the Identification Through Heteroscedasticity (ITH) approach of Rigobon (2003). In each year, for each exporting country in our sample, we estimate a shock transmission coefficient from $ExpRet$ (the weighted average SCDS returns across all export destination countries) to the contemporaneous SCDS returns of the exporting country in question based on weekly data in that year. Following Rigobon (2003), we divide the 52 weeks in each year into two halves based on realized volatility to solve the simultaneous equations. We then conduct a panel regression of the country-specific shock transmission coefficients on the country's eigenvector centrality in the trade network and the vulnerability index (which is the rank average of each country's (inverse) credit rating, and external-debt-to-GDP ratio). For ease of interpretation, both independent variables are then transformed into a zero/one dummy with the sample median as the threshold. Other control variables include log GDP and log total export. Observations in each year are weighted by the inverse of the number observations in that year. Column (1) shows the results for the full sample, Columns (2)-(7) report the results based on various subsamples. We report *t*-statistics based on standard errors double-clustered at both year and country levels in parentheses with *, **, and *** indicating statistical significance at the 10%, 5%, and 1% levels, respectively.

	Depvar = Shock Transmission Coefficients						
	Full Sample	Drop Safe Haven	Drop G20	Drop EU	Drop 10% Smallest Countries	Drop 10% Illiquid Countries	Drop OPEC
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$Vulnerability$	1.454***	1.281**	1.379**	1.915**	1.403**	0.965*	1.331**
	(2.59)	(2.29)	(2.23)	(2.41)	(2.48)	(1.94)	(2.16)
$Centrality$	1.885***	1.815***	1.941***	2.333***	1.826***	1.576***	1.911***
	(3.32)	(3.20)	(3.10)	(3.05)	(3.05)	(3.08)	(3.07)
Adj-R2	0.07	0.07	0.06	0.08	0.08	0.07	0.08
No. Obs.	1,027	965	719	674	972	998	941

Appendix Table A5: SCDS Returns Forecasting Global Equity Volatilities

This table reports forecasting regressions of equity market volatility on lagged sovereign CDS (SCDS) returns. Daily global equity market returns are the export-volume weighted average of all countries' equity market returns in a given day; we then compute the realized monthly volatility of the daily global equity returns. The main independent variable, the monthly global SCDS return, is defined as the export-volume weighted average of all countries' SCDS returns in each month. Column (1) includes the previous month global equity market volatility as a control; column (2) includes five additional lags of global equity market volatility. We report *t*-statistics based on a Newey-West adjustment with up to 12 lags in parentheses with *, **, and *** indicating statistical significance at the 10%, 5%, and 1% levels, respectively.

	Depvar = Trade-weighted global equity volatility in month t	
	(1)	(2)
$Global\ SCDS\ Ret_{t-1}$	0.00303***	0.00288***
	(3.29)	(2.43)
$Global\ Equity\ Vol_{t-1}$	0.676***	0.865***
	(12.60)	(9.25)
$Global\ Equity\ Vol_{t-2}$		-0.309***
		(-2.78)
$Global\ Equity\ Vol_{t-3}$		0.037
		(0.32)
$Global\ Equity\ Vol_{t-4}$		0.089
		(0.78)
$Global\ Equity\ Vol_{t-5}$		-0.030
		(-0.27)
$Global\ Equity\ Vol_{t-6}$		0.095
		(1.06)
No. of Obs.	175	170
Adj. R^2	0.581	0.623

Appendix Table A6. Investor Sentiment and Future Returns

This table reports regressions forecasting future equity returns and sovereign CDS returns. The dependent variable in column (1) to (4) are equity returns in future 1-month, 3-month, 6-month and 12-month. The dependent variable in column (5) to (8) are sovereign CDS returns in future 1-month, 3-month, 6-month and 12-month. The main independent variable, $BW\ Index_t$, is the sentiment index in Baker and Wurgler (2006). In columns (1) to (4), we control for the past 12-month equity returns by controlling for the past 1-month equity return, $StockRet_t$, and the additional past 11-month equity return, $StockRet_{t-11,t-1}$. In columns (5) to (8), we control for the past 12-month sovereign CDS returns by controlling for the past 1-month sovereign CDS return, $SCDSRet_t$, and the additional past 11-month sovereign CDS return, $SCDSRet_{t-11,t-1}$. We report *t*-statistics based on standard errors with Newey-West adjustments of up to 12 lags in parentheses with *, **, and *** indicating statistical significance at the 10%, 5%, and 1% levels, respectively.

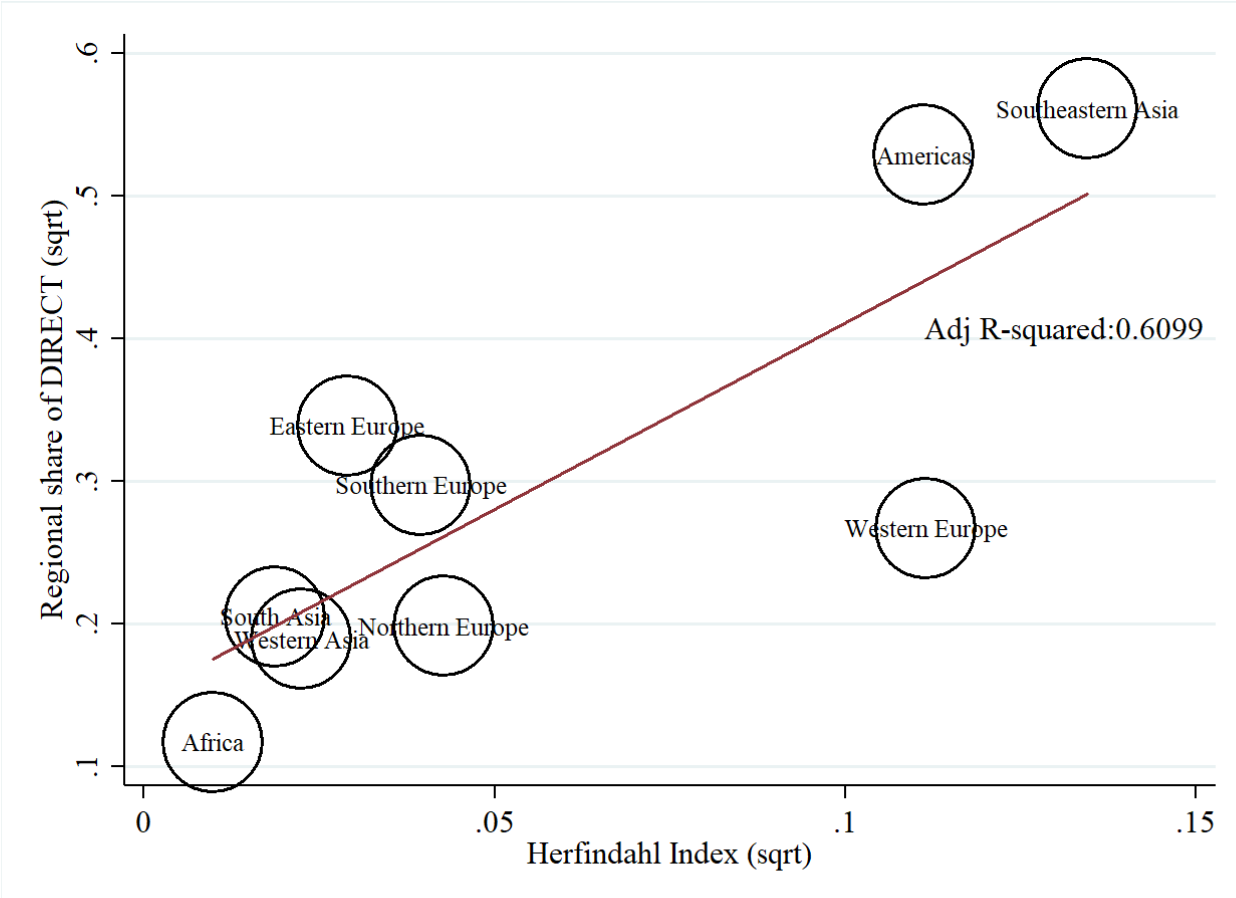
	$StockRet$				$SCDSRet$			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	$t+1$	$t+3$	$t+6$	$t+12$	$t+1$	$t+3$	$t+6$	$t+12$
$BW\ Index_t$	-0.020**	-0.067***	-0.147***	-0.277***	0.0001	0.001	0.004	0.008
	(-2.16)	(-2.87)	(-3.32)	(-3.75)	(0.08)	(0.40)	(1.21)	(1.10)
$StockRet_t$	0.113	0.190	0.107	-0.177				
	(1.06)	(0.89)	(0.48)	(-0.64)				
$StockRet_{t-11,t-1}$	0.011	0.006	-0.021	-0.072				
	(0.38)	(0.09)	(-0.19)	(-0.76)				
$SCDSRet_t$					0.040	-0.142	-0.241	-0.379**
					(0.31)	(-0.50)	(-1.13)	(-2.27)
$SCDSRet_{t-11,t-1}$					-0.053	-0.151	-0.240	-0.184
					(-0.64)	(-0.98)	(-1.43)	(-1.46)
Obs.	164	162	159	153	129	127	124	118
Adj. R2	0.03	0.09	0.18	0.32	0.001	0.03	0.09	0.11

Appendix Table A7. SCDS Returns Forecasting Real Economic Outcomes

This table reports regressions forecasting real economic outcomes with SCDS returns. The dependent variable in Panel A is the export growth of each country in year *t*+1. The main independent variable of interest is the corresponding country's annual SCDS return in year *t* ($OwnRet_t$). Other control variables include the country's equity market return ($OwnStock_t$), currency return ($OwnCurr_t$), as well as export growth and GDP growth, all measured in year *t*. Panel B reports regressions of forecasting future one-year import growth with the exporting countries' SCDS returns. The dependent variable is the import growth of each country in year *t+1*. The main independent variable of interest, $ImpRet_t$, is the weighted average of annual SCDS returns for the import destination (upstream) countries in year *t*. Other control variables include the import-weighted average of annual equity returns, $ImpStock_t$, and currency returns, $ImpCurr_t$ for the import destination (upstream) countries in year *t*. All independent variables are standardized to have a mean of zero and standard deviation of one. Time fixed effects are included in all specifications. We report *t*-statistics based on standard errors double-clustered by time and country in parentheses with *, **, and *** indicating statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Depvar = Export Growth (in %)					
	(1)	(2)	(3)	(4)	(5)
$OwnRet_t$	-0.517	-0.505	-0.324	-0.135	-0.126
	(-0.56)	(-0.53)	(-0.35)	(-0.17)	(-0.16)
$OwnStock_t$				1.287	1.260
				(1.56)	(1.44)
$OwnCurr_t$					0.063
					(0.12)
$ExportGrowth_t$		-0.713	-2.216	-0.431	-0.428
		(-0.29)	(-0.89)	(-0.24)	(-0.24)
$GDPGrowth_t$			3.497***	2.666***	2.665***
			(3.83)	(3.42)	(3.44)
Time FE	Yes	Yes	Yes	Yes	Yes
No. of Obs.	894	894	894	768	767
Adj. R^2	0.61	0.61	0.63	0.70	0.70

Panel B: Depvar $= ImportGrowth_{t+1}$ (in %)		
$ImpRet_t$	-0.870	-1.017
	(-1.24)	(-1.57)
$ImpStock_t$	6.555***	6.454***
	(3.27)	(3.27)
$ImpCurr_t$	-0.914	-0.405
	(1.32)	(-0.48)
$OwnRet_t$	-2.205***	-2.203***
	(-3.20)	(-3.28)
$ImportGrowth_t$		1.420*
		(1.85)
Time FE	Yes	Yes
No. of Obs.	950	950
Adj. R^2	0.52	0.53

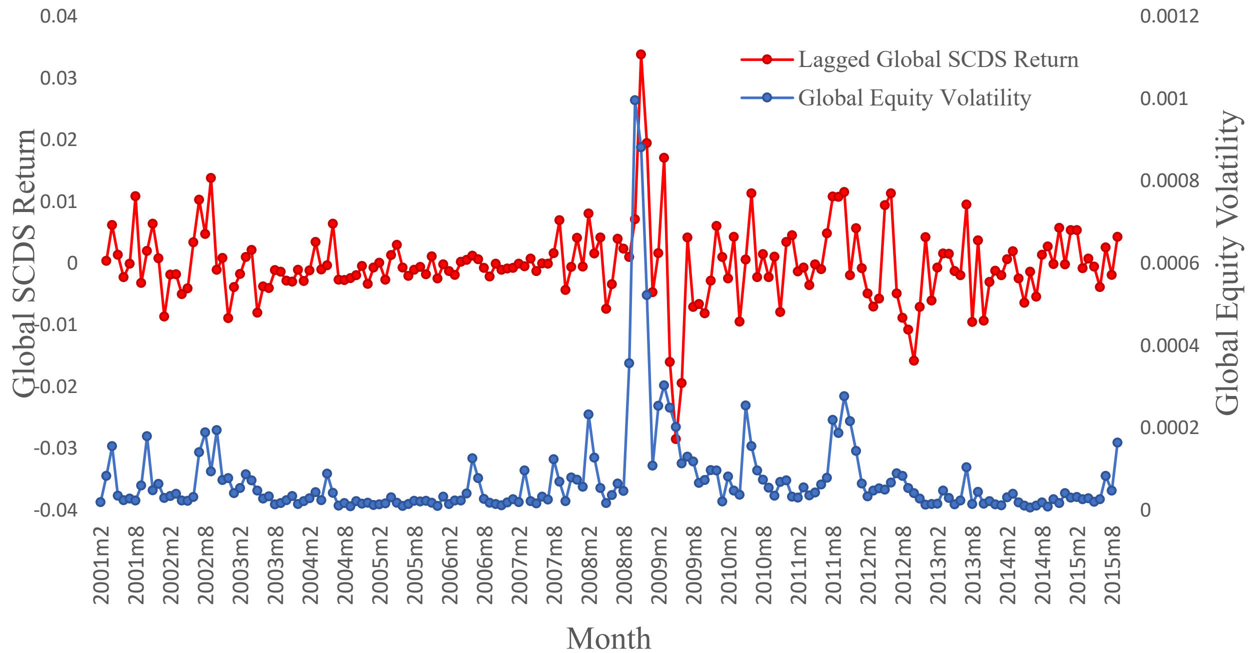


Appendix Figure A1. Global SCDS Volatilities and Regional Export Concentration

This figure shows the relation between regional export concentration and the region's contribution to the global SCDS volatility. The y-axis is the share of regional contribution to the *DIRECT* component of the global SCDS volatility. The decomposition of global SCDS volatility into the *DIRECT* and *LINK* components follows Giovanni, Levchenko and Mejean (2014):

$$\sigma_{g,\tau}^2 = \underbrace{\sum_i w_{i,\tau-1}^2 Var\left(Ret_{i,t}\right)}_{DIRECT_\tau} + \underbrace{\sum_i \sum_j w_{i,\tau-1} * w_{j,\tau-1} * Cov\left(Ret_{i,t}, Ret_{j,t}\right)}_{LINK_\tau}.$$

The x-axis is the Herfindahl index of each country's share of the global export in each region. We also fit a regression line through these observations, with an adj-R^2 of 61%.



Appendix Figure A2. Global Equity Volatilities and Lagged SCDS Returns

This figure shows the monthly series of global equity market volatilities and lagged one-month global SCDS returns. Both variables are calculated as the trade-weighted averages across all countries in the sample.