It Takes More Than A Moment: Revisiting The Link Between Firm Productivity and Aggregate Exports

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Outline

- Motivation, findings and contribution
- Theoretical model
- Estimation strategy
- Data
- Results
- Conclusions

Motivation: from micro to macro I

Firm heterogeneity and aggregate exports: i(r)resistible prominence of averages ("first moment")

- Macro: price competitiveness measured by average ULC; non-price competitiveness measured by average RD intensity
- Micro: "New trade models, same old gains?" (Arkolakis et al,12): in many trade models (including extensions of Melitz (03) with Pareto TFP distribution) a country's domestic trade share and *across-market constant* elasticity of trade to variable trade costs are sufficient statistics to estimate aggregate welfare gains from trade.
- That is: many new micro facts (ie, share of exporters, productivity distr., trade-induced reallocations) do not have a relevant macro impact

Motivation: from micro to macro II

However there are some contradicting hints

- Firm size distribution fat-tailed (granular economy): idiosyncratic shocks to individual (large) firms affect aggregate outcomes (Gabaix, 11; di Giovanni et al.,14; Mayer and Ottaviano, 07)
- Ample evidence of large heterogeneity of firms performances (TFP and labour productivity) both within and between countries (CompNet)
- "New trade models, new welfare implications" (Melitz-Redding, 15): moving beyond Arkolakis et al.'s parameter restrictions, trade share and trade elasticities are no longer sufficient statistics. Micro structure matters!

Motivation: from micro to macro III

However there are some contradicting hints

- Bas et al.(17): in a world of heterogeneous firms and no Pareto, trade elasticity to trade costs differ across markets; aggregate impact of ER shocks or trade policies changes.
- Firm-level evidence on firms' heterogeneous reaction to ER shocks (Berman et al, 12; Gopinath and Neiman, 14; Berthou and Dhyne, 18)

What we do

- Use a multi-country one-sector version of the Melitz (03) theoretical framework and derive a structural gravity equation
- Estimate gravity equation at the country-sector-year level
- Extract exporting country FE (at sector-year level) net of destination country FE and dyadic terms: multilateral resistance/competitiveness index /exporter capability
- Regress exporting country FE on different moments of TFP distribution: CompNet data allows to account for micro structure *across countries without firm-level data*
- ...comparing Pareto vs Lognormal

Findings and contribution

- Gravity/trade literature with heterogeneous firms: this only paper focusing on multilateral resistance term against many papers focusing on trade elasticities to variable trade costs (ER, tariffs, wages...)
- Find that higher moments of productivity distribution (skewness) are relevant for aggregate export performance (intensive margin): micro structure matters; "happy few" story holds
- Find evidence in support of Log Normal and against Pareto productivity distribution as in Bas et al. (17): implication for trade models (Head and Mayer, 14)

Gravity Model

We generalize Bas et al(17) and Helpman et al(08). Basic ingredients

- Country i exporting to country n in sector s at year t
- CES demand
- Iceberg trade cost
- Firms are heterogeneous in terms of TFP: start without imposing Pareto (as Helpman et al, 08) or Lognormal (as Bas et al., 17)

$$X_{ni} = E\left[Y^{\varepsilon-1} \mid Y \geq y^*_{ni}\right] \left(\frac{\varepsilon}{\varepsilon-1}\right)^{1-\varepsilon} (m_i \tau_{ni})^{1-\varepsilon} A_n s^x_{ni} M^e_i \quad (1)$$

Need functional form for $F(y)$ to characterize $E\left[Y^{\varepsilon-1} \mid Y \geq y^*_{ni}\right]$

Gravity Model: Pareto

Assuming Pareto

$$F(y) = 1 - \left(\frac{y_{M,i}}{y} \right)^{k_i}$$

$y_{M,i} > 0$ and $k_i > 0$ are origin-specific Pareto scale and shape parameters

Gravity equation becomes:

$$X_{ni} = \varepsilon \, \frac{k_i}{k_i - \varepsilon + 1} \, (m_i)^{\mu} \, M_i^e \; f_{ni} s_{ni}^x \; (m_n)^{1-\mu}$$

$$\ln X_{ni} = \underbrace{\ln \varepsilon}_{\text{constant}} + \underbrace{\ln \left(\frac{k_i}{k_i - \varepsilon + 1} \, (m_i)^{\mu} \, M_i^e \right)}_{I_i} + \underbrace{\ln \left(f_{ni} s_{ni}^x \right)}_{I_{ni}} + \underbrace{\ln \left(m_n \right)^{1-\mu}}_{I_n}$$

Gravity Model: Pareto

Exporter FE thus evaluates to

$$I_i = \mu \ln m_i + \ln M_i^e + \ln \frac{k_i}{k_i - \varepsilon + 1}$$

Proposition

Consider the intensive margin gravity under Pareto. After controlling for input prices and number of producers, exporter FE: (P1) does not depend on the mean and variance of the TFP distribution; (P2) increases with skewness.

$$skewness = \frac{2(k_i + 1)}{k_i - 3} \sqrt{\frac{k_i - 2}{k_i}}$$

Gravity Model: Lognormal

Assuming log-normal

$$Y = e^X \text{ with } \ln Y = X \sim N(\mu_i, \sigma_i^2)$$

X is normal random variable with mean μ_i and variance σ_i^2

$$\ln X_{ni} = \underbrace{\ln\left(\frac{\varepsilon}{\varepsilon-1}\right)^{1-\varepsilon}}_{\text{constant}} + \underbrace{\ln\left((m_i)^{1-\varepsilon} M_i^e e^{(\varepsilon-1)\mu_i + \frac{1}{2}(\varepsilon-1)^2\sigma_i^2}\right)}_{I_i}$$

$$+ \underbrace{\ln\left(\frac{\Phi\left((\varepsilon-1)\sigma_i - \frac{\ln y_{ni}^* - \mu_i}{\sigma}\right)}{1-\Phi\left(\frac{\ln y_{ni}^* - \mu_i}{\sigma_i}\right)}(\tau_{ni})^{1-\varepsilon} s_{ni}^x\right)}_{I_{ni}} + \underbrace{\ln A_n}_{I_n}$$

Gravity Model: LogNormal

Exporter FE

$$lnI_i = -(\varepsilon - 1)\ln m_i + \ln M_i^e + (\varepsilon - 1)\mu_i + \frac{1}{2}(\varepsilon - 1)^2 \sigma_i^2$$

Proposition

Consider the intensive margin gravity under Log-Normal. After controlling for input prices and number of firms, exporter FE increases: (L1) with simple mean of TFP distribution; (L2) and with skewness (increasing in dispersion) of TFP distribution.

Estimation - step 1: gravity

Estimate the gravity equation to retrieve I_i.

Problem: lack of data on share of exporting firms causes an omitted variable bias when estimating the intensive margin and therefore exporter FE

Solution: two-stage approach by Helpman et al. (08) to correct for zeros and firms' heterogeneity in the extensive margin

1. estimate the probability that i export to n i.e.

   $$p_{ni} = Pr(Exp_{ni} = 1 | \mathbf{x}_n, \mathbf{x}_{ni}, \mathbf{x}_i) = \Phi\left(\gamma_0 + \gamma_n - \gamma_i + \delta\tau_{ni} - \lambda C_{ni}\right),$$

2. estimate gravity on positive trade flows by OLS

   $$\ln X_{ni} = \beta_0 + I_i + I_n + \ln\tau_{ni} + \widehat{z}_{ni} + \widehat{z}_{ni}^2 + \widehat{z}_{ni}^3 + \widehat{\eta}_{ni} + u_{ni} \quad \forall X_{ni} > 0.$$

$\hat{z}$: predicted value from first stage (accounts for firm heterogeneity in decision to export); η_{ni}: inverse Mills ratio (accounts for zero trade flows)

Estimation - step 2: FE and productivity distribution

With exporter FE, test two alternative hypothesis for TFP distribution: Pareto vs Lognormal

$$\widehat{I_i} = \beta_0 + \beta_1 \ln M_i^e + \beta_2 Mean_i + \beta_3 Skew_i + \boldsymbol{\Gamma}_i + e_i.$$

Table: Testing hypothesis

	Theory	Empirical Model	
	Comparative Statics	Mean	Skewness
Pareto	$\frac{dI_i}{dk_i} < 0;\ \frac{dskew}{dk_i} > 0 \rightarrow$	$\beta_2 = 0$	$\beta_3 \neq 0$
LogNormal	$\frac{dI_i}{d\mu_i} > 0;\ \frac{dI_i}{d\sigma_i^2};\ \frac{dskew}{d\sigma_i^2} > 0 \rightarrow$	$\beta_2 \neq 0$	$\beta_3 \neq 0$

Data sources

Gravity

- BACI database (CEPII), or OECD bilateral
- Gravity GeoDist (CEPII)
- RTA (Larch)

Productivity distribution

- CompNet database: comparable economic indicators for 18 EU countries. Main source: Central Banks and NSI micro level databases
- At the country-sector-year level, CompNet provides different moments of TFP distribution: unweighted average; median; coefficient of variation; 10th, 20th, 80th, and 90th percentiles; skewness
- Two samples: full sample: all firms, 1996-2015 vs *20E sample: firms with more than 20 employees, 2001-15*

Data Source CompNet: 6th wave

- Countries: Belgium, Croatia, Czech Rep, Denmark, Finland, France, Germany, Hungary, Italy, Lithuania, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and Sweden.
- Sectors: manufacturing sectors at NACE 2-digit rev.2 (with the exclusion of Coke and Petroleum 19, and Tobacco 12)
- Time period: 2001-2015
- Productivity measured as labor productivity (value added per worker) and *TFP (Olley-Pakes/Wooldridge procedure)*
- We eliminate observational units that are obtained with less than 10 observations (at least 10 firms by sector, year, and country)
- Unbalanced panel: about 4,000 obs

Gravity model: First stage

Sector (NACE 2-digit)	10	11	12	13	14	15	16	17	18	20	21
ln *Distance*	-0.962***	-0.868***	-0.908***	-1.176***	-1.032***	-1.023***	-1.205***	-1.314***	-1.078***	-1.205***	-1.018***
	(0.0653)	(0.0393)	(0.0281)	(0.0514)	(0.0430)	(0.0405)	(0.0452)	(0.0507)	(0.0319)	(0.0660)	(0.0379)
Religion	-0.312***	0.578***	0.335***	0.125	0.406***	0.334***	0.149*	0.395***	0.194***	0.243**	0.138*
	(0.102)	(0.0784)	(0.0556)	(0.101)	(0.0989)	(0.0787)	(0.0818)	(0.0849)	(0.0631)	(0.106)	(0.0755)
Const.	11.10***	14.63***	11.90***	10.63***	7.473***	11.08***	12.27***	13.63***	12.85***	11.87***	11.23***
	(0.801)	(0.596)	(0.393)	(0.661)	(0.506)	(0.546)	(0.578)	(0.775)	(0.397)	(0.875)	(0.553)
Obs	11,360	32,455	38,661	15,641	18,506	27,408	30,692	21,844	37,142	11,405	24,846
Pseudo R^2	0.459	0.579	0.510	0.501	0.560	0.580	0.579	0.541	0.561	0.513	0.557
Sector (NACE 2-digit)	22	23	24	25	26	27	28	29	30	31	32
ln *Distance*	-1.250***	-1.256***	-1.185***	-1.256***	-0.930***	-1.240***	-1.217***	-1.006***	-0.981***	-1.154***	-0.977***
	(0.0580)	(0.0463)	(0.0452)	(0.0506)	(0.0601)	(0.0743)	(0.0650)	(0.0488)	(0.0369)	(0.0416)	(0.0582)
Religion	0.168*	-0.137*	0.208**	0.165*	0.447***	0.318***	0.404***	0.409***	0.275***	0.151*	0.182*
	(0.101)	(0.0779)	(0.0917)	(0.0986)	(0.0995)	(0.105)	(0.122)	(0.0904)	(0.0601)	(0.0775)	(0.103)
Const.	9.331***	8.493***	11.56***	9.815***	7.463***	9.357***	10.39***	10.25***	7.345***	7.741***	7.188***
	(0.771)	(0.539)	(0.833)	(0.562)	(0.899)	(0.862)	(0.887)	(0.620)	(0.473)	(0.495)	(0.747)
Obs	17,438	19,205	21,770	15,650	10,053	11,909	9,382	24,518	26,659	30,333	13,997
Pseudo R^2	0.602	0.583	0.592	0.579	0.565	0.624	0.547	0.613	0.535	0.624	0.544

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Gravity model: Second stage

Sector (NACE 2-digit)	10	11	12	13	14	15	16	17	18	20	21
ln *Distance*	-1.288***	-1.067***	-0.973***	-1.233***	-1.278***	-1.111***	-1.452***	-1.541***	-1.109***	-1.373***	-0.829***
	(0.0275)	(0.0322)	(0.156)	(0.0242)	(0.0274)	(0.0255)	(0.0286)	(0.0255)	(0.0463)	(0.0229)	(0.0233)
Cons.	14.93***	14.54***	17.24***	16.41***	19.10***	15.51***	15.22***	22.97***	10.27***	18.35***	11.11***
	(0.488)	(0.471)	(1.367)	(0.481)	(0.479)	(0.394)	(0.362)	(0.261)	(0.662)	(0.676)	(0.442)
Obs	37,114	29,591	16,797	36,387	35,492	32,722	32,203	33,127	12,473	37,005	31,610
R^2	0.808	0.773	0.535	0.828	0.823	0.792	0.762	0.785	0.608	0.849	0.802
Sector (NACE 2-digit)	22	23	24	25	26	27	28	29	30	31	32
ln *Distance*	-1.413***	-1.442***	-1.509***	-1.339***	-1.000***	-1.173***	-1.108***	-1.407***	-1.087***	-1.330***	-0.997***
	(0.0203)	(0.0238)	(0.0300)	(0.0209)	(0.0180)	(0.0181)	(0.0185)	(0.0270)	(0.0303)	(0.0225)	(0.0195)
Cons.	21.78***	17.76***	21.81***	24.20***	16.29***	24.19***	21.77***	15.24***	15.02***	25.52***	15.99***
	(0.215)	(0.529)	(0.307)	(0.249)	(0.436)	(0.459)	(0.701)	(0.430)	(0.603)	(0.513)	(0.475)
Obs	35,970	34,581	33,707	35,788	37,062	36,843	37,092	33,879	32,935	31,380	36,162
R^2	0.873	0.846	0.799	0.874	0.879	0.872	0.899	0.841	0.715	0.842	0.866

[a] OLS regression. Dependent variable: log of export value. Importer-Year and Exporter-Year fixed effects included. Standard errors are clustered at exporter-yea level and are reported in parenthesis. Significance level: * 0.10> value ** 0.05> value *** 0.01> value.

Gravity Output

- Fixed effects descriptive statistics here
- Fixed effects vs trade balance here

TFP distribution: Pareto vs LogNormal

We need parameters k and y_M (Pareto) and μ σ (LogNormal). CompNet provides both sample mean m and standard deviation s (of variables in levels). Following Head (2016), we can define

$$k_i = 1 + \sqrt{1 + m_i^2 / v_i}$$
$$y_{M,i} = m_i (k_i - 1)/k_i.$$

	Head (2016)	Lognormal Properties
	$\sigma_i = \sqrt{\ln(m_i^2 + v_i) - 2 \ln m_i}$	Dispersion$= \frac{e^{\mu_i + \sigma_i^2/2}}{e_i^{\mu}} = e^{\sigma_i^2/2}$
	$\mu_i = \ln m_i - \sigma_i^2/2$	P50$=e^{\mu_i}$

Testing Pareto: baseline

	(1) Exp. FE	(2) Exp. FE	(3) Exp. FE	(4) Exp. FE	(5) Exp. FE	(6) Exp. FE
k(TFP)	-.20902***		-.20196***	-.20141***		
	(.02407)		(.02302)	(.02295)		
Skew(TFP)		.03827***			.03204**	.03082**
		(.01481)			(.01515)	(.01522)
y_M(TFP)			.00037***		.00055***	
			(9.2e-05)		(9.9e-05)	
Mean(TFP)				.00021***		.00032***
				(5.1e-05)		(5.7e-05)
ln N.Firms	.77433***	.71377***	.77292***	.77265***	.71526***	.71522***
	(.02396)	(.03011)	(.02396)	(.02396)	(.03025)	(.03024)
Cons.	1.5563***	1.1996***	1.5293***	1.5329***	1.1826***	1.1907***
	(.17737)	(.20619)	(.17562)	(.17545)	(.2064)	(.20617)
Obs.	4153	4153	4153	4153	4153	4153
R^2	.97181	.97067	.97187	.97187	.97081	.97081

[a] Country, Sector and Year fixed effects included. Bootstrapped SE (500 reps) reported in parenthesis

Testing LogNormal: baseline

	(1) Exp. FE	(2) Exp. FE	(3) Exp. FE	(4) Exp. FE	(5) Exp. FE
μ(TFP)	.07146***			.08132***	
	(.01705)			(.01554)	
ln P50(TFP)		.07327***	.07736***		.08243***
		(.01722)	(.01667)		(.01587)
σ^2(TFP)	.14606**	.14846***			
	(.05785)	(.0576)			
Dis(TFP)			.08321**		
			(.03939)		
Skew(TFP)				.03165**	.03051**
				(.01529)	(.01539)
ln N.Firms	.7248***	.72473***	.72461***	.71964***	.71962***
	(.03044)	(.03044)	(.03054)	(.03064)	(.03066)
Cons.	.88119***	.87643***	.8753***	.85408***	.85537***
	(.22559)	(.22608)	(.22649)	(.22368)	(.22442)
Obs.	4153	4153	4153	4153	4153
R^2	.97087	.97088	.97086	.97089	.97088

[a] Country, Sector and Year fixed effects included. Bootstrapped SE (500 reps) reported in parenthesis

Robustness Pareto: different FEs

	(1) Exp. FE	(2) Exp. FE	(3) Exp. FE	(4) Exp. FE	(5) Exp. FE	(6) Exp. FE
k(TFP)	-.20196***	-.20141***	-.21187***	-.21128***	-.19871***	-.19814***
	(.02545)	(.0242)	(.02816)	(.02674)	(.02705)	(.02727)
y_M(TFP)	.00037***		.00033***		.00037***	
	(9.4e-05)		(9.4e-05)		(9.9e-05)	
Mean(TFP)		.00021***		.00019***		.00021***
		(5.6e-05)		(5.6e-05)		(5.3e-05)
ln N.Firms	.77292***	.77265***	.78163***	.78138***	.76621***	.76594***
	(.03778)	(.035)	(.03821)	(.03528)	(.03632)	(.03491)
Cons.	1.5293***	1.5329***	1.8578***	1.8605***	1.71***	1.7136***
	(.24027)	(.22846)	(.24474)	(.23729)	(.41768)	(.41503)
Obs.	4153	4153	4153	4153	4153	4153
R^2	.97187	.97187	.97267	.97267	.97412	.97412
Year F.E.	yes	yes	no	no	no	no
Sector F.E.	yes	yes	yes	yes	no	no
Country F.E.	yes	yes	no	no	yes	yes
Country x Year F.E.	no	no	yes	yes	no	no
Sector x Year F.E.	no	no	no	no	yes	yes

Robustness Lognormal: different FEs

	(1) Exp. FE	(2) Exp. FE	(3) Exp. FE
σ^2(TFP)	.14606**	.18092***	.15337**
	(.06056)	(.06388)	(.06208)
μ(TFP)	.07146***	.06063***	.07262***
	(.01742)	(.01792)	(.0181)
ln N.Firms	.7248***	.73149***	.72002***
	(.04188)	(.04233)	(.03927)
Cons.	.88119***	1.2222***	1.043**
	(.2772)	(.2773)	(.46282)
Obs.	4153	4153	4153
R^2	.97087	.9716	.97322
Year F.E.	yes	no	no
Sector F.E.	yes	yes	no
Country F.E.	yes	no	yes
Country x Year F.E.	no	yes	no
Sector x Year F.E.	no	no	yes

Robustness: Dyadic Gravity

- Pareto here
- LogNormal here
- Pareto with different FEs here
- LogNormal with different FEs here

Conclusions

- We provide an analytical framework to reconcile micro level characteristics (productivity) and aggregate outcomes export
- We show that LogNormal distribution describes better productivity distribution (it has important consequences for welfare analysis)
- Our framework is relatively parsimonious in terms of data: not necessary the full population but only moments
- Prominence of skewness for aggregate outcomes

Next on agenda

- Counterfactual analysis to quantitatively assess importance of mean and skewness for aggregate exports
- Endogeneity: how to identify causal effect of productivity on exports excluding reverse causality (learning by exporting)?
- ...further suggestions?

Exporter FE: country averages

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Belgium	Croatia	Czech Republic	Denmark	Finland	France	Germany	Hungary	Italy
3.366	-0.369	2.112	2.301	2.093	4.240	5.107	1.586	4.587
Lithuania	Netherlands	Poland	Portugal	Romania	Slovakia	Slovenia	Spain	Sweden
0.118	3.469	2.469	2.147	1.268	1.047	0.696	3.778	2.776

Exporter FE and Trade Balance

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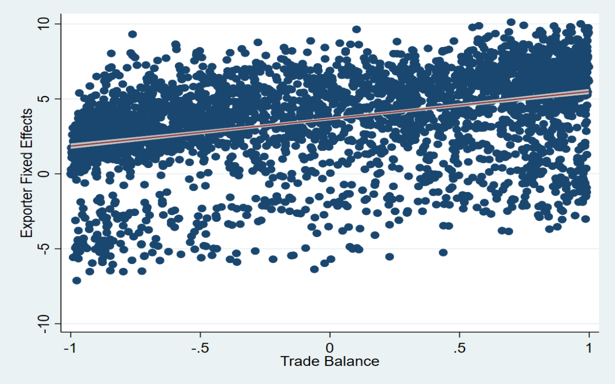

Source: authors elaborations on BACI data. Each point identifies the triple origin, sector, year. Trade balance: ratio between export minus imports to total trade (exports plus imports). Vertical axis: log of exporter FE

Robustness Pareto: dyadic gravity

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	(1) Exp. FE	(2) Exp. FE	(3) Exp. FE	(4) Exp. FE	(5) Exp. FE	(6) Exp. FE
k(TFP)	-.18924***		-.18453***	-.18392***		
	(.02381)		(.02324)	(.02316)		
Skew(TFP)		.042**			.03733**	.03627**
		(.01697)			(.01737)	(.01746)
y_M(TFP)			.00025*		.0004***	
			(.00013)		(.00014)	
Mean(TFP)				.00015**		.00024***
				(7.5e-05)		(7.9e-05)
ln N.Firms	.79967***	.73932***	.79852***	.79827***	.74018***	.74019***
	(.02831)	(.03448)	(.02835)	(.02835)	(.03473)	(.03473)
Cons.	3.9743***	3.6702***	3.9571***	3.959***	3.6593***	3.6651***
	(.19928)	(.23304)	(.19922)	(.19917)	(.23403)	(.23383)
Obs.	3841	3841	3841	3841	3841	3841
R^2	.88762	.88455	.88772	.88773	.8848	.88483

[a] Country, sector and year fixed effects included. Bootstrapped SE (500 reps) reported in parenthesis

Robustness LogNormal: dyadic gravity

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	(1) Exp. FE	(2) Exp. FE	(3) Exp. FE	(4) Exp. FE
μ(TFP)	.05867***		.06616***	
	(.01897)		(.01759)	
ln P50(TFP)		.06167***		.06603***
		(.019)		(.01798)
σ^2(TFP)	.13105*			
	(.0725)			
Dis(TFP)		.08478*		
		(.04894)		
Skew(TFP)			.03682**	.03605**
			(.01736)	(.01738)
ln N.Firms	.74947***	.74936***	.74404***	.74383***
	(.03537)	(.03542)	(.03506)	(.03508)
Cons.	3.419***	3.4172***	3.3878***	3.3942***
	(.26023)	(.26078)	(.25576)	(.25652)
Obs.	3841	3841	3841	3841
R^2	.88487	.88484	.88503	.885

[a] Country, sector and year fixed effects included. Bootstrapped SE (500 reps) reported in parenthesis

Robustness Pareto: dyadic gravity and different FEs

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	(1) Exp. FE	(2) Exp. FE	(3) Exp. FE	(4) Exp. FE	(5) Exp. FE	(6) Exp. FE
k(TFP)	-.18453***	-.18392***	-.19249***	-.19186***	-.18885***	-.18834***
	(.02455)	(.02386)	(.02647)	(.02559)	(.02351)	(.02238)
y_M(TFP)	.00025*		.00019		.00028***	
	(.00014)		(.00014)		(.00011)	
Mean(TFP)		.00015*		.00012		.00016***
		(8.7e-05)		(7.6e-05)		(5.5e-05)
ln N.Firms	.79852***	.79827***	.79902***	.79881***	.81394***	.81373***
	(.04131)	(.03894)	(.02672)	(.02751)	(.02473)	(.02493)
Cons.	3.9571***	3.959***	4.7143***	4.7149***	3.9073***	3.9097***
	(.27016)	(.26095)	(.24503)	(.24482)	(.40507)	(.40827)
Obs.	3841	3841	3841	3841	3841	3841
R^2	.88772	.88773	.89215	.89217	.91807	.91808
Year F.E.	yes	yes	no	no	no	no
Sector F.E.	yes	yes	yes	yes	no	no
Country F.E.	yes	yes	no	no	yes	yes
Country x Year F.E.	no	no	yes	yes	no	no
Sector x Year F.E.	no	no	no	no	yes	yes

Robustness LogNormal: dyadic gravity and different FEs

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	(1) Exp. FE	(2) Exp. FE	(3) Exp. FE
σ^2(TFP)	.13105*	.18286***	.09089
	(.06776)	(.06473)	(.06141)
μ(TFP)	.05867***	.04079**	.05782***
	(.02091)	(.01921)	(.0171)
ln N.Firms	.74947***	.74821***	.76411***
	(.04654)	(.03282)	(.03069)
Cons.	3.419***	4.2201***	3.3752***
	(.33405)	(.28276)	(.44136)
Obs.	3841	3841	3841
R^2	.88487	.88915	.91506
Year F.E.	yes	no	no
Sector F.E.	yes	yes	no
Country F.E.	yes	no	yes
Country x Year F.E.	no	yes	no
Sector x Year F.E.	no	no	yes