Trade Costs, Asset Market Frictions and Risk Sharing

Doireann Fitzgerald

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1 Derivation of Gravity equations

The first order condition for Z_t^i is :

$$P_t^i X_t^{i\frac{1}{\eta}} Z_t^{ik-\frac{1}{\eta}} = \tau_t^{ik} Q_t^k \tag{1}$$

This can be rearranged to obtain demand:

$$\tau_t^{ik} Q_t^k Z_t^{ik} = \left(\frac{\tau_t^{ik} Q_t^k}{P_t^i}\right)^{1-\eta} P_t^i X_t^i \tag{2}$$

Substituting demand into the resource constraint for the country-k good, one obtains:

$$Q_t^k Y_t^k = \sum_{j=1}^{N} \tau_t^{jk} Q_t^k Z_t^{jk} = \left(\frac{1}{Q_t^k}\right)^{\eta-1} \sum_{j=1}^{N} \left(\frac{P_t^j}{\tau_t^{jk}}\right)^{\eta-1} P_t^j X_t^j \tag{3}$$

Rearranging this expression, it can be used to substitute in for $Q_t^{k(1-\eta)}$ in (2), yielding:

$$\frac{IM_t^{ik}}{EXP_t^i OUT_t^k} = \frac{\tau_t^{ik} Q_t^k Z_t^{ik}}{\left(P_t^i X_t^i\right)\left(Q_t^k Y_t^k\right)} = \left(\frac{P_t^i \Pi_t^k}{\tau_t^{ik}}\right)^{\eta-1} \tag{4}$$

where

$$\left(\Pi_t^k\right)^{1-\eta} = \sum_{j=1}^{N} \left(\frac{P_t^j}{\tau_t^{jk}}\right)^{\eta-1} P_t^j X_t^j \tag{5}$$

which is exactly what is reported in the text.

Now assume balanced trade, so $P_t^i X_t^i = Q_t^i Y_t^i$ and symmetric trade costs, so $\tau_t^{ik} = \tau_t^{ki}$. Remember that

$$\left(P_t^k\right)^{1-\eta} = \sum_{j=1}^{N} \left(\frac{1}{\tau_t^{kj}}\right)^{\eta-1} Q_t^{j(1-\eta)} \tag{6}$$

Using (3) to substitute in for $Q_t^{j(1-\eta)}$, and making use of $P_t^j X_t^j = Q_t^j Y_t^j$ we obtain

$$\left(P_t^k\right)^{1-\eta} = \sum_{j=1}^{N} \left(\frac{\Pi_t^j}{\tau_t^{kj}}\right)^{\eta-1} P_t^j X_t^j \tag{7}$$

Notice that $\Pi_t^k = P_t^k$ is a solution to (5) and (7) as long as trade costs are symmetric, so we

can write:

$$\frac{IM_t^{ik}}{EXP_t^i OUT_t^k} = \left(\frac{P_t^i P_t^k}{\tau_t^{ik}}\right)^{\eta-1}$$

2 List of countries included in the sample

The choice of the 88-country sample is motivated by a desire to maintain a balanced panel over the period 1970-2000. All countries such that a complete set of the required data is available from the sources described in the text are included in the full sample. This results in the exclusion of some countries (e.g. Argentina, Poland, Romania and Bulgaria) for which the requisite data is not available for all sample years (the main constraint here is data on consumption and employment). The desire to work with a balanced panel also leads me to exclude all countries whose borders change, or which come into existence or disappear during the sample period (such as USSR/ Russia, Czechoslovakia/ Czech and Slovak Republics). The exception to this is Germany, the one big developed country that experiences a change in borders over the sample. Given its importance in world trade throughout the sample, Germany is included in the sample. The data for Germany refers to West Germany up to 1990, and to all of Germany from 1991. As regards Luxembourg, although Belgium and Luxembourg are separate countries with constant borders, until 1988, bilateral merchandise trade data is reported only for the aggregate of Belgium and Luxembourg, and not broken out separately for Belgium and Luxembourg. To ensure a balanced panel while including both of these countries, I aggregate Belgium and Luxembourg together throughout the sample period.

Full sample: Algeria, Australia, Austria, Barbados, Belgium-Luxembourg, Benin, Bolivia, Brazil, Burkina Faso, Burundi, Cameroon, Canada, Central African Republic, Chile, China, Colombia, Congo, Dem. Rep., Congo, Rep., Costa Rica, Cote d'Ivoire, Denmark, Dominican Republic, Ecuador, Egypt, Arab Rep., El Salvador, Fiji, Finland, France, Gabon, Germany, Ghana, Greece, Guatemala, Guinea-Bissau, Guyana, Haiti, Honduras, Hong Kong, China, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Japan, Kenya, Korea, Rep., Madagascar, Malaysia, Mali, Malta, Mauritania, Mexico, Morocco, Netherlands, New Zealand, Nicaragua, Niger, Norway, Pakistan, Papua New Guinea, Paraguay, Peru, Philippines, Portugal, Rwanda, Saudi Arabia, Senegal, Sierra Leone, South Africa, Spain, Sri Lanka, Sudan, Sweden, Switzerland, Syrian Arab Republic, Taiwan, Thailand, Togo, Trinidad and Tobago,

Tunisia, Turkey, United Kingdom, United States, Uruguay, Venezuela, RB, Zambia. **Baseline developed country sample:** Australia, Austria, Belgium-Luxembourg, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, United States.

Alternative "developed country" subsamples

1. Developed: The 6 OECD countries used by Kollmann (1995). USA, Japan, France, UK, Italy, Canada. Developing: All other countries in the 88-country sample.

2. Developed: The 8 OECD countries used by Backus and Smith (1993). Australia, Canada, France, West Germany, Japan, Sweden, UK and USA. Developing: All other countries in the 88-country sample.

3. Developed: The 12 OECD countries used by Ravn (2001). Australia, Canada, Denmark, France, Italy, Japan, the Netherlands, New Zealand, Norway, Switzerland, UK, USA. Developing: All other countries in the 88-country sample.

4. Developed: Ravn (2001) definition plus 5 additional core countries. Australia, Austria, Belgium-Luxembourg, Canada, Denmark, Finland, France, Germany, Italy, Japan, the Netherlands, New Zealand, Norway, Sweden, Switzerland, UK, USA. Developing: All other countries in the 88-country sample.

5. Developed: The 23 countries whose average PPP-GDP per capita rank over the sample period is greater than or equal to 24, but excluding Hong Kong because though its average rank is high, it is high because it increases sharply over the sample period. Australia, Austria, Barbados, Belgium-Luxembourg, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Japan, Netherlands, New Zealand, Norway, Spain, Sweden, Switzerland, United Kingdom, United States. Developing: All other countries in the 88-country sample. Note: Portugal is classified as a developing country.

6. Developed: The 24 countries whose average PPP-GDP per capita rank over the sample period is greater than or equal to 24. Australia, Austria, Barbados, Belgium-Luxembourg, Canada, Denmark, Finland, France, Germany, Greece, Hong Kong, Iceland, Ireland, Israel, Italy, Japan, Netherlands, New Zealand, Norway, Spain, Sweden,

Switzerland, United Kingdom, United States. Developing: All other countries in the 88-country sample. Note: Portugal is classified as a developing country.

7. Developed: The 23 countries that were OECD members as of 1973. Australia, Austria, Belgium-Luxembourg, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States. Developing: All other countries. Note: As described above, Belgium and Luxembourg are merged for data resasons.

8. Developed: All 26 countries which were members of the OECD at some point over the period 1970-2000 and which are included in the 88-country sample: Australia, Austria, Belgium-Luxembourg, Canada, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, Mexico, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States. Developing: All other countries in the 88-country sample. Note: Czech Republic, Poland and the Slovak Republic joined the OECD in the period 1995-2000, but are not included in the 88-country sample because of the desire to maintain a balanced panel, and hence are not included in either group.

9. Developed: All 28 OECD members as of 2010 which are included in the 88-country sample: Australia, Austria, Belgium-Luxembourg, Canada, Chile, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Israel, Japan, Korea, Mexico, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States. Developing: All other countries in the 88-country sample. Note: Czech Republic, Estonia, Luxembourg, Poland, Slovak Republic and Slovenia are current OECD members, but are not included in the 88-country sample, and hence not included in either group.

3 Procedure to construct in-sample shares for structural estimation

Let variables without a tilde denote the raw data, and variables with a tilde denote the constructed variables for use in the structural estimation. Let N be the full number of

countries in the world, and let $\tilde{N}$ be the number of countries in the sample. Then, reorder countries such that 1to $\tilde{N}$ are in the sample. I then construct the following. If $i \neq k$, then:

$$\tilde{IM_t^{ik}} = \frac{IM_t^{ik}}{\sum_{j=1,j\neq i}^{\tilde{N}} IM_t^{ij}} IM_t^i \frac{1}{\sum_{h=1}^{\tilde{N}} \sum_{l=1}^{\tilde{N}} \tilde{IM_t^{ik}}}$$

while if $i = k$, then:

$$\tilde{IM_t^{ii}} = \left[OUT_t^i - EX_t^i\right] \frac{1}{\sum_{h=1}^{\tilde{N}} \sum_{l=1}^{\tilde{N}} \tilde{IM_t^{ik}}}$$

where IM_t^i is total imports into country i at date t, measured using national accounts data, and EX_t^i is total exports from country i at date t, also measured using national accounts data. Then:

$$\tilde{OUT}_t^i = \frac{OUT_t^i}{\sum_{j=1}^{\tilde{N}} OUT_t^j}$$

$$\tilde{EXP}_t^i = \frac{EXP_t^i}{\sum_{j=1}^{\tilde{N}} OUT_t^j}$$

In this way, all variables are expressed as shares of in-sample output or in-sample absorption. Note that the sample as a whole runs only a small trade balance with the rest of the world (the maximum surplus is 0.6% of in-sample GDP while the maximum deficit is 0.4% of in-sample GDP), so in-sample output and in-sample absorption are very close. The variables with tilde are then used in the structural estimation.

4 More details on structural estimation

Mechanically, I take logs of

$$\frac{IM_t^{ik}}{EXP_t^i} = \frac{\left(\tau_t^{ik}\right)^{1-\eta} \left(Q_t^k\right)^{1-\eta}}{\sum_{j=1}^{N} \left(\tau_t^{ij}\right)^{1-\eta} \left(Q_t^j\right)^{1-\eta}} \tag{8}$$

add an error term, reformulate the variables and estimate:

$$\ln\left(\frac{IM_t^{ik}}{EXP_t^i}\right) = d^{ik}\gamma_t + \alpha_t^k - \ln\left(\sum_{j=1}^{N} \exp\left(\mathbf{d}^{ij} \cdot \boldsymbol{\gamma}_t + \alpha_t^j\right)\right) + \varepsilon_t^{ik} \tag{9}$$

subject to the restriction that:

$$OUT_t^i = \sum_{j=1}^{N} \frac{\exp\left(\mathbf{d}^{ji} \cdot \boldsymbol{\gamma}_t + \alpha_t^i\right)}{\sum_{k=1}^{N} \exp\left(\mathbf{d}^{jk} \cdot \boldsymbol{\gamma}_t + \alpha_t^k\right)} EXP_t^j \tag{10}$$

by estimating penalized non-linear least squares. More precisely, for each period, I choose the vectors $\boldsymbol{\gamma}_t$ and $\boldsymbol{\alpha}_t$ to minimize:

$$\sum_{i=1}^{N}\sum_{j=1}^{N} \omega_t^{ij} \left(\varepsilon_t^{ij}\right)^2 + \chi \sum_{k=1}^{N} \zeta_t^k \left(\upsilon_t^k\right)^2 \tag{11}$$

where

$$OUT_t^i = \sum_{j=1}^{N} \frac{\exp\left(\mathbf{d}^{ji} \cdot \boldsymbol{\gamma}_t + \alpha_t^i\right)}{\sum_{k=1}^{N} \exp\left(\mathbf{d}^{jk} \cdot \boldsymbol{\gamma}_t + \alpha_t^k\right)} EXP_t^j + \upsilon_t^i$$

and $\zeta_t^k = OUT_t^k$. I set χ very large - sufficiently large that replacing χ by 10χ results in only very small changes in the parameter vector. Computationally, this is much more straightforward than directly imposing (10) with equality. This procedure is repeated for each cross-section independently. Notice that nothing ties down the absolute level of prices, so I set $Q_{tN} = 1$ for all t to estimate the $N-1$-vector of relative prices.

5 Algorithm for recovering fitted values from structural estimates

Given the fitted values for $\boldsymbol{\gamma}_t$ and $\boldsymbol{\alpha}_t$, and the chosen values of η and ρ, the variables necessary for the counterfactual are recovered as follows. Trade costs are given by

$$\hat{\tau}_t^{ij} = \left[\exp\left(\mathbf{d}^{ij\prime}\hat{\boldsymbol{\gamma}}_t\right)\right]^{\frac{1}{1-\eta}}$$

while estimates of (relative) output prices are given by:

$$\hat{Q}_t^i = \left[\exp\left(\hat{\alpha}_t^i\right)\right]^{\frac{1}{1-\eta}}$$

Output prices and trade costs together yield the estimate of (relative) consumption prices

using:

$$\hat{P}_t^i = \left[\sum_{j=1}^{N} \left(\hat{\tau}_t^{ij} \hat{Q}_t^j \right)^{1-\eta} \right]^{\frac{1}{1-\eta}}$$

Estimated consumption prices and data on the value of expenditure on consumption are used to recover an estimate of (relative) real consumption:

$$\hat{C}_t^i = \frac{\mu_t^i EXP_t^i}{\hat{P}_t^i}$$

where μ_t^i is the historical share of expenditure devoted to private consumption. An estimate of the amount of (relative) real output devoted to consumption is then constructed using real demand for each intermediate and the resource constraint for each intermediate:

$$\hat{Y}_t^{iC} = \sum_{j=1}^{N} \tau_t^{ji} \left(\frac{\hat{\tau}_t^{ji} \hat{Q}_t^i}{\hat{P}_t^j} \right)^{-\eta} \hat{C}_t^j$$

It will also be convenient to have an estimate of total real output, which can be calculated as:

$$\hat{Y}_t^i = \sum_{j=1}^{N} \tau_t^{ji} \left(\frac{\hat{\tau}_t^{ji} \hat{Q}_t^i}{\hat{P}_t^j} \right)^{-\eta} \frac{EXP_t^j}{\hat{P}_t^j} = \frac{OUT_t^i}{\hat{Q}_t^i}$$

(the last equality is because (10) is imposed on the estimates with equality). Finally, to obtain an estimate of the vector $\boldsymbol{\lambda}_t$, I need to make an assumption about the form of $u(\cdot)$ and $u_c(\cdot)$. I assume that utility is CRRA with risk aversion ρ, so:

$$\hat{\lambda}_t^i = \hat{P}_t^i \left(\frac{\hat{C}_t^i}{L_t^i} \right)^{\rho}$$

where L_t^i is population. Note that this can be performed for each period independently. The $\hat{\lambda}_t^i$ can then be re-expressed such that $\sum_{i=1}^{N} \hat{\lambda}_t^i = 1$. This will impose a different normalization on prices, though relative prices and the implied relative real allocation will remain unchanged.

Calculating counterfactual net exports and trade does not require any comparison of the absolute levels of real output and real consumption across periods. However calculating welfare does require this. Since the model is estimated on each cross-section independently, the estimates do not tie down the relative size of the real pie across peri-

ods, only the division of that pie within periods. Comparing the pie across periods requires data on real output or real consumption for a numeraire country. I pick the US as the numeraire, and use real GDP as the series I benchmark to. This is implemented as follows. Having constructed $\left\{\hat{\mathbf{Q}}_t, \hat{\mathbf{P}}_t, \hat{\mathbf{C}}_t, \hat{\mathbf{Y}}_t^C, \hat{\mathbf{Y}}_t\right\}$ as described above, I then construct $\left\{\hat{\hat{\mathbf{Q}}}_t, \hat{\hat{\mathbf{P}}}_t, \hat{\hat{\mathbf{C}}}_t, \hat{\hat{\mathbf{Y}}}_t^C, \hat{\hat{\mathbf{Y}}}_t\right\} = \left\{\alpha_t\hat{\mathbf{Q}}_t, \alpha_t\hat{\mathbf{P}}_t, \frac{\hat{\mathbf{C}}_t}{\alpha_t}, \frac{\hat{\mathbf{Y}}_t^C}{\alpha_t}, \frac{\hat{\mathbf{Y}}_t}{\alpha_t}\right\}$ with $\alpha_t = \hat{Y}_{US,t}/Y_{US,t}$.

6 Algorithm for finding solution to planner's problem

Given $\left\{\mathbf{L}_t, \hat{\boldsymbol{\tau}}_t, \hat{\hat{\mathbf{Y}}}_t^C, \tilde{\boldsymbol{\lambda}}_t; \eta, \rho\right\}$, for any vector of goods prices $\mathbf{Q}$, we can calculate the vector of excess demands for individual goods, $h\left(\mathbf{Q}; \mathbf{L}_t, \hat{\boldsymbol{\tau}}_t, \hat{\hat{\mathbf{Y}}}_t^C, \tilde{\boldsymbol{\lambda}}_t; \eta, \rho\right)$. Starting with some $\mathbf{Q}^0$, let

$$\mathbf{Q}^1 = \mathbf{Q}^0 * \left(1 + \left(h\left(\mathbf{Q}^0; \mathbf{L}_t, \hat{\boldsymbol{\tau}}_t, \hat{\hat{\mathbf{Y}}}_t^C, \tilde{\boldsymbol{\lambda}}_t; \eta, \rho\right) ./ \hat{\mathbf{Y}}_t\right)\right)$$

This is iterated until convergence, which is achieved rapidly. Given this vector of prices, it is possible to calculate the equilibrium values of all relevant variables.

7 Discounted Pareto weights and compensating variation

As an alternative to the baseline, one can calculate the optimal risk sharing Pareto weights as the discounted weighted average of the estimated relative weights within the risk-sharing group. For the exercise that imposes optimal risk sharing within developed countries alone, the weight of the developed countries as a whole relative to that of the rest of the world is held fixed at its estimated level just as before. The weights for developed countries are calculated as (remember $\sum_{i=1}^{N} \hat{\lambda}_t^i = 1$):

$$\tilde{\lambda}_t^{i,rich}(1) = \frac{\sum_{t=1970}^{2000} \beta^{t-1970} \hat{\lambda}_t^i}{\sum_{j \in rich} \sum_{t=1970}^{2000} \beta^{t-1970} \hat{\lambda}_t^j} \left[\sum_{j \in rich} \hat{\lambda}_t^j\right] \tag{12}$$

The time-series of Pareto weights for developing countries are also fixed at their estimated levels, i.e. $\tilde{\lambda}_t^{i,poor}(1) = \hat{\lambda}_t^{i,poor}$.

For optimal risk sharing for the full sample of countries, each country's counterfactual weight is calculated as:

$$\tilde{\lambda}^i(2) = \frac{\sum_{t=1970}^{2000} \beta^{t-1970} \hat{\lambda}_t^i}{\sum_{j=1}^{N} \sum_{t=1970}^{2000} \beta^{t-1970} \hat{\lambda}_t^j} \tag{13}$$

The corresponding measure of welfare is:

$$W_2^i = \sum_{t=1}^{T} \beta^{t-1} \frac{\left(C_t^i / N_t^i\right)^{1-\rho}}{1-\rho} \tag{14}$$

and the corresponding measure of compensating variation is δ_2 such that:

$$\sum_{t=1}^{T} \beta^{t-1} \frac{\left(\delta_2 \hat{\hat{C}}_t^i / L_t^i\right)^{1-\rho}}{1-\rho} = \sum_{t=1}^{T} \beta^{t-1} \frac{\left(\tilde{C}_t^i / L_t^i\right)^{1-\rho}}{1-\rho}$$

This is implemented with $\beta = 0.95$.

8 Additional tables

Table 1: Reduced form gravity equations, estimation results: Full sample

	(1)	(2)	(3)	(4)
ln(vc/pop)		0.58 (0.03)***		
ldist x yr	yes	yes	yes	no
ncontig x yr	yes	yes	yes	no
ncomlang x yr	yes	yes	yes	no
ncolony x yr	yes	yes	yes	no
ncomcol x yr	yes	yes	yes	no
nlegal x yr	yes	yes	yes	no
imp-yr f.e.	yes	no	symmetric	no
exp-yr f.e.	yes	yes	no	no
imp f.e.	no	yes	no	no
time f.e.	no	no	no	yes
# param	5611	3002	2914	31
N	240064	240064	240064	240064
R-sq	0.55	0.52	0.52	0.04

Notes: Dependent variable is $\ln\left(\left(1+IM_t^{ij}\right)/EXP_t^iOUT_t^j\right)$. Estimation is by OLS. Robust standard errors are reported in parentheses. * indicates significantly different from zero at the 10% level, ** indicates significantly different from zero at the 5% level, *** indicates significantly different from zero at the 1% level.

Table 2: Reduced form gravity coefficients, unrestricted model: Full sample

	ldist		ncontig		ncomlang		ncolony		ncomcol		nlegal	
year	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.
1970	-1.22	(0.07)***	0.17	(0.46)	-2.14	(0.16)***	-0.64	(0.31)**	-2.02	(0.25)***	0.28	(0.13)**
1971	-1.20	(0.07)***	-0.11	(0.45)	-2.28	(0.16)***	-0.63	(0.30)**	-1.76	(0.25)***	0.29	(0.13)**
1972	-1.15	(0.07)***	-0.42	(0.45)	-2.44	(0.17)***	-0.74	(0.30)**	-1.91	(0.26)***	0.33	(0.13)**
1973	-1.24	(0.07)***	0.14	(0.47)	-2.41	(0.17)***	-0.57	(0.30)*	-1.74	(0.26)***	0.30	(0.13)**
1974	-1.19	(0.07)***	-0.38	(0.49)	-2.37	(0.17)***	-0.33	(0.31)	-1.87	(0.26)***	0.22	(0.13)*
1975	-1.21	(0.07)***	-0.58	(0.47)	-2.34	(0.17)***	-0.35	(0.31)	-1.55	(0.26)***	0.29	(0.13)**
1976	-1.28	(0.07)***	0.36	(0.50)	-2.23	(0.17)***	-0.66	(0.32)**	-1.62	(0.26)***	0.29	(0.13)**
1977	-1.38	(0.08)***	1.83	(0.48)***	-2.04	(0.18)***	-1.39	(0.32)***	-1.17	(0.26)***	0.31	(0.13)**
1978	-0.98	(0.08)***	1.40	(0.46)***	0.09	(0.17)	-4.15	(0.36)***	-2.11	(0.26)***	0.12	(0.14)
1979	-1.28	(0.08)***	0.56	(0.49)	-2.23	(0.17)***	-0.95	(0.32)***	-1.05	(0.27)***	0.34	(0.13)**
1980	-1.28	(0.08)***	1.06	(0.50)**	-1.98	(0.18)***	-1.47	(0.34)***	-0.98	(0.27)***	0.17	(0.14)
1981	-1.20	(0.08)***	0.53	(0.51)	-1.91	(0.18)***	-1.41	(0.34)***	-1.48	(0.27)***	0.30	(0.14)**
1982	-1.33	(0.08)***	1.41	(0.44)***	-1.52	(0.18)***	-2.18	(0.35)***	-0.51	(0.25)**	0.00	(0.14)
1983	-0.95	(0.08)***	0.06	(0.45)	-0.18	(0.17)	-3.83	(0.37)***	-1.06	(0.25)***	0.01	(0.14)
1984	-1.28	(0.09)***	0.95	(0.46)**	-1.22	(0.20)***	-2.56	(0.37)***	-0.47	(0.28)*	-0.04	(0.16)
1985	-1.20	(0.08)***	0.64	(0.45)	-0.97	(0.20)***	-3.01	(0.36)***	-0.50	(0.28)*	-0.07	(0.16)
1986	-1.24	(0.08)***	1.08	(0.44)**	-1.23	(0.19)***	-2.79	(0.35)***	-0.25	(0.28)	-0.19	(0.15)
1987	-1.30	(0.08)***	1.40	(0.44)***	-1.08	(0.19)***	-2.75	(0.35)***	-0.25	(0.28)	-0.21	(0.15)
1988	-1.18	(0.08)***	0.96	(0.43)**	-1.30	(0.19)***	-2.66	(0.35)***	-0.46	(0.27)*	-0.05	(0.15)
1989	-1.23	(0.08)***	0.93	(0.42)**	-1.19	(0.19)***	-2.63	(0.35)***	-0.10	(0.28)	-0.12	(0.15)
1990	-1.23	(0.08)***	1.16	(0.42)***	-1.41	(0.19)***	-2.66	(0.35)***	0.02	(0.27)	0.02	(0.15)
1991	-1.21	(0.08)***	1.12	(0.42)***	-1.61	(0.19)***	-2.64	(0.35)***	0.20	(0.27)	0.13	(0.15)
1992	-1.28	(0.08)***	1.38	(0.40)***	-1.51	(0.19)***	-2.50	(0.35)***	0.45	(0.27)*	-0.03	(0.15)
1993	-1.29	(0.08)***	1.53	(0.40)***	-1.79	(0.19)***	-2.37	(0.35)***	0.18	(0.27)	0.16	(0.15)
1994	-1.22	(0.08)***	1.35	(0.39)***	-1.66	(0.19)***	-2.38	(0.35)***	0.24	(0.27)	0.07	(0.14)
1995	-1.23	(0.08)***	1.35	(0.39)***	-1.65	(0.19)***	-2.49	(0.35)***	0.47	(0.27)*	0.19	(0.14)
1996	-1.21	(0.08)***	1.38	(0.39)***	-1.46	(0.19)***	-2.47	(0.35)***	0.25	(0.27)	-0.05	(0.14)
1997	-1.21	(0.08)***	1.26	(0.40)***	-1.68	(0.19)***	-2.33	(0.35)***	0.33	(0.27)	0.16	(0.14)
1998	-1.16	(0.08)***	1.36	(0.40)***	-1.81	(0.18)***	-2.34	(0.35)***	0.22	(0.27)	0.22	(0.14)
1999	-1.19	(0.08)***	1.39	(0.39)***	-1.57	(0.19)***	-2.42	(0.35)***	0.23	(0.27)	0.15	(0.14)
2000	-1.13	(0.08)***	0.91	(0.40)**	-1.28	(0.20)***	-2.83	(0.36)***	0.39	(0.27)	0.09	(0.15)

Notes: Dependent variable is $\ln\left(\left(1+IM_t^{ij}\right)/EXP_t^i OUT_t^j\right)$. Estimation is by OLS. Robust standard errors are reported in parentheses. * indicates significantly different from zero at the 10% level, ** indicates significantly different from zero at the 5% level, *** indicates significantly different from zero at the 1% level. Othe regressors and R-squared are reported in column (1) of Table 1.

Table 3: Reduced form gravity coefficients, optimal risk sharing model: Full sample

	ldist		ncontig		ncomlang		ncolony		ncomcol		nlegal	
year	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.
1970	-1.26	(0.07)***	0.44	(0.48)	-2.34	(0.16)***	-0.03	(0.32)	-2.57	(0.24)***	0.20	(0.12)
1971	-1.17	(0.07)***	-0.02	(0.47)	-2.53	(0.16)***	-0.18	(0.30)	-2.38	(0.24)***	0.23	(0.12)*
1972	-1.15	(0.07)***	-0.33	(0.48)	-2.60	(0.16)***	-0.18	(0.30)	-2.36	(0.25)***	0.14	(0.12)
1973	-1.23	(0.07)***	0.21	(0.49)	-2.66	(0.16)***	-0.11	(0.30)	-2.07	(0.25)***	0.16	(0.12)
1974	-1.21	(0.07)***	-0.25	(0.51)	-2.59	(0.16)***	0.12	(0.31)	-2.12	(0.25)***	0.07	(0.12)
1975	-1.22	(0.07)***	-0.54	(0.49)	-2.47	(0.16)***	0.12	(0.31)	-1.75	(0.26)***	0.05	(0.12)
1976	-1.32	(0.07)***	0.59	(0.51)	-2.38	(0.16)***	-0.33	(0.32)	-1.71	(0.26)***	0.13	(0.12)
1977	-1.41	(0.07)***	2.16	(0.47)***	-2.14	(0.17)***	-1.18	(0.31)***	-1.30	(0.25)***	0.21	(0.12)*
1978	-1.22	(0.08)***	2.51	(0.47)***	-0.13	(0.19)	-3.94	(0.33)***	-2.29	(0.27)***	0.39	(0.13)***
1979	-1.28	(0.07)***	0.71	(0.49)	-2.18	(0.17)***	-0.67	(0.31)**	-1.49	(0.26)***	0.28	(0.12)**
1980	-1.30	(0.08)***	1.24	(0.51)**	-1.90	(0.17)***	-1.34	(0.32)***	-1.17	(0.27)***	0.12	(0.12)
1981	-1.29	(0.08)***	0.87	(0.53)*	-1.68	(0.18)***	-1.28	(0.33)***	-1.64	(0.27)***	0.14	(0.12)
1982	-1.38	(0.07)***	1.67	(0.45)***	-1.44	(0.18)***	-2.39	(0.33)***	-0.28	(0.27)	0.07	(0.12)
1983	-1.25	(0.08)***	1.18	(0.46)***	-0.14	(0.19)	-3.80	(0.34)***	-0.98	(0.27)***	0.15	(0.13)
1984	-1.38	(0.08)***	1.23	(0.44)***	-1.17	(0.19)***	-3.00	(0.34)***	-0.11	(0.27)	0.22	(0.14)
1985	-1.32	(0.08)***	1.01	(0.43)**	-0.83	(0.19)***	-3.38	(0.33)***	-0.14	(0.26)	0.04	(0.14)
1986	-1.31	(0.08)***	1.19	(0.44)***	-1.07	(0.18)***	-3.14	(0.32)***	0.13	(0.26)	-0.09	(0.14)
1987	-1.31	(0.08)***	1.29	(0.44)***	-1.01	(0.18)***	-3.05	(0.32)***	0.10	(0.27)	-0.11	(0.14)
1988	-1.18	(0.08)***	0.81	(0.43)*	-1.21	(0.18)***	-2.94	(0.32)***	-0.03	(0.26)	-0.05	(0.14)
1989	-1.22	(0.08)***	0.76	(0.43)*	-1.19	(0.18)***	-2.88	(0.32)***	0.29	(0.27)	-0.09	(0.14)
1990	-1.20	(0.08)***	0.91	(0.42)**	-1.33	(0.18)***	-2.86	(0.33)***	0.34	(0.27)	-0.03	(0.13)
1991	-1.14	(0.08)***	0.74	(0.42)*	-1.47	(0.18)***	-2.92	(0.33)***	0.34	(0.26)	0.26	(0.13)*
1992	-1.18	(0.07)***	1.04	(0.40)**	-1.47	(0.18)***	-2.71	(0.33)***	0.42	(0.26)	0.08	(0.13)
1993	-1.18	(0.07)***	1.11	(0.41)***	-1.71	(0.18)***	-2.69	(0.33)***	0.24	(0.26)	0.25	(0.13)*
1994	-1.11	(0.07)***	0.89	(0.40)**	-1.64	(0.18)***	-2.57	(0.33)***	0.30	(0.26)	0.11	(0.13)
1995	-1.13	(0.07)***	0.94	(0.41)**	-1.59	(0.18)***	-2.60	(0.33)***	0.58	(0.26)**	0.14	(0.13)
1996	-1.10	(0.08)***	0.93	(0.40)**	-1.44	(0.18)***	-2.64	(0.33)***	0.33	(0.26)	-0.04	(0.13)
1997	-1.07	(0.08)***	0.76	(0.41)*	-1.65	(0.18)***	-2.54	(0.34)***	0.34	(0.26)	0.15	(0.13)
1998	-1.06	(0.07)***	0.88	(0.41)**	-1.71	(0.17)***	-2.48	(0.33)***	0.27	(0.26)	0.27	(0.13)**
1999	-1.05	(0.07)***	0.84	(0.40)**	-1.53	(0.18)***	-2.58	(0.33)***	0.31	(0.26)	0.15	(0.13)
2000	-1.03	(0.08)***	0.39	(0.42)	-1.20	(0.19)***	-2.97	(0.33)***	0.53	(0.27)**	0.14	(0.14)

Notes: Dependent variable is $\ln\left(\left(1+IM_t^{ij}\right)/EXP_t^iOUT_t^j\right)$. Estimation is by OLS. Robust standard errors are reported in parentheses. * indicates significantly different from zero at the 10% level, ** indicates significantly different from zero at the 5% level, *** indicates significantly different from zero at the 1% level. Othe regressors and R-squared are reported in column (1) of Table 1.

Table 4: Reduced form gravity coefficients, financial autarky model: Full sample

	ldist		ncontig		ncomlang		ncolony		ncomcol		nlegal	
year	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.
1970	-1.22	(0.07)***	0.17	(0.46)	-2.14	(0.17)***	-0.64	(0.31)**	-2.02	(0.26)***	0.28	(0.13)**
1971	-1.20	(0.07)***	-0.11	(0.45)	-2.28	(0.17)***	-0.63	(0.29)**	-1.76	(0.26)***	0.29	(0.13)**
1972	-1.15	(0.07)***	-0.42	(0.45)	-2.44	(0.17)***	-0.74	(0.29)**	-1.91	(0.27)***	0.33	(0.14)**
1973	-1.24	(0.07)***	0.14	(0.47)	-2.41	(0.17)***	-0.57	(0.30)*	-1.74	(0.27)***	0.30	(0.14)**
1974	-1.19	(0.07)***	-0.38	(0.49)	-2.37	(0.17)***	-0.33	(0.30)	-1.87	(0.27)***	0.22	(0.14)
1975	-1.21	(0.07)***	-0.58	(0.47)	-2.34	(0.17)***	-0.35	(0.31)	-1.55	(0.27)***	0.29	(0.14)**
1976	-1.28	(0.08)***	0.36	(0.50)	-2.23	(0.18)***	-0.66	(0.32)**	-1.62	(0.27)***	0.29	(0.14)**
1977	-1.38	(0.08)***	1.83	(0.48)***	-2.04	(0.18)***	-1.39	(0.32)***	-1.17	(0.27)***	0.31	(0.14)**
1978	-0.98	(0.08)***	1.40	(0.46)***	0.09	(0.17)	-4.15	(0.36)***	-2.11	(0.26)***	0.12	(0.14)
1979	-1.28	(0.08)***	0.56	(0.49)	-2.23	(0.18)***	-0.95	(0.32)***	-1.05	(0.27)***	0.34	(0.14)**
1980	-1.28	(0.08)***	1.06	(0.49)**	-1.98	(0.18)***	-1.47	(0.33)***	-0.98	(0.28)***	0.17	(0.14)
1981	-1.20	(0.08)***	0.53	(0.51)	-1.91	(0.18)***	-1.41	(0.33)***	-1.48	(0.28)***	0.30	(0.14)**
1982	-1.33	(0.08)***	1.41	(0.44)***	-1.52	(0.18)***	-2.18	(0.35)***	-0.51	(0.25)**	0.00	(0.14)
1983	-0.95	(0.09)***	0.06	(0.47)	-0.18	(0.17)	-3.83	(0.37)***	-1.06	(0.25)***	0.01	(0.14)
1984	-1.28	(0.09)***	0.95	(0.46)**	-1.22	(0.20)***	-2.56	(0.37)***	-0.47	(0.28)*	-0.04	(0.16)
1985	-1.20	(0.08)***	0.64	(0.45)	-0.97	(0.20)***	-3.01	(0.36)***	-0.50	(0.28)*	-0.07	(0.16)
1986	-1.24	(0.08)***	1.08	(0.44)**	-1.23	(0.20)***	-2.79	(0.35)***	-0.25	(0.28)	-0.19	(0.16)
1987	-1.30	(0.08)***	1.40	(0.44)***	-1.08	(0.20)***	-2.75	(0.34)***	-0.25	(0.28)	-0.21	(0.16)
1988	-1.18	(0.08)***	0.96	(0.42)**	-1.30	(0.19)***	-2.66	(0.35)***	-0.46	(0.28)	-0.05	(0.15)
1989	-1.23	(0.08)***	0.93	(0.42)**	-1.19	(0.19)***	-2.63	(0.35)***	-0.10	(0.28)	-0.12	(0.15)
1990	-1.23	(0.08)***	1.16	(0.41)***	-1.41	(0.19)***	-2.66	(0.35)***	0.02	(0.28)	0.02	(0.15)
1991	-1.21	(0.08)***	1.12	(0.42)***	-1.61	(0.19)***	-2.64	(0.34)***	0.20	(0.28)	0.13	(0.15)
1992	-1.28	(0.08)***	1.38	(0.40)***	-1.51	(0.19)***	-2.50	(0.34)***	0.45	(0.27)*	-0.03	(0.15)
1993	-1.29	(0.08)***	1.53	(0.40)***	-1.79	(0.19)***	-2.37	(0.35)***	0.18	(0.27)	0.16	(0.15)
1994	-1.22	(0.08)***	1.35	(0.39)***	-1.66	(0.19)***	-2.38	(0.34)***	0.24	(0.27)	0.07	(0.15)
1995	-1.23	(0.08)***	1.35	(0.39)***	-1.65	(0.19)***	-2.49	(0.34)***	0.47	(0.27)*	0.19	(0.14)
1996	-1.21	(0.08)***	1.38	(0.39)***	-1.46	(0.19)***	-2.47	(0.35)***	0.25	(0.27)	-0.05	(0.15)
1997	-1.21	(0.08)***	1.26	(0.40)***	-1.68	(0.19)***	-2.33	(0.35)***	0.33	(0.27)	0.16	(0.14)
1998	-1.16	(0.08)***	1.36	(0.40)***	-1.81	(0.19)***	-2.34	(0.34)***	0.22	(0.27)	0.22	(0.14)
1999	-1.19	(0.08)***	1.39	(0.39)***	-1.57	(0.19)***	-2.42	(0.35)***	0.23	(0.27)	0.15	(0.15)
2000	-1.13	(0.08)***	0.91	(0.40)**	-1.28	(0.20)***	-2.83	(0.35)***	0.39	(0.28)	0.09	(0.16)

Notes: Dependent variable is $\ln\left(\left(1+IM_t^{ij}\right)/EXP_t^iOUT_t^j\right)$. Estimation is by OLS. Robust standard errors are reported in parentheses. * indicates significantly different from zero at the 10% level, ** indicates significantly different from zero at the 5% level, *** indicates significantly different from zero at the 1% level. Othe regressors and R-squared are reported in column (1) of Table 1.

Table 5: Reduced form gravity equations, estimation results: Developed countries

	(1)	(2)	(3)	(4)
ln(vc/pop)		-0.30 (0.06)***		
ldist x yr	yes	yes	yes	no
ncontig x yr	yes	yes	yes	no
ncomlang x yr	yes	yes	yes	no
ncolony x yr	yes	yes	yes	no
ncomcol x yr	yes	yes	yes	no
nlegal x yr	yes	yes	yes	no
imp-yr f.e.	yes	no	symmetric	no
exp-yr f.e.	yes	yes	no	no
imp f.e.	no	yes	no	no
time f.e.	no	no	no	yes
# param	1519	890	868	31
N	15004	15004	15004	15004
R-sq	0.83	0.83	0.81	0.09

Notes: Dependent variable is $\ln\left(\left(1+IM_t^{ij}\right)/EXP_t^iOUT_t^j\right)$. Estimation is by OLS. Robust standard errors are reported in parentheses. * indicates significantly different from zero at the 10% level, ** indicates significantly different from zero at the 5% level, *** indicates significantly different from zero at the 1% level.

Table 6: Reduced form gravity coefficients, unrestricted model: Developed countries

	ldist		ncontig		ncomlang		ncolony		ncomcol		nlegal	
year	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.
1970	-0.73	(0.08)***	-0.06	(0.16)	-0.26	(0.15)*	-0.79	(0.22)***	0.70	(0.66)	-0.55	(0.09)***
1971	-0.73	(0.08)***	-0.13	(0.16)	-0.22	(0.14)	-0.77	(0.20)***	0.70	(0.64)	-0.56	(0.09)***
1972	-0.74	(0.08)***	-0.13	(0.16)	-0.17	(0.14)	-0.76	(0.19)***	0.73	(0.64)	-0.57	(0.09)***
1973	-0.75	(0.07)***	-0.19	(0.13)	-0.11	(0.13)	-0.72	(0.17)***	0.86	(0.57)	-0.54	(0.08)***
1974	-0.76	(0.06)***	-0.17	(0.13)	-0.14	(0.12)	-0.70	(0.16)***	1.01	(0.55)*	-0.47	(0.08)***
1975	-0.77	(0.07)***	-0.19	(0.13)	-0.15	(0.13)	-0.71	(0.17)***	0.97	(0.57)*	-0.46	(0.08)***
1976	-0.80	(0.07)***	-0.15	(0.13)	-0.12	(0.13)	-0.68	(0.16)***	1.20	(0.57)**	-0.46	(0.08)***
1977	-0.81	(0.07)***	-0.13	(0.16)	-0.12	(0.13)	-0.60	(0.17)***	1.15	(0.59)*	-0.50	(0.09)***
1978	-0.80	(0.07)***	-0.13	(0.13)	-0.08	(0.13)	-0.60	(0.16)***	1.11	(0.55)**	-0.52	(0.09)***
1979	-0.83	(0.07)***	-0.07	(0.15)	-0.12	(0.13)	-0.51	(0.16)***	1.30	(0.56)**	-0.54	(0.09)***
1980	-0.83	(0.06)***	-0.08	(0.12)	-0.11	(0.12)	-0.49	(0.14)***	1.33	(0.52)**	-0.51	(0.08)***
1981	-0.82	(0.06)***	-0.12	(0.12)	-0.15	(0.11)	-0.47	(0.14)***	1.32	(0.52)**	-0.46	(0.08)***
1982	-0.83	(0.06)***	-0.11	(0.11)	-0.11	(0.12)	-0.47	(0.14)***	1.35	(0.52)***	-0.48	(0.08)***
1983	-0.83	(0.06)***	-0.12	(0.11)	-0.10	(0.11)	-0.42	(0.13)***	1.32	(0.51)**	-0.46	(0.07)***
1984	-0.84	(0.09)***	0.11	(0.20)	-0.21	(0.16)	-0.52	(0.22)**	1.40	(0.77)*	-0.57	(0.12)***
1985	-0.86	(0.08)***	0.12	(0.19)	-0.20	(0.14)	-0.49	(0.20)**	1.59	(0.64)**	-0.53	(0.11)***
1986	-0.83	(0.06)***	-0.04	(0.11)	-0.11	(0.11)	-0.46	(0.16)***	1.34	(0.52)**	-0.54	(0.08)***
1987	-0.84	(0.07)***	0.05	(0.15)	-0.13	(0.13)	-0.45	(0.17)***	1.39	(0.58)**	-0.59	(0.08)***
1988	-0.84	(0.08)***	0.12	(0.18)	-0.15	(0.14)	-0.48	(0.20)**	1.38	(0.63)**	-0.64	(0.10)***
1989	-0.87	(0.08)***	0.16	(0.19)	-0.03	(0.18)	-0.51	(0.23)**	1.57	(0.64)**	-0.69	(0.13)***
1990	-0.84	(0.07)***	0.02	(0.15)	-0.08	(0.12)	-0.46	(0.17)***	1.43	(0.57)**	-0.59	(0.08)***
1991	-0.88	(0.08)***	0.15	(0.19)	-0.14	(0.14)	-0.46	(0.20)**	1.65	(0.63)***	-0.61	(0.09)***
1992	-0.88	(0.08)***	0.16	(0.19)	-0.12	(0.14)	-0.45	(0.21)**	1.64	(0.62)***	-0.64	(0.10)***
1993	-0.90	(0.08)***	0.19	(0.19)	-0.13	(0.14)	-0.42	(0.23)*	1.69	(0.64)***	-0.64	(0.10)***
1994	-0.88	(0.07)***	0.07	(0.15)	-0.04	(0.13)	-0.40	(0.20)*	1.61	(0.57)***	-0.64	(0.09)***
1995	-0.87	(0.07)***	0.06	(0.15)	-0.05	(0.13)	-0.37	(0.20)*	1.60	(0.56)***	-0.64	(0.09)***
1996	-0.86	(0.06)***	-0.05	(0.11)	0.04	(0.11)	-0.34	(0.16)**	1.55	(0.49)***	-0.63	(0.07)***
1997	-0.85	(0.06)***	-0.03	(0.12)	0.04	(0.11)	-0.33	(0.16)**	1.48	(0.51)***	-0.63	(0.07)***
1998	-0.83	(0.06)***	-0.04	(0.11)	-0.03	(0.11)	-0.27	(0.16)	1.32	(0.49)***	-0.59	(0.07)***
1999	-0.84	(0.06)***	-0.02	(0.12)	-0.04	(0.11)	-0.28	(0.16)*	1.41	(0.51)***	-0.58	(0.08)***
2000	-0.79	(0.08)***	0.00	(0.13)	-0.06	(0.14)	-0.41	(0.25)*	1.29	(0.63)**	-0.64	(0.10)***

Notes: Dependent variable is $\ln\left(\left(1+IM_t^{ij}\right)/EXP_t^i OUT_t^j\right)$. Estimation is by OLS. Robust standard errors are reported in parentheses. * indicates significantly different from zero at the 10% level, ** indicates significantly different from zero at the 5% level, *** indicates significantly different from zero at the 1% level. Othe regressors and R-squared are reported in column (1) of Table 5.

Table 7: Reduced form gravity coefficients, optimal risk sharing model: Developed countries

	ldist		ncontig		ncomlang		ncolony		ncomcol		nlegal	
year	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.
1970	-0.81	(0.07)***	0.04	(0.17)	-0.21	(0.12)*	-0.83	(0.22)***	1.24	(0.60)**	-0.54	(0.09)***
1971	-0.81	(0.07)***	-0.01	(0.17)	-0.13	(0.11)	-0.83	(0.21)***	1.20	(0.60)**	-0.57	(0.09)***
1972	-0.80	(0.07)***	-0.06	(0.16)	-0.09	(0.11)	-0.84	(0.19)***	1.16	(0.59)**	-0.56	(0.09)***
1973	-0.79	(0.05)***	-0.09	(0.13)	-0.04	(0.11)	-0.78	(0.17)***	1.13	(0.43)***	-0.55	(0.08)***
1974	-0.76	(0.04)***	-0.11	(0.12)	-0.09	(0.11)	-0.73	(0.17)***	0.94	(0.41)**	-0.49	(0.08)***
1975	-0.76	(0.04)***	-0.15	(0.12)	-0.06	(0.11)	-0.72	(0.17)***	0.83	(0.42)**	-0.50	(0.08)***
1976	-0.83	(0.05)***	-0.11	(0.13)	-0.05	(0.11)	-0.71	(0.16)***	1.36	(0.43)***	-0.47	(0.08)***
1977	-0.87	(0.07)***	-0.04	(0.17)	-0.08	(0.11)	-0.65	(0.17)***	1.56	(0.59)***	-0.49	(0.08)***
1978	-0.77	(0.04)***	-0.09	(0.12)	-0.24	(0.12)**	-0.61	(0.16)***	0.97	(0.40)**	-0.47	(0.09)***
1979	-0.87	(0.08)***	-0.02	(0.17)	-0.09	(0.10)	-0.57	(0.17)***	1.57	(0.60)***	-0.52	(0.08)***
1980	-0.84	(0.04)***	-0.09	(0.11)	-0.09	(0.10)	-0.49	(0.14)***	1.34	(0.38)***	-0.50	(0.08)***
1981	-0.82	(0.04)***	-0.10	(0.11)	-0.12	(0.10)	-0.48	(0.15)***	1.27	(0.37)***	-0.47	(0.08)***
1982	-0.81	(0.04)***	-0.12	(0.11)	-0.06	(0.10)	-0.48	(0.15)***	1.19	(0.37)***	-0.51	(0.07)***
1983	-0.79	(0.04)***	-0.13	(0.10)	-0.12	(0.10)	-0.40	(0.14)***	0.98	(0.36)***	-0.48	(0.07)***
1984	-0.85	(0.08)***	0.00	(0.18)	-0.13	(0.15)	-0.56	(0.18)***	1.54	(0.65)**	-0.56	(0.11)***
1985	-0.86	(0.08)***	0.07	(0.18)	-0.24	(0.14)*	-0.50	(0.17)***	1.64	(0.61)***	-0.50	(0.09)***
1986	-0.81	(0.04)***	-0.06	(0.10)	-0.13	(0.10)	-0.47	(0.14)***	1.25	(0.37)***	-0.53	(0.07)***
1987	-0.88	(0.08)***	0.06	(0.16)	-0.08	(0.10)	-0.51	(0.16)***	1.74	(0.62)***	-0.58	(0.07)***
1988	-0.88	(0.08)***	0.10	(0.18)	-0.12	(0.13)	-0.49	(0.16)***	1.74	(0.62)***	-0.63	(0.08)***
1989	-0.87	(0.08)***	0.08	(0.18)	-0.07	(0.13)	-0.46	(0.16)***	1.66	(0.62)***	-0.67	(0.10)***
1990	-0.85	(0.08)***	-0.01	(0.16)	-0.03	(0.10)	-0.46	(0.17)***	1.50	(0.62)**	-0.59	(0.07)***
1991	-0.89	(0.08)***	0.11	(0.18)	-0.12	(0.13)	-0.43	(0.18)**	1.74	(0.62)***	-0.61	(0.07)***
1992	-0.90	(0.08)***	0.12	(0.18)	-0.11	(0.13)	-0.42	(0.18)**	1.75	(0.62)***	-0.64	(0.07)***
1993	-0.84	(0.04)***	0.10	(0.15)	-0.23	(0.16)	-0.33	(0.16)**	1.30	(0.39)***	-0.64	(0.08)***
1994	-0.81	(0.04)***	0.00	(0.13)	-0.15	(0.14)	-0.33	(0.16)**	1.19	(0.37)***	-0.63	(0.07)***
1995	-0.79	(0.04)***	-0.03	(0.13)	-0.14	(0.13)	-0.30	(0.16)*	1.08	(0.38)***	-0.65	(0.07)***
1996	-0.78	(0.03)***	-0.08	(0.10)	-0.03	(0.10)	-0.30	(0.15)**	0.97	(0.35)***	-0.64	(0.06)***
1997	-0.79	(0.03)***	-0.06	(0.10)	-0.03	(0.10)	-0.28	(0.15)*	1.03	(0.35)***	-0.64	(0.07)***
1998	-0.79	(0.03)***	-0.04	(0.10)	-0.07	(0.10)	-0.23	(0.15)	1.03	(0.35)***	-0.60	(0.07)***
1999	-0.79	(0.03)***	-0.03	(0.11)	-0.10	(0.10)	-0.24	(0.15)	1.10	(0.36)***	-0.59	(0.07)***
2000	-0.80	(0.04)***	0.00	(0.12)	-0.17	(0.13)	-0.35	(0.21)*	1.35	(0.38)***	-0.63	(0.08)***

Notes: Dependent variable is $\ln\left(\left(1+IM_t^{ij}\right)/EXP_t^iOUT_t^j\right)$. Estimation is by OLS. Robust standard errors are reported in parentheses. * indicates significantly different from zero at the 10% level, ** indicates significantly different from zero at the 5% level, *** indicates significantly different from zero at the 1% level. Othe regressors and R-squared are reported in column (1) of Table 5.

Table 8: Reduced form gravity coefficients, autarky model: Developed countries

	ldist		ncontig		ncomlang		ncolony		ncomcol		nlegal	
year	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.
1970	-0.73	(0.07)***	-0.06	(0.16)	-0.26	(0.15)*	-0.79	(0.22)***	0.70	(0.61)	-0.55	(0.10)***
1971	-0.73	(0.07)***	-0.13	(0.16)	-0.22	(0.14)	-0.77	(0.20)***	0.70	(0.59)	-0.56	(0.10)***
1972	-0.74	(0.07)***	-0.13	(0.16)	-0.17	(0.14)	-0.76	(0.19)***	0.73	(0.59)	-0.57	(0.10)***
1973	-0.75	(0.07)***	-0.19	(0.14)	-0.11	(0.13)	-0.72	(0.17)***	0.86	(0.55)	-0.54	(0.09)***
1974	-0.76	(0.06)***	-0.17	(0.13)	-0.14	(0.13)	-0.70	(0.17)***	1.01	(0.54)*	-0.47	(0.09)***
1975	-0.77	(0.07)***	-0.19	(0.13)	-0.15	(0.13)	-0.71	(0.18)***	0.97	(0.55)*	-0.46	(0.09)***
1976	-0.80	(0.07)***	-0.15	(0.14)	-0.12	(0.13)	-0.68	(0.17)***	1.20	(0.55)**	-0.46	(0.09)***
1977	-0.81	(0.07)***	-0.13	(0.16)	-0.12	(0.14)	-0.60	(0.18)***	1.15	(0.56)**	-0.50	(0.10)***
1978	-0.80	(0.06)***	-0.13	(0.13)	-0.08	(0.14)	-0.60	(0.17)***	1.11	(0.53)**	-0.52	(0.10)***
1979	-0.83	(0.06)***	-0.07	(0.15)	-0.12	(0.13)	-0.51	(0.17)***	1.30	(0.53)**	-0.54	(0.09)***
1980	-0.83	(0.06)***	-0.08	(0.12)	-0.11	(0.12)	-0.49	(0.16)***	1.33	(0.50)***	-0.51	(0.09)***
1981	-0.82	(0.06)***	-0.12	(0.12)	-0.15	(0.12)	-0.47	(0.16)***	1.32	(0.50)***	-0.46	(0.09)***
1982	-0.83	(0.06)***	-0.11	(0.12)	-0.11	(0.13)	-0.47	(0.16)***	1.35	(0.51)***	-0.48	(0.09)***
1983	-0.83	(0.06)***	-0.12	(0.11)	-0.10	(0.12)	-0.42	(0.15)***	1.32	(0.50)***	-0.46	(0.08)***
1984	-0.84	(0.09)***	0.11	(0.19)	-0.21	(0.16)	-0.52	(0.22)**	1.40	(0.72)*	-0.57	(0.12)***
1985	-0.86	(0.07)***	0.12	(0.19)	-0.20	(0.15)	-0.49	(0.20)**	1.59	(0.60)***	-0.53	(0.11)***
1986	-0.83	(0.06)***	-0.04	(0.11)	-0.11	(0.12)	-0.46	(0.16)***	1.34	(0.50)***	-0.54	(0.08)***
1987	-0.84	(0.07)***	0.05	(0.15)	-0.13	(0.13)	-0.45	(0.17)**	1.39	(0.54)**	-0.59	(0.09)***
1988	-0.84	(0.08)***	0.12	(0.18)	-0.15	(0.15)	-0.48	(0.20)**	1.38	(0.61)**	-0.64	(0.10)***
1989	-0.87	(0.08)***	0.16	(0.19)	-0.03	(0.18)	-0.51	(0.22)**	1.57	(0.62)**	-0.69	(0.13)***
1990	-0.84	(0.06)***	0.02	(0.15)	-0.08	(0.13)	-0.46	(0.18)**	1.43	(0.54)***	-0.59	(0.09)***
1991	-0.88	(0.08)***	0.15	(0.18)	-0.14	(0.14)	-0.46	(0.21)**	1.65	(0.61)***	-0.61	(0.10)***
1992	-0.88	(0.08)***	0.16	(0.18)	-0.12	(0.15)	-0.45	(0.21)**	1.64	(0.61)***	-0.64	(0.10)***
1993	-0.90	(0.07)***	0.19	(0.19)	-0.13	(0.14)	-0.42	(0.21)**	1.69	(0.61)***	-0.64	(0.10)***
1994	-0.88	(0.07)***	0.07	(0.15)	-0.04	(0.13)	-0.40	(0.19)**	1.61	(0.55)***	-0.64	(0.09)***
1995	-0.87	(0.06)***	0.06	(0.15)	-0.05	(0.13)	-0.37	(0.19)*	1.60	(0.54)***	-0.64	(0.09)***
1996	-0.86	(0.06)***	-0.05	(0.11)	0.04	(0.12)	-0.34	(0.16)**	1.55	(0.48)***	-0.63	(0.08)***
1997	-0.85	(0.06)***	-0.03	(0.12)	0.04	(0.12)	-0.33	(0.16)**	1.48	(0.49)***	-0.63	(0.08)***
1998	-0.83	(0.06)***	-0.04	(0.11)	-0.03	(0.12)	-0.27	(0.17)	1.32	(0.48)***	-0.59	(0.09)***
1999	-0.84	(0.06)***	-0.02	(0.12)	-0.04	(0.12)	-0.28	(0.17)*	1.41	(0.50)***	-0.58	(0.09)***
2000	-0.79	(0.08)***	0.00	(0.12)	-0.06	(0.14)	-0.41	(0.22)*	1.29	(0.61)**	-0.64	(0.11)***

Notes: Dependent variable is $\ln\left(\left(1+IM_t^{ij}\right)/EXP_t^iOUT_t^j\right)$. Estimation is by OLS. Robust standard errors are reported in parentheses. * indicates significantly different from zero at the 10% level, ** indicates significantly different from zero at the 5% level, *** indicates significantly different from zero at the 1% level. Othe regressors and R-squared are reported in column (1) of Table 5.

Table 9: Robustness tests on baseline test: I: Different sub-samples

Null	Alternative	F-stat	# restr	d.f.	p-val
(1) 6 OECD countries used by Kollmann (1995)					
tcost, share	tcost, noshare	0.09	148	589	0
no tcost	tcost, noshare	27.01	496	589	1
tcost, fin aut	tcost, noshare	0.37	155	589	0
(2) 8 OECD countries used by Backus and Smith (1993)					
tcost, share	tcost, noshare	0.12	208	1116	0
no tcost	tcost, noshare	38.8	589	1116	1
tcost, fin aut	tcost, noshare	2.78	186	1116	1
(3) 12 OECD countries used by Ravn (2001)					
tcost, share	tcost, noshare	0.39	328	3565	0
no tcost	tcost, noshare	64.6	868	3565	1
tcost, fin aut	tcost, noshare	1.49	341	3565	1
(4) 17 OECD countries used by Ravn (2001) plus 5 more core					
tcost, share	tcost, noshare	0.50	478	7750	0
no tcost	tcost, noshare	96.9	1178	7750	1
tcost, fin aut	tcost, noshare	2.50	496	7750	1
(5) 23 top ranked countries by avg PPP-GDP less Hong Kong					
tcost, share	tcost, noshare	0.71	658	14818	0
no tcost	tcost, noshare	17.5	1550	14818	1
tcost, fin aut	tcost, noshare	4.44	682	14818	1
(6) 24 top ranked countries by average PPP-GDP					
tcost, share	tcost, noshare	0.72	688	16213	0
no tcost	tcost, noshare	17.4	1612	16213	1
tcost, fin aut	tcost, noshare	4.67	713	16213	1
(7) 23 OECD members as of 1973 (baseline 22 plus Turkey)					
tcost, share	tcost, noshare	0.87	658	14818	0.01
no tcost	tcost, noshare	35.2	1550	14818	1
tcost, fin aut	tcost, noshare	2.25	682	14818	1
(8) 26 countries that joined OECD before 2001					
tcost, share	tcost, noshare	1.69	748	19189	1
no tcost	tcost, noshare	21.3	1736	19189	1
tcost, fin aut	tcost, noshare	1.50	775	19189	1
(9) 28 members of OECD in 2010					
tcost, share	tcost, noshare	1.99	808	22413	1
no tcost	tcost, noshare	17.6	1860	22413	1
tcost, fin aut	tcost, noshare	1.38	837	22413	1

Notes: This table reports results from F-tests of null hypotheses against the alternative. Tests are based on estimating restricted and unrestricted log-linear gravity models of trade, as described in the text. All bilateral pairs including trade with self are included. Zeros in bilateral trade are replaced by 1 to generate the dependent variable, which is bilateral imports normalized by importer's expenditure and exporter's gross output. Baseline gravity variables include log distance and six indicator variables constructed to normalize trade costs to zero within countries. The different panels report the tests for different sub-samples of the full 88-country sample.

Table 10: Robustness tests on baseline test: II

Null	Alternative	F-stat	# restr	d.f.	p-val
Include data up to 2005, All					
tcost, share	tcost, noshare	7.13	3044	272268	1
no tcost	tcost, noshare	46.39	6480	272268	1
tcost, fin aut	tcost, noshare	5.93	3132	272268	1
Include data up to 2005, developed					
tcost, share	tcost, noshare	0.79	734	15660	0
no tcost	tcost, noshare	42.88	1728	15660	1
tcost, fin aut	tcost, noshare	2.82	756	15660	1
Chinn-Ito: rank greater than 59					
tcost, share	tcost, noshare	0.96	719	17670	0.24
no tcost	tcost, noshare	12.62	1674	17670	1
tcost, fin aut	tcost, noshare	1.03	744	17670	0.71
Chinn-Ito: rank greater than 60					
tcost, share	tcost, noshare	0.60	569	11005	0
no tcost	tcost, noshare	12.66	1364	11005	1
tcost, fin aut	tcost, noshare	0.77	589	11005	0
Baseline, developing only					
tcost, share	tcost, noshare	1.560	1949	42160	1
no tcost	tcost, noshare	14.65	2821	42160	1
tcost, fin aut	tcost, noshare	13.24	651	42160	1
Baseline, developed plus Turkey					
tcost, share	tcost, noshare	0.87	658	14818	0.01
no tcost	tcost, noshare	35.2	1550	14818	1
tcost, fin aut	tcost, noshare	2.25	682	14818	1
Baseline, developed plus Turkey, Korea					
tcost, share	tcost, noshare	1.11	688	16213	0.97
no tcost	tcost, noshare	32.68	1612	16213	1
tcost, fin aut	tcost, noshare	2.19	713	16213	1

Notes: This table reports results from F-tests of null hypotheses against the alternative. Tests are based on estimating restricted and unrestricted log-linear gravity models of trade, as described in the text. Baseline sample includes 88 countries as listed in the Appendix, annual data 1970-2000. All bilateral pairs including trade with self are included. Zeros in bilateral trade are replaced by 1 to generate the dependent variable, which is bilateral imports normalized by importer's expenditure and exporter's gross output. Baseline gravity variables include log distance and six indicator variables constructed to normalize trade costs to zero within countries. The first two panels report results based on extending the sample to 2005 using DOTS data on bilateral trade. The second two panels report results based on choosing an "integrated" subsample of countries (constant over time) based on median ranking according to the Chinn and Ito [2008] measure of financial integration. The first panel chooses a lower cutoff, i.e. a bigger sample, than the second. The next panels report results for samples that include only developing countries, the baseline developed countries plus Turkey, and the baseline developed countries plus Turkey and Korea respectively.

Table 11: Robustness tests on baseline test: III

Null	Alternative	F-stat	# restr	d.f.	p-val
Exclude trade with self, All					
tcost, share	tcost, noshare	7.02	2609	231725	1
no tcost	tcost, noshare	45.84	5580	231725	1
tcost, fin aut	tcost, noshare	6.03	2697	231725	1
Exclude trade with self, developed countries					
tcost, share	tcost, noshare	0.80	629	12834	0
no tcost	tcost, noshare	18.6	1457	12834	1
tcost, fin aut	tcost, noshare	2.75	651	12834	1
Zeros in dependent variable adjusted by min imports, All					
tcost, share	tcost, noshare	9.38	2609	234453	1
no tcost	tcost, noshare	9.09	2697	234453	1
tcost, fin aut	tcost, noshare	52.73	5580	234453	1
Zeros in dependent variable adjusted by min imports, developed					
tcost, share	tcost, noshare	0.64	629	13485	0
no tcost	tcost, noshare	4.1	651	13485	1
tcost, fin aut	tcost, noshare	72.56	1488	13485	1
Zeros in dependent variable adjusted by min exports, All					
tcost, share	tcost, noshare	7.35	2609	234453	1
no tcost	tcost, noshare	11.19	2697	234453	1
tcost, fin aut	tcost, noshare	54.24	5580	234453	1
Zeros in dependent variable adjusted by min exports, developed					
tcost, share	tcost, noshare	0.64	629	13485	0
no tcost	tcost, noshare	4.14	651	13485	1
tcost, fin aut	tcost, noshare	72.63	1488	13485	1
Drop zeros, All					
tcost, share	tcost, noshare	2.38	2609	146673	1
no tcost	tcost, noshare	35.83	5580	146673	1
tcost, fin aut	tcost, noshare	5.17	2697	146673	1
Drop zeros, developed					
tcost, share	tcost, noshare	0.62	629	13459	0
no tcost	tcost, noshare	75.44	1488	13459	1
tcost, fin aut	tcost, noshare	4.16	651	13459	1
5-year aggregation, All					
tcost, share	tcost, noshare	8.08	521	52941	1
no tcost	tcost, noshare	46.18	1260	52941	1
tcost, fin aut	tcost, noshare	5.23	609	52941	1
5-year aggregation, developed					
tcost, share	tcost, noshare	0.71	125	3045	0.01
no tcost	tcost, noshare	80.03	336	3045	1
tcost, fin aut	tcost, noshare	4.35	147	3045	1
Helpman, Melitz, Rubinstein, All					
tcost, share	tcost, noshare	2.13	2639	146674	1

Notes: This table reports results from F-tests of null hypotheses against the alternative. Tests are based on estimating restricted and unrestricted log-linear gravity models of trade, as described in the text. Baseline sample includes 88 countries as listed in the Appendix, annual data 1970-2000. All bilateral pairs including trade with self are included. Unless otherwise noted, zeros in bilateral trade are replaced by 1 to generate the dependent variable, which is bilateral imports normalized by importer's expenditure and exporter's gross output. Baseline gravity variables include log distance and six indicator variables constructed to normalize trade costs to zero within countries. The first two panels report results based on excluding imports from self from the baseline sample. The second two panels report results based on excluding all zero observations on bilateral imports from the baseline sample. The third two panels report results based on aggregating the data in the baseline sample over 5-year periods. The final panel reports the results based on the second stage of the procedure proposed by Helpman, Melitz and Rubinstein [2008] to control for selection. This is not implemented on the developed country sample because there are too few zeros in the dependent variable for the first stage to work.

Table 12: Robustness tests on baseline test: IV

Null	Alternative	F-stat	# restr	d.f.	p-val
Include employment variable, All					
tcost, share	tcost, noshare	6.52	2608	234453	1
Include employment variable, developed					
tcost, share	tcost, noshare	0.71	628	13485	0
Alternative gravity variables I, All					
tcost, share	tcost, noshare	6.76	2609	234608	1
no tcost	tcost, noshare	46.48	5425	234608	1
tcost, fin aut	tcost, noshare	5.7	2697	234608	1
Alternative gravity variables I, developed					
tcost, share	tcost, noshare	0.65	629	13640	0
no tcost	tcost, noshare	38.8	1333	13640	1
tcost, fin aut	tcost, noshare	2.36	651	13640	1
Alternative gravity variables II, All					
tcost, share	tcost, noshare	6.66	2609	234329	1
no tcost	tcost, noshare	47.95	5704	234329	1
tcost, fin aut	tcost, noshare	5.95	2697	234329	1
Alternative gravity variables II, developed					
tcost, share	tcost, noshare	0.72	629	13361	0
no tcost	tcost, noshare	36.68	1612	13361	1
tcost, fin aut	tcost, noshare	2.62	651	13361	1
Alternative gravity variables III, All					
tcost, share	tcost, noshare	6.56	2579	234453	1
no tcost	tcost, noshare	53.07	5580	234453	1
tcost, fin aut	tcost, noshare	6.04	2666	234453	1
Alternative gravity variables III, developed					
tcost, share	tcost, noshare	0.65	629	13640	0
no tcost	tcost, noshare	38.8	1333	13640	1
tcost, fin aut	tcost, noshare	2.36	651	13640	1

Notes: This table reports results from F-tests of null hypotheses against the alternative. Tests are based on estimating restricted and unrestricted log-linear gravity models of trade, as described in the text. Baseline sample includes 88 countries as listed in the Appendix, annual data 1970-2000. All bilateral pairs including trade with self are included. Zeros in bilateral trade are replaced by 1 to generate the dependent variable, which is bilateral imports normalized by importer's expenditure and exporter's gross output. Baseline gravity variables include log distance and six indicator variables constructed to normalize trade costs to zero within countries. The first two panels report results from the tests of the null of optimal risk sharing against the alternative where the employment per capita variable is dropped from the restricted model. In Alternative gravity variables I, log distance is the only gravity variable included. In Alternative gravity variables II, in addition to the baseline gravity variables, I allow interactions between the distance variable and the standard indicator variables. In Alternative gravity variables III, I drop the standard indicator variables, but allow main effects and interactions with the distance variable for indicator variables for trade between an developed country and a developing country and for trade between two (different) developing countries.

Table 13: Robustness tests on baseline test V

Null	Alternative	F-stat	# restr	d.f.	p-val
Impose coeff on ln(vc/p) = -10, All					
tcost, share	tcost, noshare	54.7	2610	234453	1
Impose coeff on ln(vc/p) = -10, developed					
tcost, share	tcost, noshare	44.29	630	13485	1
Impose coeff on ln(vc/p) = -5, All					
tcost, share	tcost, noshare	20.01	2610	234453	1
Impose coeff on ln(vc/p) = -5, developed					
tcost, share	tcost, noshare	10.94	630	13485	1
Impose coeff on ln(vc/p) = -1, All					
tcost, share	tcost, noshare	7.72	2610	234453	1
Impose coeff on ln(vc/p) = -1, developed					
tcost, share	tcost, noshare	0.94	630	13485	0.14
Impose coeff on ln(vc/p) = -0.5, All					
tcost, share	tcost, noshare	7.14	2610	234453	1
Impose coeff on ln(vc/p) = -0.5, developed					
tcost, share	tcost, noshare	0.73	630	13485	0
Impose coeff on ln(vc/p) = 0.5, All					
tcost, share	tcost, noshare	6.64	2610	234453	1
Impose coeff on ln(vc/p) = 0.5, developed					
tcost, share	tcost, noshare	1.01	630	13485	0.60
Impose coeff on ln(vc/p) = 1, All					
tcost, share	tcost, noshare	6.72	2610	234453	1
Impose coeff on ln(vc/p) = 1, developed					
tcost, share	tcost, noshare	1.50	630	13485	1
Impose coeff on ln(vc/p) = 5, All					
tcost, share	tcost, noshare	15.91	2610	234453	1
Impose coeff on ln(vc/p) = 5, developed					
tcost, share	tcost, noshare	13.75	630	13485	1
Impose coeff on ln(vc/p) = 10, All					
tcost, share	tcost, noshare	44.70	2610	234453	1
Impose coeff on ln(vc/p) = 10, developed					
tcost, share	tcost, noshare	49.91	630	13485	1

Notes: This table reports results from F-tests of the joint null hypothesis of optimal risk sharing, $\psi = 0$ and a particular value for $\frac{-\rho}{1-\rho}(\eta - 1)$ against the alternative of an unrestricted gravity model. Baseline sample includes 88 countries as listed in the Appendix, annual data 1970-2000. All bilateral pairs including trade with self are included. Zeros in bilateral trade are replaced by 1 to generate the dependent variable, which is bilateral imports normalized by importer's expenditure and exporter's gross output. Baseline gravity variables include log distance and six indicator variables constructed to normalize trade costs to zero within countries. The different panels report results for different values for $\frac{-\rho}{1-\rho}(\eta - 1)$.

Table 14: Robustness: Imposing coefficients on consumption and employment

Null	F-stat	# restr	d.f.	p-val	F-stat	# restr	d.f.	p-val	F-stat	# restr	d.f.	p-val
	$\beta_c = -10$, $\beta_l = -7$				$\beta_c = -10$, $\beta_l = -5$				$\beta_c = -10$, $\beta_l = -2$			
All	58.5	2610	234453	1	57.3	2610	234453	1	55.7	2610	234453	1
Developed	45.6	630	13485	1	44.8	630	13485	1	44.2	630	13485	1
	$\beta_c = -5$, $\beta_l = -7$				$\beta_c = -5$, $\beta_l = -5$				$\beta_c = -5$, $\beta_l = -2$			
All	22.6	2610	234453	1	21.7	2610	234453	1	20.6	2610	234453	1
Developed	12.6	630	13485	1	11.7	630	13485	1	11.0	630	13485	1
	$\beta_c = -1$, $\beta_l = -7$				$\beta_c = -1$, $\beta_l = -5$				$\beta_c = -1$, $\beta_l = -2$			
All	9.36	2610	234453	1	8.75	2610	234453	1	8.04	2610	234453	1
Developed	2.84	630	13485	1	1.86	630	13485	1	1.04	630	13485	0.77
	$\beta_c = -0.5$, $\beta_l = -7$				$\beta_c = -0.5$, $\beta_l = -5$				$\beta_c = -0.5$, $\beta_l = -2$			
All	8.67	2610	234453	1	8.09	2610	234453	1	**7.44**	**2610**	**234453**	**1**
Developed	2.66	630	13485	1	1.67	630	13485	1	**0.84**	**630**	**13485**	**0**
	$\beta_c = 0.5$, $\beta_l = -7$				$\beta_c = 0.5$, $\beta_l = -5$				$\beta_c = 0.5$, $\beta_l = -2$			
All	7.93	2610	234453	1	7.42	2610	234453	1	6.87	2610	234453	1
Developed	3.01	630	13485	1	2.00	630	13485	1	1.14	630	13485	0.99
	$\beta_c = 1$, $\beta_l = -7$				$\beta_c = 1$, $\beta_l = -5$				$\beta_c = 1$, $\beta_l = -2$			
All	7.88	2610	234453	1	7.41	2610	234453	1	6.91	2610	234453	1
Developed	3.53	630	13485	1	2.51	630	13485	1	1.64	630	13485	1
	$\beta_c = 5$, $\beta_l = -7$				$\beta_c = 5$, $\beta_l = -5$				$\beta_c = 5$, $\beta_l = -2$			
All	15.2	2610	234453	1	15.0	2610	234453	1	14.9	2610	234453	1
Developed	16.0	630	13485	1	14.9	630	13485	1	14.0	630	13485	1
	$\beta_c = 10$, $\beta_l = -7$				$\beta_c = 10$, $\beta_l = -5$				$\beta_c = 10$, $\beta_l = -2$			
All	43.7	2610	234453	1	43.9	2610	234453	1	44.3	2610	234453	1
Developed	52.5	630	13485	1	51.3	630	13485	1	50.2	630	13485	1
	$\beta_c = -10$, $\beta_l = -0.1$				$\beta_c = -10$, $\beta_l = 0.1$				$\beta_c = -10$, $\beta_l = 0.5$			
All	54.8	2610	234453	1	54.7	2610	234453	1	54.5	2610	234453	1
Developed	44.3	630	13485	1	44.3	630	13485	1	44.4	630	13485	1
	$\beta_c = -5$, $\beta_l = -0.1$				$\beta_c = -5$, $\beta_l = 0.1$				$\beta_c = -5$, $\beta_l = 0.5$			
All	20.0	2609	234453	1	20.0	2610	234453	1	19.9	2610	234453	1
Developed	10.9	630	13485	1	10.9	630	13485	1	11.0	630	13485	1
	$\beta_c = -1$, $\beta_l = -0.1$				$\beta_c = -1$, $\beta_l = 0.1$				$\beta_c = -1$, $\beta_l = 0.5$			
All	7.73	2610	234453	1	7.70	2610	234453	1	7.65	2610	234453	1
Developed	0.94	630	13485	0.13	0.94	630	13485	0.16	0.97	630	13485	0.30
	$\beta_c = -0.5$, $\beta_l = -0.1$				$\beta_c = -0.5$, $\beta_l = 0.1$				$\beta_c = -0.5$, $\beta_l = 0.5$			
All	**7.16**	**2610**	**234453**	**1**	**7.13**	**2610**	**234453**	**1**	**7.09**	**2610**	**234453**	**1**
Developed	**0.73**	**630**	**13485**	**0**	**0.74**	**630**	**13485**	**0**	**0.76**	**630**	**13485**	**0**
	$\beta_c = 0.5$, $\beta_l = -0.1$				$\beta_c = 0.5$, $\beta_l = 0.1$				$\beta_c = 0.5$, $\beta_l = 0.5$			
All	6.65	2610	234453	1	6.64	2610	234453	1	6.60	2610	234453	1
Developed	1.01	630	13485	0.59	1.02	630	13485	0.62	1.04	630	13485	0.74
	$\beta_c = 1$, $\beta_l = -0.1$				$\beta_c = 1$, $\beta_l = 0.1$				$\beta_c = 1$, $\beta_l = 0.5$			
All	6.72	2610	234453	1	6.71	2610	234453	1	6.68	2610	234453	1
Developed	1.50	630	13485	1	1.50	630	13485	1	1.52	630	13485	1
	$\beta_c = 5$, $\beta_l = -0.1$				$\beta_c = 5$, $\beta_l = 0.1$				$\beta_c = 5$, $\beta_l = 0.5$			
All	15.0	2610	234453	1	15.0	2610	234453	1	15.1	2610	234453	1
Developed	13.8	630	13485	1	13.7	630	13485	1	13.8	630	13485	1
	$\beta_c = 10$, $\beta_l = -0.1$				$\beta_c = 10$, $\beta_l = 0.1$				$\beta_c = 10$, $\beta_l = 0.5$			
All	44.7	2610	234453	1	44.7	2610	234453	1	44.8	2610	234453	1
Developed	49.9	630	13485	1	49.9	630	13485	1	49.9	630	13485	1

Notes: This table reports results from F-tests of the joint null hypothesis of optimal risk sharing, some trade costs and particular values for(β_c, β_l) against the alternative of some friction in asset markets and trade costs. Tests are based on estimating restricted and unrestricted log-linear gravity models of trade, as described in the text. All bilateral pairs including trade with self are included. Zeros in bilateral trade are replaced by 1 to generate the dependent variable, which is bilateral imports normalized by importer's expenditure and exporter's gross output. Baseline gravity variables include log distance and six indicator variables constructed to normalize trade costs to zero within countries.

Table 15: Correlation of log change in relative prices and log change in relative consumption

	Min	p25	p50	p75	Max
Prices from data					
All	-0.89	-0.39	-0.07	0.09	0.72
Developed	-0.39	-0.07	0.05	0.17	0.33
Developing	-0.89	-0.47	-0.14	0.08	0.72
Estimated prices, $\eta = 1.5$					
All	-0.97	-0.97	-0.97	-0.96	-0.96
Developed	-0.97	-0.97	-0.96	-0.96	-0.96
Developing	-0.97	-0.97	-0.97	-0.96	-0.96
Estimated prices, $\eta = 3$					
All	-0.96	-0.95	-0.94	-0.93	-0.87
Developed	-0.96	-0.94	-0.94	-0.93	-0.92
Developing	-0.96	-0.96	-0.95	-0.93	-0.87
Estimated prices, $\eta = 6$					
All	-0.95	-0.90	-0.85	-0.80	-0.60
Developed	-0.95	-0.85	-0.81	-0.79	-0.76
Developing	-0.95	-0.91	-0.86	-0.82	-0.60
Estimated prices, $\eta = 9$					
All	-0.94	-0.83	-0.72	-0.66	-0.42
Developed	-0.93	-0.71	-0.67	-0.62	-0.59
Developing	-0.94	-0.83	-0.76	-0.68	-0.42

Notes: This table reports summary statistics on the distribution of the country-by-country time series correlations of relative consumption and relative prices for the listed groups of countries. The US is excluded as it is the numeraire in each case. In each panel, the correlation is based on real consumption and relative prices based on a decomposition of the value of consumption into quantity and price parts using a different price series. The top panel uses data on nominal exchange rates and CPIs. The bottom panels use the estimates of $P_t^{i(1-\eta)}$ obtained by estimating the unrestricted gravity model, with different values of η used to back out P_t^iin each case.

Table 16: Coefficient in regression of log change in relative prices on log change in relative consumption

	data	$\eta = 1.5$	$\eta = 3$	$\eta = 6$	$\eta = 9$
All					
mean	-0.08	-1.00	-0.94	-0.76	-0.58
min	-1.17	-1.02	-1.01	-0.98	-0.95
p25	-0.45	-1.00	-0.98	-0.87	-0.72
p50	-0.05	-1.00	-0.95	-0.76	-0.55
p75	0.26	-0.99	-0.92	-0.67	-0.45
max	1.19	-0.97	-0.77	-0.40	-0.20
Developed only					
mean	0.17	-1.00	-0.96	-0.75	-0.54
min	-0.65	-1.01	-1.01	-0.98	-0.95
p25	-0.21	-1.00	-0.97	-0.79	-0.58
p50	0.16	-1.00	-0.95	-0.72	-0.49
p75	0.45	-1.00	-0.94	-0.70	-0.46
max	1.14	-0.99	-0.91	-0.63	-0.40
Developing only					
mean	-0.17	-0.99	-0.94	-0.76	-0.59
min	-1.17	-1.02	-1.01	-0.97	-0.89
p25	-0.57	-1.00	-0.98	-0.89	-0.74
p50	-0.23	-1.00	-0.95	-0.77	-0.57
p75	0.12	-0.99	-0.91	-0.66	-0.44
max	1.19	-0.97	-0.77	-0.40	-0.20

Notes: This table reports summary statistics on the distribution across countries of the coefficient on relative consumption in the country-by-country time-series regression of log changes in relative prices on log changes in relative consumption, where different sets of prices are used to decompose the value of consumption into price and real quantity components. The US is the numeraire in each case. The data column reports the results where the decomposition is performed using data on CPIs and nominal exchange rates. The other columns report the results where the decomposition is performed using the importer-year fixed effects estimated in the unrestricted reduced form gravity equation, with a value for η used to convert these into price estimates.

Table 17: Coefficients on gravity variables from structural estimation

	ldist		ldist*rich-poor		ldist*poor-poor		rich-poor		poor-poor	
1970	-0.65	(0.00)	-0.49	(0.01)	-1.63	(0.01)	2.47	(0.49)	10.14	(0.40)
1971	-0.65	(0.00)	-0.14	(0.01)	-0.45	(0.00)	-0.15	(0.56)	-0.79	(0.29)
1972	-0.65	(0.00)	-0.06	(0.01)	-0.79	(0.00)	-0.67	(0.54)	3.07	(0.25)
1973	-0.64	(0.00)	0.02	(0.01)	-0.86	(0.00)	-1.24	(0.56)	3.89	(0.24)
1974	-0.62	(0.00)	-0.08	(0.01)	-1.04	(0.00)	-0.21	(0.64)	5.65	(0.25)
1975	-0.64	(0.00)	-0.02	(0.01)	-0.80	(0.00)	-0.72	(0.64)	3.38	(0.22)
1976	-0.64	(0.00)	-0.03	(0.01)	-0.99	(0.00)	-0.59	(0.78)	5.08	(0.23)
1977	-0.64	(0.00)	-0.01	(0.01)	-0.20	(0.00)	-0.75	(0.74)	-2.02	(0.33)
1978	-0.63	(0.00)	0.05	(0.01)	-0.44	(0.01)	-1.28	(0.57)	0.58	(0.55)
1979	-0.63	(0.00)	0.09	(0.01)	-0.62	(0.00)	-1.59	(0.85)	2.21	(0.30)
1980	-0.62	(0.00)	-0.01	(0.01)	-0.89	(0.00)	-0.52	(0.91)	5.01	(0.33)
1981	-0.61	(0.00)	-0.10	(0.01)	-0.87	(0.00)	0.27	(0.95)	4.88	(0.32)
1982	-0.62	(0.00)	-0.03	(0.01)	-0.84	(0.00)	-0.46	(0.83)	4.44	(0.36)
1983	-0.61	(0.00)	0.13	(0.01)	-0.78	(0.01)	-1.85	(0.75)	3.95	(0.41)
1984	-0.60	(0.00)	0.07	(0.00)	-0.72	(0.00)	-1.46	(0.37)	3.85	(0.27)
1985	-0.60	(0.00)	-0.06	(0.01)	-0.59	(0.00)	-0.35	(0.40)	2.57	(0.31)
1986	-0.61	(0.00)	0.16	(0.00)	-0.61	(0.00)	-2.31	(0.34)	2.75	(0.30)
1987	-0.62	(0.00)	0.11	(0.00)	-0.35	(0.00)	-1.77	(0.37)	0.43	(0.36)
1988	-0.61	(0.00)	0.08	(0.01)	-0.63	(0.00)	-1.51	(0.41)	3.20	(0.28)
1989	-0.61	(0.00)	0.02	(0.01)	-0.51	(0.00)	-0.93	(0.43)	2.29	(0.32)
1990	-0.61	(0.00)	0.05	(0.01)	-0.56	(0.00)	-1.16	(0.44)	2.74	(0.30)
1991	-0.62	(0.00)	-0.02	(0.01)	-0.75	(0.00)	-0.43	(0.49)	4.60	(0.25)
1992	-0.62	(0.00)	-0.05	(0.01)	-0.89	(0.00)	-0.11	(0.55)	5.95	(0.28)
1993	-0.62	(0.00)	-0.10	(0.01)	-0.85	(0.00)	0.42	(0.56)	5.78	(0.31)
1994	-0.61	(0.00)	-0.14	(0.01)	-0.75	(0.00)	0.80	(0.54)	4.92	(0.28)
1995	-0.61	(0.00)	-0.11	(0.01)	-0.63	(0.00)	0.55	(0.53)	4.06	(0.31)
1996	-0.61	(0.00)	-0.11	(0.01)	-0.60	(0.00)	0.51	(0.57)	3.85	(0.34)
1997	-0.60	(0.00)	-0.10	(0.01)	-0.60	(0.00)	0.48	(0.55)	3.83	(0.31)
1998	-0.60	(0.00)	-0.10	(0.01)	-0.75	(0.00)	0.41	(0.53)	4.99	(0.27)
1999	-0.60	(0.00)	-0.15	(0.01)	-0.94	(0.00)	0.86	(0.57)	6.77	(0.29)
2000	-0.58	(0.00)	-0.23	(0.01)	-0.91	(0.00)	1.63	(0.58)	6.64	(0.26)

Notes: This table reports the estimated coefficients on the gravity variables included in the structural estimation of the nonlinear gravity equation. The model is independently estimated for each year. The standard errors reported are analytic robust standard errors. These estimates are used to construct the fitted values of trade costs used in the counterfactual exercises.

Table 18: Summary statistics on fitted values of trade costs, structural model

	All					Developed				
	p05	p25	p50	p75	p95	p05	p25	p50	p75	p95
	eta = 9					eta = 9				
1970	154	184	273	337	371	64	78	88	108	122
1975	129	165	238	274	292	63	77	86	106	120
1980	115	132	200	233	250	61	74	83	102	115
1985	115	131	179	203	215	58	70	78	96	108
1990	114	127	168	190	202	59	72	81	99	112
1995	105	117	147	169	180	59	72	81	99	112
2000	96	109	138	164	177	56	68	76	93	105
	eta = 6					eta = 6				
1970	183	344	431	723	958	121	153	174	222	258
1975	200	277	376	603	724	119	150	171	219	254
1980	171	239	285	480	585	114	143	163	207	240
1985	173	241	282	418	490	107	134	152	193	223
1990	175	239	272	384	450	111	139	158	201	232
1995	151	215	246	325	387	110	139	157	200	232
2000	130	193	225	300	372	103	130	147	186	214
	eta = 3					eta =3				
1970	4054	6395	19356	36321	48926	624	914	1139	1766	2330
1975	2654	4852	13011	19419	23471	610	891	1108	1711	2252
1980	2021	2807	7987	12187	14881	568	823	1019	1557	2035
1985	2050	2754	6000	8360	9780	517	741	910	1372	1776
1990	2015	2577	5049	7006	8178	544	785	968	1470	1912
1995	1657	2125	3619	5137	6060	542	781	963	1462	1902
2000	1371	1800	3104	4734	5775	491	699	856	1281	1649

Notes: This table reports summary statistics on the distribution of the fitted values of trade costs for bilateral pairs $i \neq j$, expressed as a fraction of the producer price. These are calculated as $100\left[\exp\left(\frac{1}{1-\eta}\sum_{n=1}^{J}\hat{\gamma}_{nt}d_n^{ik}\right)-1\right]$. I report these fitted values for the estimates of the coefficients on gravity variables ($\hat{\gamma}$) from estimating the structural version of the gravity model. I report statistics separately for the sample as a whole and for the OECD, though the coefficients are taken from the pooled estimation in both cases. Although fitted trade costs can be calculated for every year, I report them only at 5-year intervals to save on space. I report statistics for three different assumptions about the value of η.

Table 19: Summary statistics on compensating variation, population-weighted

	avg	min	p25	p50	p75	max
Optimal risk sharing in developed only						
All	0.99	0.95	0.98	0.99	0.99	1.16
Developed	1.02	0.97	0.99	0.99	1.03	1.16
Developing	0.98	0.95	0.98	0.98	0.99	1.00
Optimal risk sharing in full sample						
All	1.06	0.95	1.01	1.06	1.07	2.13
Developed	1.02	0.96	0.98	0.98	1.01	1.16
Developing	1.08	0.95	1.03	1.06	1.07	2.13
Optimal risk sharing for all, no trade costs						
All	1.99	1.55	1.89	1.97	2.01	4.36
Developed	1.75	1.55	0.78	1.70	1.89	2.15
Developing	2.05	1.85	1.88	1.97	2.02	4.36

Notes: This table reports population-weighted summary statistics on the distribution of δ, the measure of compensating variation based on a measure of ex-post welfare that is a simple average of per-period welfare. These distributions are reported for the three counterfactual exercises described in the text relative to the baseline estimated distribution of real consumption, and for the full sample as well as the developed and developing subsamples.The three counterfactual exercises are first, the imposition of optimal risk sharing between developed countries, second, the imposition of optimal risk sharing in the world as a whole, and third, optimal risk sharing and zero trade costs in the world as a whole. The baseline in each case is based on the structural estimation of the nonlinear gravity equation. For both fitted and counterfactual exercises, $\{\eta, \rho\} = \{6, 2\}$. The population weights are the average share of population of the relevant sample (All, developed, developing) over the period.

Table 20: Summary statistics on compensating variation: Pareto weights that guarantee welfare gains within risk-sharing group

	avg	min	p25	p50	p75	max
Optimal risk sharing in developed only						
All	1.00	0.97	0.99	0.99	1.00	1.07
Developed	1.02	1.00	1.00	1.00	1.03	1.07
Developing	0.99	0.97	0.99	0.99	0.99	1.01
Optimal risk sharing in full sample						
All	1.04	1.00	1.01	1.04	1.07	1.09
Developed	1.02	1.00	1.00	1.00	1.02	1.08
Developing	1.05	1.00	1.02	1.04	1.08	1.09

Notes: This table reports summary statistics on the distribution of compensating variation constructed based on a measure of ex-post welfare that is the simple average of per-period welfare over the sample. The optimal risk sharing vector in each case is chosen based on iterating on the baseline optimal risk sharing vector, to increase the relative Pareto weight of countries in the risk sharing group for which compensating variation is less than 1 and to decrease the relative Pareto weight of countries in the risk sharing group for which compensating variation is greater than 1. As soon as a vector is found such that compensating variation is at least 1 for all countries in the risk sharing group, the algorithm terminates.

Table 21: Summary statistics on compensating variation: Smoothed Pareto weights; Pareto weights from 1970

	avg	min	p25	p50	p75	max
Smoothed Pareto weights						
Smoothed Pareto weights in developed only						
All	1.00	0.97	0.99	0.99	0.99	1.28
Developed	1.04	0.98	0.99	1.02	1.05	1.28
Developing	0.99	0.97	0.99	0.99	0.99	1.00
Smoothed Pareto weights in full sample						
All	1.09	0.97	1.00	1.03	1.13	2.19
Developed	1.00	0.97	0.98	0.99	1.01	1.13
Developing	1.12	0.97	1.02	1.05	1.14	2.19
Pareto weights set at 1970 levels						
Optimal risk sharing in developed only						
All	0.96	0.71	0.95	0.97	0.97	1.17
Developed	0.94	0.71	0.87	0.94	1.00	1.17
Developing	0.96	0.94	0.96	0.97	0.97	0.98
Optimal risk sharing in full sample						
All	1.23	0.63	0.92	1.11	1.36	3.29
Developed	0.90	0.67	0.83	0.90	0.95	1.13
Developing	1.34	0.63	0.99	1.19	1.55	3.29

Notes: This table reports summary statistics on the distribution of δ, the measure of compensating variation based on a measure of ex-post welfare that is a simple average of per-period welfare. These distributions are reported for two counterfactual exercises relative to the baseline estimated distribution of real consumption, and for the full sample as well as the developed and developing subsamples. In the first panel, the first counterfactual reallocates consumption based on relative Pareto weights that are smoothed over time for developed countries. The second counterfactual reallocates consumption based on relative Pareto weights that are smoothed over time for all countries in the sample. In the second panel, the first counterfactual reallocates consumption based on the estimated relative Pareto weights from 1970 for OECD countries. The second counterfactual reallocates consumption based on the estimated relative Pareto weights from 1970 for all countries in the sample. The baseline in each case is based on the structural estimation of the nonlinear gravity equation. For both fitted and counterfactual exercises, $\{\eta, \rho\} = \{6, 2\}$.

Table 22: Summary statistics on compensating variation, with discounting

	avg	min	p25	p50	p75	max
Optimal risk sharing in developed only						
All	0.99	0.96	0.98	0.99	0.99	1.14
Developed	1.01	0.98	0.99	1.00	1.02	1.14
Developing	0.99	0.96	0.98	0.99	0.99	1.00
Optimal risk sharing in full sample						
All	1.06	0.96	0.99	1.01	1.07	1.68
Developed	1.00	0.97	0.98	0.99	1.01	1.14
Developing	1.08	0.96	1.00	1.03	1.12	1.68
Optimal risk sharing for all, no trade costs						
All	2.21	1.55	1.97	2.17	2.37	3.39
Developed	1.87	1.55	1.79	1.88	1.97	2.20
Developing	2.32	1.86	2.11	2.26	2.42	3.39

Notes: This table reports population-weighted summary statistics on the distribution of an alternative measure of compensating variation, δ_2, which is based on a measure of ex-post welfare that is discounted sum of within-sample welfare, discounted from the perspective of 1970, with $\beta = 0.95$. These distributions are reported for the three counterfactual exercises described in the text relative to the baseline estimated distribution of real consumption, and for the full sample as well as the developed and developing subsamples. The optimal risk sharing point is calculated using the weighted average of within-risk-sharing-group estimated Pareto weights, where the weights are based on discounting using the same β. The three counterfactual exercises are first, the imposition of optimal risk sharing between developed countries, second, the imposition of optimal risk sharing in the world as a whole, and third, optimal risk sharing and zero trade costs in the world as a whole. The baseline in each case is based on the structural estimation of the nonlinear gravity equation. For both fitted and counterfactual exercises, $\{\eta, \rho\} = \{6, 2\}$.

Table 23: Compensating variation under alternative values for $\{\eta, \rho\}$, I

		avg	min	p25	p50	p75	max
				rho = 0.5, eta = 1.5			
World, avg	All	1.01	0.99	1.00	1.00	1.01	1.03
	Developed	1.00	1.00	1.00	1.00	1.00	1.03
	Developing	1.01	0.99	1.00	1.01	1.01	1.02
Developed, avg	All	1.15	0.88	1.00	1.03	1.10	8.51
	Developed	0.99	0.98	0.99	0.99	1.00	1.01
	Developing	1.20	0.88	1.01	1.05	1.15	8.51
World, avg	All	2192213	4.49	3520	70783	1749947	38373479
zero tcost	Developed	15130	4.49	116	1233	5334	239890
	Developing	2917907	381	29912	470800	3079872	38373479
				rho = 0.5, eta = 3			
World, avg	All	1.00	0.99	1.00	1.00	1.00	1.02
	Developed	1.00	0.99	1.00	1.00	1.01	1.02
	Developing	1.00	1.00	1.00	1.00	1.00	1.01
Developed, avg	All	1.05	0.95	1.00	1.02	1.08	1.39
	Developed	1.00	0.99	0.99	1.00	1.00	1.01
	Developing	1.06	0.95	1.02	1.05	1.10	1.39
World, avg	All	31.5	1.87	9.81	21.9	48.6	111
zero tcost	Developed	8.76	1.87	4.18	7.62	11.0	28.5
	Developing	39.1	5.84	18.10	35.1	59.1	111
				rho = 0.5, eta = 6			
World, avg	All	1.00	0.99	1.00	1.00	1.01	1.02
	Developed	1.00	0.99	1.00	1.00	1.01	1.02
	Developing	1.00	1.00	1.00	1.00	1.00	1.01
Developing, avg	All	1.05	0.93	1.00	1.03	1.08	1.24
	Developed	1.00	0.98	0.99	1.00	1.00	1.02
	Developing	1.06	0.93	1.02	1.05	1.11	1.24
World, avg	All	3.79	1.30	2.51	3.60	4.89	7.08
zero tcost	Developed	2.29	1.30	1.78	2.28	2.63	3.85
	Developing	4.29	2.09	3.23	4.44	5.41	7.08
				rho = 0.5, eta = 9			
World, avg	All	1.00	0.98	1.00	1.00	1.01	1.02
	Developed	1.00	0.98	1.00	1.00	1.01	1.02
	Developing	1.00	1.00	1.00	1.00	1.01	1.01
Developing, avg	All	1.04	0.92	1.00	1.03	1.08	1.25
	Developed	1.00	0.98	0.99	1.00	1.00	1.02
	Developing	1.06	0.92	1.02	1.05	1.10	1.25
World, avg	All	2.30	1.19	1.79	2.29	2.82	3.54
zero tcost	Developed	1.67	1.19	1.43	1.68	1.83	2.32
	Developing	2.51	1.61	2.10	2.59	2.96	3.54

Notes: This table reports summary statistics on the distribution of δ, the baseline measure of compensating variation based the simple average across the sample period of ex-post welfare. These distributions are reported for the three counterfactual exercises described in the text relative to the baseline estimated distribution of real consumption, and for the full sample as well as the developed and developing subsamples. The three counterfactual exercises are first, the imposition of optimal risk sharing between developed countries, second, the imposition of optimal risk sharing in the world as a whole, and third, optimal risk sharing and zero trade costs in the world as a whole. The baseline in each case is based on the structural estimation of the nonlinear gravity equation. For both fitted and counterfactual exercises, $\{\eta, \rho\}$ are as listed.

Table 24: Compensating variation under alternative values for $\{\eta, \rho\}$, II

		avg	min	p25	p50	p75	max
		rho = 0.9, eta = 1.5					
World, avg	All	1.00	1.00	1.00	1.00	1.00	1.01
	Developed	1.00	1.00	1.00	1.00	1.00	1.01
	Developing	1.00	1.00	1.00	1.00	1.00	1.00
Developed, avg	All	1.05	0.98	1.00	1.02	1.08	1.32
	Developed	1.00	0.99	1.00	1.00	1.00	1.01
	Developing	1.07	0.98	1.01	1.04	1.10	1.32
World, avg	All	65381	66.7	3097	15342	91354	527163
zero tcost	Developed	3554	66.7	425	1548	3551	29789
	Developing	85989	874	9819	44367	136473	527163
		rho = 0.9, eta = 3					
World, avg	All	1.00	0.99	1.00	1.00	1.00	1.01
	Developed	1.00	1.00	1.00	1.00	1.01	1.01
	Developing	1.00	0.99	1.00	1.00	1.00	1.00
Developed, avg	All	1.05	0.98	1.00	1.03	1.07	1.47
	Developed	1.00	0.99	1.00	1.00	1.00	1.01
	Developing	1.07	0.98	1.02	1.05	1.10	1.47
World, avg	All	12.5	2.70	7.21	10.97	17.1	27.9
zero tcost	Developed	6.13	2.70	4.30	5.92	7.30	12.4
	Developing	14.6	5.35	9.61	14.5	19.6	27.9
		rho = 0.9, eta = 6					
World, avg	All	1.00	0.99	1.00	1.00	1.00	1.01
	Developed	1.00	1.00	1.00	1.00	1.01	1.01
	Developing	1.00	0.99	1.00	1.00	1.00	1.00
Developed, avg	All	1.05	0.99	1.00	1.03	1.08	1.51
	Developed	1.00	0.99	1.00	1.00	1.00	1.01
	Developing	1.07	0.99	1.02	1.05	1.09	1.51
World, avg	All	2.72	1.48	2.20	2.68	3.22	4.03
zero tcost	Developed	2.02	1.48	1.78	2.02	2.19	2.71
	Developing	2.96	1.98	2.46	2.98	3.38	4.03
		rho = 0.9, eta = 9					
World, avg	All	1.00	0.99	1.00	1.00	1.00	1.01
	Developed	1.00	1.00	1.00	1.00	1.01	1.01
	Developing	1.00	0.99	1.00	1.00	1.00	1.00
Developed, avg	All	1.05	0.99	1.00	1.03	1.08	1.51
	Developed	1.00	0.99	1.00	1.00	1.00	1.01
	Developing	1.07	0.99	1.02	1.05	1.09	1.51
World, avg	All	1.89	1.27	1.64	1.87	2.11	2.75
zero tcost	Developed	1.54	1.27	1.43	1.55	1.63	1.86
	Developing	2.01	1.53	1.77	2.00	2.18	2.75

Notes: This table reports summary statistics on the distribution of δ, the baseline measure of compensating variation based the simple average across the sample period of ex-post welfare. These distributions are reported for the three counterfactual exercises described in the text relative to the baseline estimated distribution of real consumption, and for the full sample as well as the developed and developing subsamples. The three counterfactual exercises are first, the imposition of optimal risk sharing between developed countries, second, the imposition of optimal risk sharing in the world as a whole, and third, optimal risk sharing and zero trade costs in the world as a whole. The baseline in each case is based on the structural estimation of the nonlinear gravity equation. For both fitted and counterfactual exercises, $\{\eta, \rho\}$ are as listed.

Table 25: Compensating variation under alternative values for $\{\eta, \rho\}$, III

		avg	min	p25	p50	p75	max
				rho = 1.1, eta = 1.5			
World, avg	All	1.00	0.99	1.00	1.00	1.00	1.02
	Developed	1.00	1.00	1.00	1.00	1.01	1.02
	Developing	1.00	0.99	1.00	1.00	1.00	1.00
Developed, avg	All	1.05	0.99	1.00	1.02	1.07	1.53
	Developed	1.00	0.99	1.00	1.00	1.00	1.01
	Developing	1.07	0.99	1.01	1.04	1.09	1.53
World, avg	All	22645	87.6	2271	7999	33738	140792
zero tcost	Developed	2050	87.6	411	1165	2328	13428
	Developing	29510	771	5456	19796	48015	140792
				rho = 1.1, eta = 3			
World, avg	All	1.00	0.99	1.00	1.00	1.00	1.02
	Developed	1.00	1.00	1.00	1.00	1.01	1.02
	Developing	1.00	0.99	1.00	1.00	1.00	1.00
Developed, avg	All	1.06	0.99	1.00	1.03	1.08	1.63
	Developed	1.00	0.99	0.99	1.00	1.00	1.01
	Developing	1.08	0.99	1.02	1.05	1.09	1.63
World, avg	All	10.2	2.88	6.56	9.21	13.3	20.1
zero tcost	Developed	5.63	2.88	4.27	5.50	6.55	10.1
	Developing	11.7	5.21	8.18	11.7	15.0	20.1
				rho = 1.1, eta = 6			
World, avg	All	1.00	0.99	1.00	1.00	1.00	1.02
	Developed	1.00	1.00	1.00	1.00	1.01	1.02
	Developing	1.00	0.99	1.00	1.00	1.00	1.00
Developed, avg	All	1.06	0.99	1.00	1.03	1.09	1.65
	Developed	1.00	0.99	0.99	1.00	1.00	1.02
	Developing	1.08	0.99	1.02	1.06	1.09	1.65
World, avg	All	2.54	1.51	2.12	2.49	2.88	4.01
zero tcost	Developed	1.96	1.51	1.78	1.95	2.10	2.50
	Developing	2.73	1.93	2.36	2.71	3.01	4.01
				rho = 1.1, eta = 9			
World, avg	All	1.00	0.99	1.00	1.00	1.00	1.03
	Developed	1.01	1.00	1.00	1.00	1.01	1.03
	Developing	1.00	0.99	1.00	1.00	1.00	1.00
Developed, avg	All	1.06	0.99	1.00	1.03	1.08	1.64
	Developed	1.00	0.99	0.99	1.00	1.00	1.03
	Developing	1.08	0.99	1.02	1.05	1.10	1.64
World, avg	All	1.82	1.29	1.60	1.81	1.99	2.84
zero tcost	Developed	1.52	1.29	1.43	1.51	1.59	1.77
	Developing	1.92	1.51	1.76	1.89	2.02	2.84

Notes: This table reports summary statistics on the distribution of δ, the baseline measure of compensating variation based the simple average across the sample period of ex-post welfare. These distributions are reported for the three counterfactual exercises described in the text relative to the baseline estimated distribution of real consumption, and for the full sample as well as the developed and developing subsamples. The three counterfactual exercises are first, the imposition of optimal risk sharing between developed countries, second, the imposition of optimal risk sharing in the world as a whole, and third, optimal risk sharing and zero trade costs in the world as a whole. The baseline in each case is based on the structural estimation of the nonlinear gravity equation. For both fitted and counterfactual exercises, $\{\eta, \rho\}$ are as listed.

Table 26: Compensating variation under alternative values for $\{\eta, \rho\}$, IV

		avg	min	p25	p50	p75	max
				rho = 2, eta = 1.5			
World, avg	All	0.97	0.89	0.95	0.97	0.98	1.14
	Developed	1.03	0.96	0.99	1.01	1.07	1.14
	Developing	0.95	0.89	0.94	0.96	0.97	0.99
Developed, avg	All	1.25	0.85	0.97	1.02	1.12	15.59
	Developed	0.99	0.91	0.95	0.97	1.03	1.09
	Developing	1.33	0.85	0.99	1.04	1.16	15.59
World, avg	All	3333	115	861	2450	4399	60699
zero tcost	Developed	681	115	333	528	859	2508
	Developing	4216	478	1621	3008	4786	60699
				rho = 2, eta = 3			
World, avg	All	0.99	0.95	0.98	0.98	0.99	1.11
	Developed	1.01	0.98	0.99	1.00	1.03	1.11
	Developing	0.98	0.95	0.98	0.98	0.99	1.00
Developed, avg	All	1.08	0.95	1.00	1.02	1.10	2.20
	Developed	1.00	0.96	0.97	0.98	1.02	1.11
	Developing	1.11	0.95	1.00	1.04	1.14	2.20
World, avg	All	6.89	3.16	5.26	6.91	8.07	13.8
zero tcost	Developed	4.79	3.16	4.24	4.69	5.25	6.84
	Developing	7.59	4.71	6.37	7.54	8.68	13.8
				rho = 2, eta = 6			
World, avg	All	0.99	0.95	0.98	0.98	0.99	1.16
	Developed	1.01	0.97	0.99	1.00	1.03	1.16
	Developing	0.98	0.95	0.98	0.98	0.99	1.00
Developed, avg	All	1.08	0.95	0.99	1.02	1.11	2.13
	Developed	1.00	0.96	0.97	0.99	1.02	1.16
	Developing	1.10	0.95	1.01	1.03	1.12	2.13
World, avg	All	2.23	1.55	1.96	2.19	2.38	4.36
zero tcost	Developed	1.86	1.55	1.78	1.86	1.95	2.15
	Developing	2.36	1.85	2.11	2.28	2.43	4.36
				rho = 2, eta = 9			
World, avg	All	0.99	0.96	0.98	0.99	0.99	1.18
	Developed	1.01	0.97	0.99	1.00	1.03	1.18
	Developing	0.98	0.96	0.98	0.98	0.99	1.00
Developed, avg	All	1.08	0.96	1.00	1.02	1.10	2.10
	Developed	1.00	0.96	0.98	0.99	1.02	1.18
	Developing	1.10	0.96	1.01	1.03	1.12	2.10
World, avg	All	1.70	1.30	1.52	1.64	1.75	3.27
zero tcost	Developed	1.48	1.30	1.43	1.47	1.51	1.69
	Developing	1.77	1.44	1.60	1.69	1.82	3.27

Notes: This table reports summary statistics on the distribution of δ, the baseline measure of compensating variation based the simple average across the sample period of ex-post welfare. These distributions are reported for the three counterfactual exercises described in the text relative to the baseline estimated distribution of real consumption, and for the full sample as well as the developed and developing subsamples. The three counterfactual exercises are first, the imposition of optimal risk sharing between developed countries, second, the imposition of optimal risk sharing in the world as a whole, and third, optimal risk sharing and zero trade costs in the world as a whole. The baseline in each case is based on the structural estimation of the nonlinear gravity equation. For both fitted and counterfactual exercises, $\{\eta, \rho\}$ are as listed.

Table 27: Compensating variation under alternative values for $\{\eta, \rho\}$, V

		avg	min	p25	p50	p75	max
				rho = 3, eta = 1.5			
World, avg	All	0.85	0.60	0.74	0.83	0.93	1.37
	Developed	1.04	0.84	0.95	1.00	1.16	1.37
	Developing	0.78	0.60	0.73	0.78	0.86	0.98
Developed, avg	All	2.20	0.57	0.80	0.91	1.08	108
	Developed	0.85	0.66	0.77	0.81	0.94	1.14
	Developing	2.66	0.57	0.83	0.94	1.15	108
World, avg	All	5263	110	599	1151	1830	345640
zero tcost	Developed	482	110	313	462	594	1464
	Developing	6857	298	979	1411	2019	345640
				rho = 3, eta = 3			
World, avg	All	0.96	0.86	0.93	0.95	0.97	1.30
	Developed	1.02	0.92	0.97	1.00	1.06	1.30
	Developing	0.94	0.86	0.93	0.95	0.96	0.99
Developed, avg	All	1.09	0.87	0.96	1.01	1.11	2.47
	Developed	1.00	0.90	0.95	0.97	1.04	1.28
	Developing	1.13	0.87	0.96	1.01	1.14	2.47
World, avg	All	6.10	3.14	4.81	5.77	6.66	13.6
zero tcost	Developed	4.60	3.14	4.18	4.60	4.97	6.17
	Developing	6.60	4.15	5.37	6.07	7.06	13.6
				rho = 3, eta = 6			
World, avg	All	0.98	0.93	0.96	0.97	0.98	1.36
	Developed	1.02	0.93	0.98	1.00	1.05	1.36
	Developing	0.96	0.93	0.96	0.97	0.97	1.00
Developed, avg	All	1.09	0.90	0.97	1.01	1.09	2.41
	Developed	1.01	0.92	0.96	0.98	1.04	1.35
	Developing	1.12	0.90	0.97	1.02	1.13	2.41
World, avg	All	2.16	1.53	1.87	2.00	2.24	4.62
zero tcost	Developed	1.86	1.53	1.72	1.83	1.96	2.50
	Developing	2.26	1.70	1.92	2.07	2.31	4.62
				rho = 3, eta = 9			
World, avg	All	0.98	0.93	0.97	0.97	0.98	1.38
	Developed	1.03	0.93	0.98	1.00	1.05	1.38
	Developing	0.97	0.94	0.97	0.97	0.97	1.00
Developed, avg	All	1.10	0.91	0.97	1.02	1.09	2.38
	Developed	1.02	0.92	0.97	0.99	1.04	1.38
	Developing	1.12	0.91	0.98	1.02	1.13	2.38
World, avg	All	1.68	1.28	1.47	1.56	1.70	3.57
zero tcost	Developed	1.49	1.28	1.38	1.46	1.56	2.02
	Developing	1.74	1.35	1.49	1.58	1.78	3.57

Notes: This table reports summary statistics on the distribution of δ, the baseline measure of compensating variation based the simple average across the sample period of ex-post welfare. These distributions are reported for the three counterfactual exercises described in the text relative to the baseline estimated distribution of real consumption, and for the full sample as well as the developed and developing subsamples. The three counterfactual exercises are first, the imposition of optimal risk sharing between developed countries, second, the imposition of optimal risk sharing in the world as a whole, and third, optimal risk sharing and zero trade costs in the world as a whole. The baseline in each case is based on the structural estimation of the nonlinear gravity equation. For both fitted and counterfactual exercises, $\{\eta, \rho\}$ are as listed.

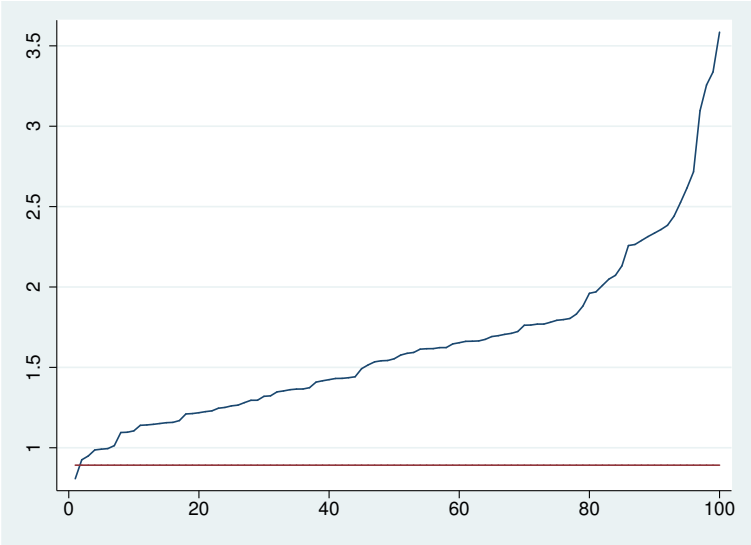
Table 28: Summary statistics on compensating variation: alternative dependent variable

	avg	min	p25	p50	p75	max
Optimal risk sharing in developed only						
All	0.99	0.91	0.98	0.99	0.99	1.16
Developed	1.01	0.97	0.99	1.00	1.03	1.16
Developing	0.98	0.91	0.98	0.98	0.99	1.00
Optimal risk sharing in full sample						
All	1.07	0.95	1.00	1.02	1.09	2.10
Developed	1.00	0.96	0.98	0.99	1.02	1.16
Developing	1.10	0.95	1.01	1.04	1.12	2.10
Optimal risk sharing for all, no trade costs						
All	2.22	1.55	1.94	2.18	2.37	4.27
Developed	1.86	1.55	1.78	1.86	1.95	2.15
Developing	2.34	1.85	2.11	2.25	2.43	4.27

Notes: This table reports summary statistics on the distribution of δ, the measure of compensating variation based on a measure of ex-post welfare that is a simple average of per-period welfare. These distributions are reported for the three counterfactual exercises described in the text relative to the baseline estimated distribution of real consumption, and for the full sample as well as the developed and developing subsamples. The three counterfactual exercises are first, the imposition of optimal risk sharing between developed countries, second, the imposition of optimal risk sharing in the world as a whole, and third, optimal risk sharing and zero trade costs in the world as a whole. The point on within-risk-sharing-group Pareto frontier is chosen based on the simple time-series average of the within-risk-sharing group estimated Pareto weights. Pareto weights are held fixed at their estimated levels for countries outside the risk-sharing group, while the weight of the risk-sharing group as a whole varies with respect to the weights of countries outside the group as estimated. The baseline in each case is based on the structural estimation of the nonlinear gravity equation, where the dependent variable is $\ln\left(\left(1+IM_t^{ij}\right)/EXP_t^iOUT_t^j\right)$, rather than the baseline of $\ln\left(IM_t^{ij}/EXP_t^iOUT_t^j\right)$. Hence, zeros in bilateral trade are not excluded. For both fitted and counterfactual exercises, $\{\eta,\rho\}=\{6,2\}$.

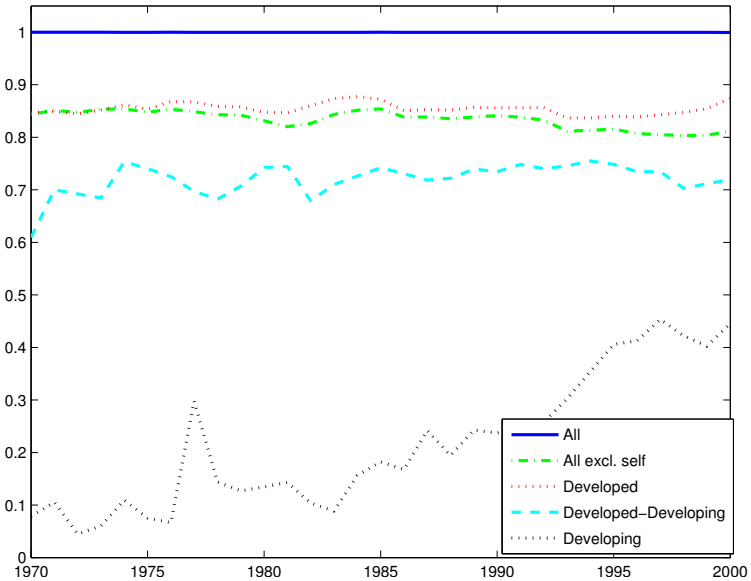
9 Additional figures

Figure 1: CDF of F-test statistics for random samples of 22 countries



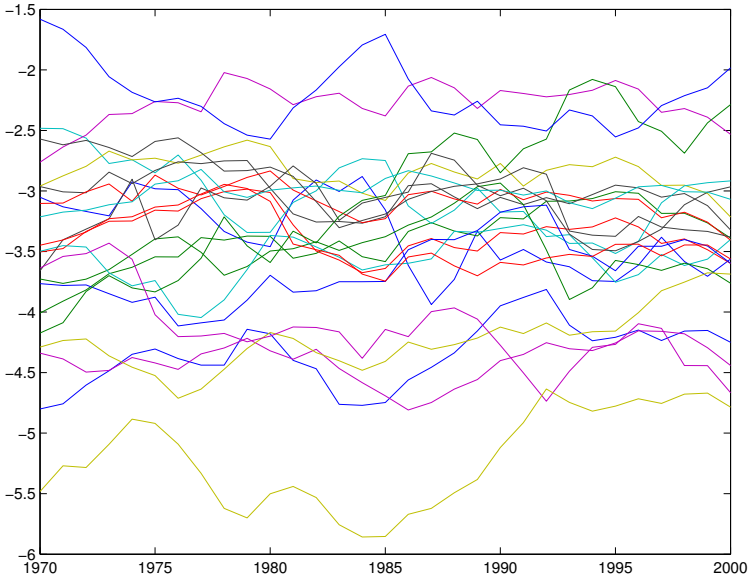
Notes: This figure plots the CDF of the F-test statistics for the test of the null of optimal risk sharing against the alternative of an unrestricted gravity model, for randomly selected samples of 22 countries. All bilateral pairs including trade with self are included. Zeros in bilateral trade are replaced by 1 to generate the dependent variable, which is bilateral imports normalized by importer's expenditure and exporter's gross output. Baseline gravity variables include log distance and six indicator variables constructed to normalize trade costs to zero within countries. The critical value for the test statistic at the 5% level is also plotted.

Figure 2: Correlation between predicted and actual bilateral imports, structural estimation



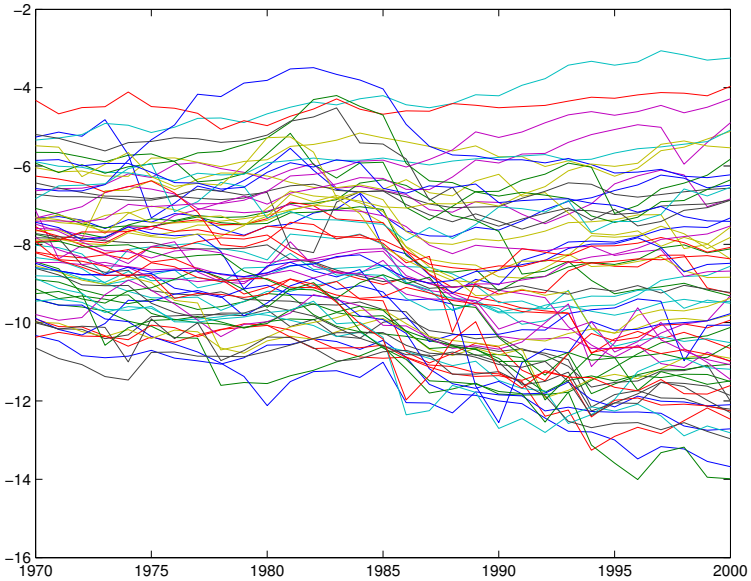
Notes: This figure shows the time-series evolution of the cross-sectional correlation between fitted and actual bilateral imports for different subsets of observations. The predictions are taken from the structural estimation of the nonlinear gravity equation. The subsets of observations are all observations; all observations excluding imports of a country from itself; imports into one developed country from another developed country (excluding imports from self), imports between developed and developing countries; and imports into one developing country from another developing country (excluding imports from self).

Figure 3: Time series evolution of developed country Pareto weights



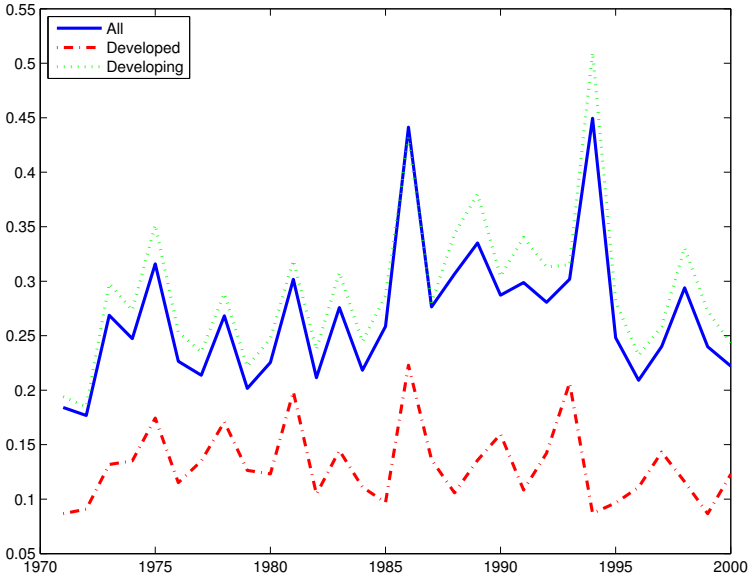
Notes: This figure plots the time series evolution of the log of the structurally estimated Pareto weights for all 22 developed countries (original weights normalized to sum to one at each point in time). The Pareto weight estimates are based on the structural estimation of the nonlinear gravity equation, combined with the assumption that $\{\eta, \rho\} = \{6, 2\}$.

Figure 4: Time series evolution of developing country Pareto weights



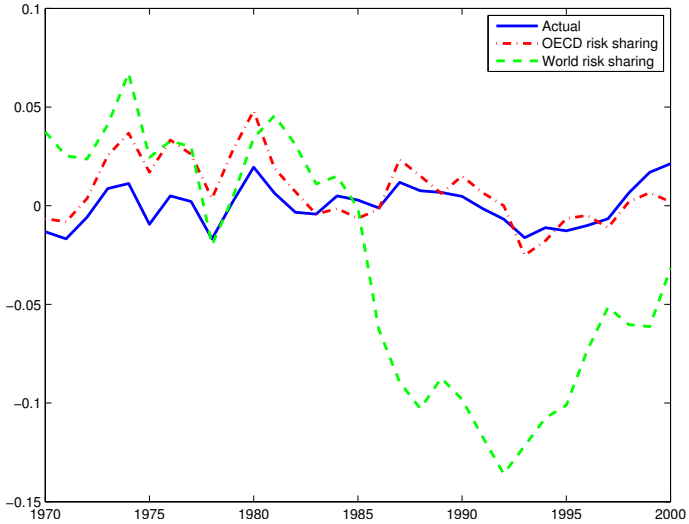
Notes: This figure plots the time series evolution of the log of the structurally estimated Pareto weights for all 66 developing countries (original weights normalized to sum to one at each point in time). The Pareto weight estimates are based on the structural estimation of the nonlinear gravity equation, combined with the assumption that $\{\eta, \rho\} = \{6, 2\}$.

Figure 5: Cross-sectional dispersion of year-on-year log changes in structural Pareto weight estimates



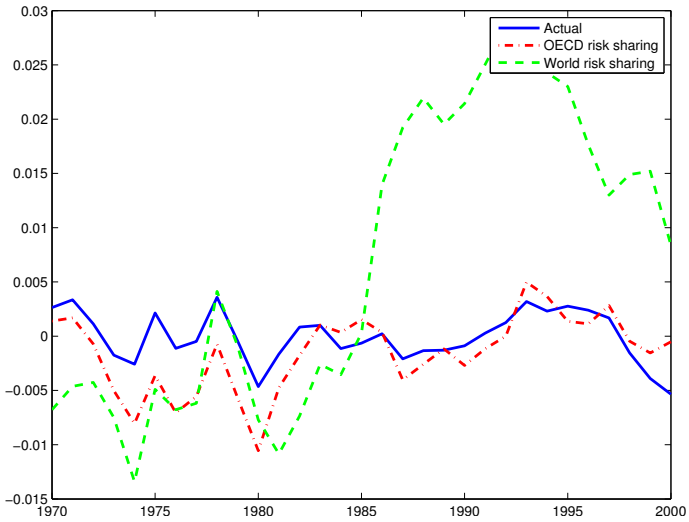
Notes: This figure plots the time-series evolution of the cross-section standard deviation of year-on-year log changes in the estimated Pareto weights expressed relative to the rest of the world. The Pareto weight estimates are based on the structural estimation of the nonlinear gravity equation, combined with the assumption that $\{\eta, \rho\} = \{6, 2\}$. The standard deviation of log changes in these weights is plotted for the world as a whole, and also for developed and developing countries separately.

Figure 6: Aggregate developing country net exports as a share of developing country GDP



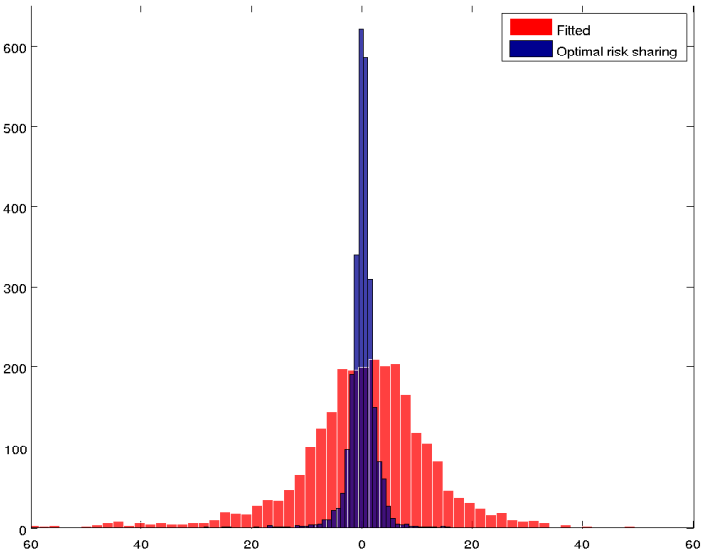
Notes: This figure plots the time-series evolution of developing country net exports as a share of developing country GDP, in the data (the evolution in the fitted model is exactly equal to that in the data by construction), under optimal risk sharing between developed countries only, and under optimal risk sharing in the world as a whole.

Figure 7: Developed country net exports as a share of developed country GDP



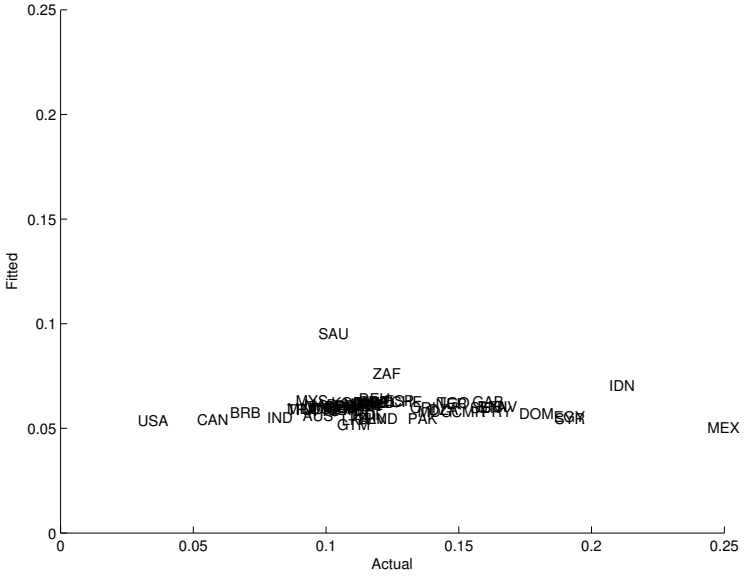
Notes: This figure plots the time-series evolution of developed country net exports as a share of developed country GDP, in the data (the evolution in the fitted model is exactly equal to that in the data by construction), under optimal risk sharing between developed countries only, and under optimal risk sharing in the world as a whole.

Figure 8: Distribution of deviations from world mean consumption growth rate



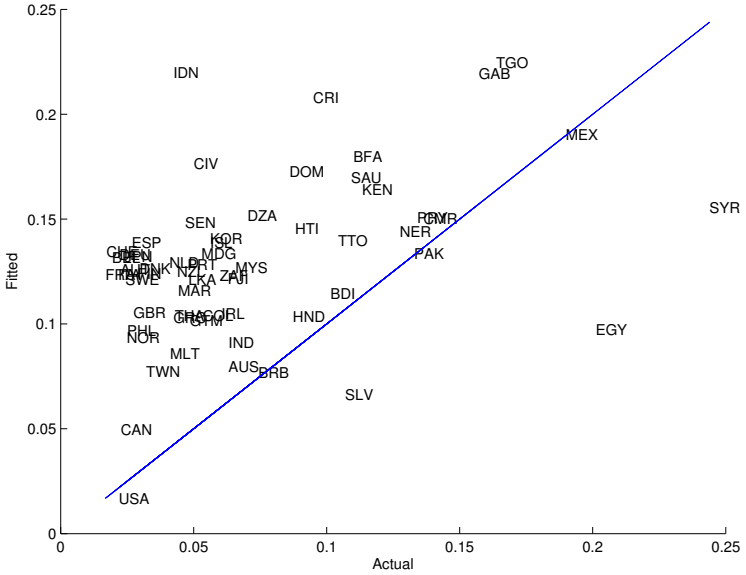
Notes: This figure shows the distribution of deviations of country year-on-year real consumption growth rates from the (unweighted) world average consumption growth rate in two cases. The first case is the fitted values of real consumption based on the price estimates and trade costs from the structural estimation of the nonlinear gravity equation. The second case is the values of real consumption in the counterfactual exercise where there is optimal risk sharing in the world as a whole, but trade costs are held at their historical levels. In both cases, all years are pooled together.

Figure 9: Standard deviation of annual log changes in prices, fitted against measured



Notes: This figure is a scatter plot of the standard deviation of annual log changes in measured prices (expressed in US$), against the standard deviation of annual log changes in estimated consumption prices based on the structural model.

Figure 10: Standard deviation of annual log changes in consumption, fitted against measured



Notes: This figure is a scatter plot of the standard deviation of annual log changes in real consumption calculated using CPI data to deflate the value of consumption against the standard deviation of annual log changes in real consumption calculated using the price estimates from the structural model.