Economic Complexity and Trade

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Is the world more complex than it used to be?

- "It's not you — the world has become more complex" (McGrath, HBR 2011)
  - "Complex systems are unforgiving places for companies, and people, who move slowly. "
  - The End of Competitive Advantage (Harvard Business Review Press)

Economic Complexity index

- The Economic Complexity Index (ECI), defined by Hidalgo and Hausmann (2009 PNAS) is derived from an integration of two other measures:
  - Diversification by product of the exports in which a country exhibits Revealed Comparative Advantage (RCA)

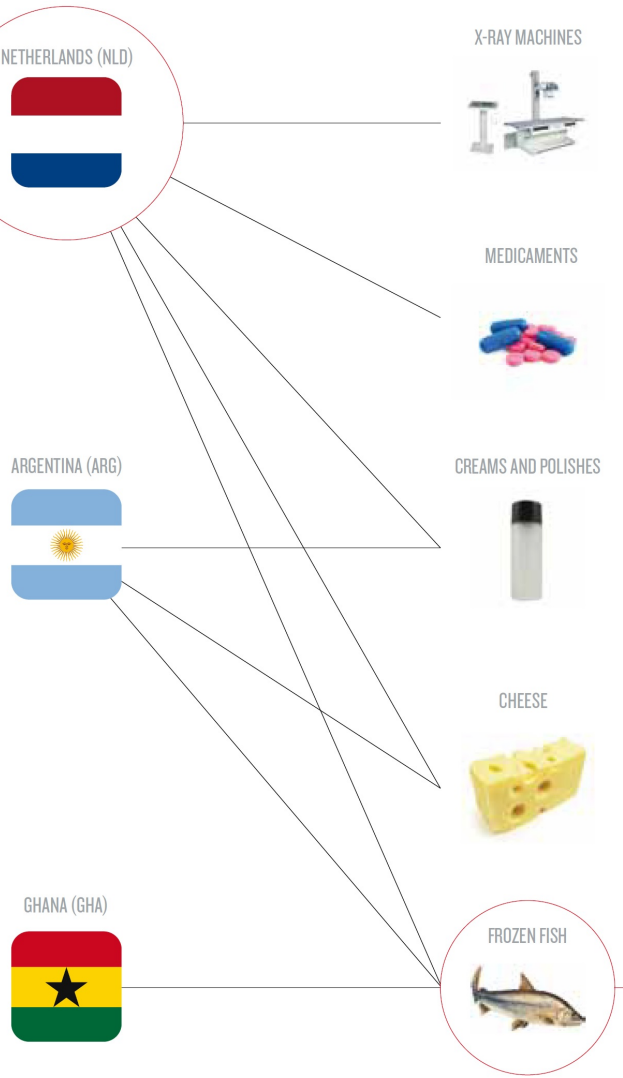
$$\text{Diversity} \equiv k_{c,o} = \sum_{p} M_{cp}$$

  - average ubiquity of these same products

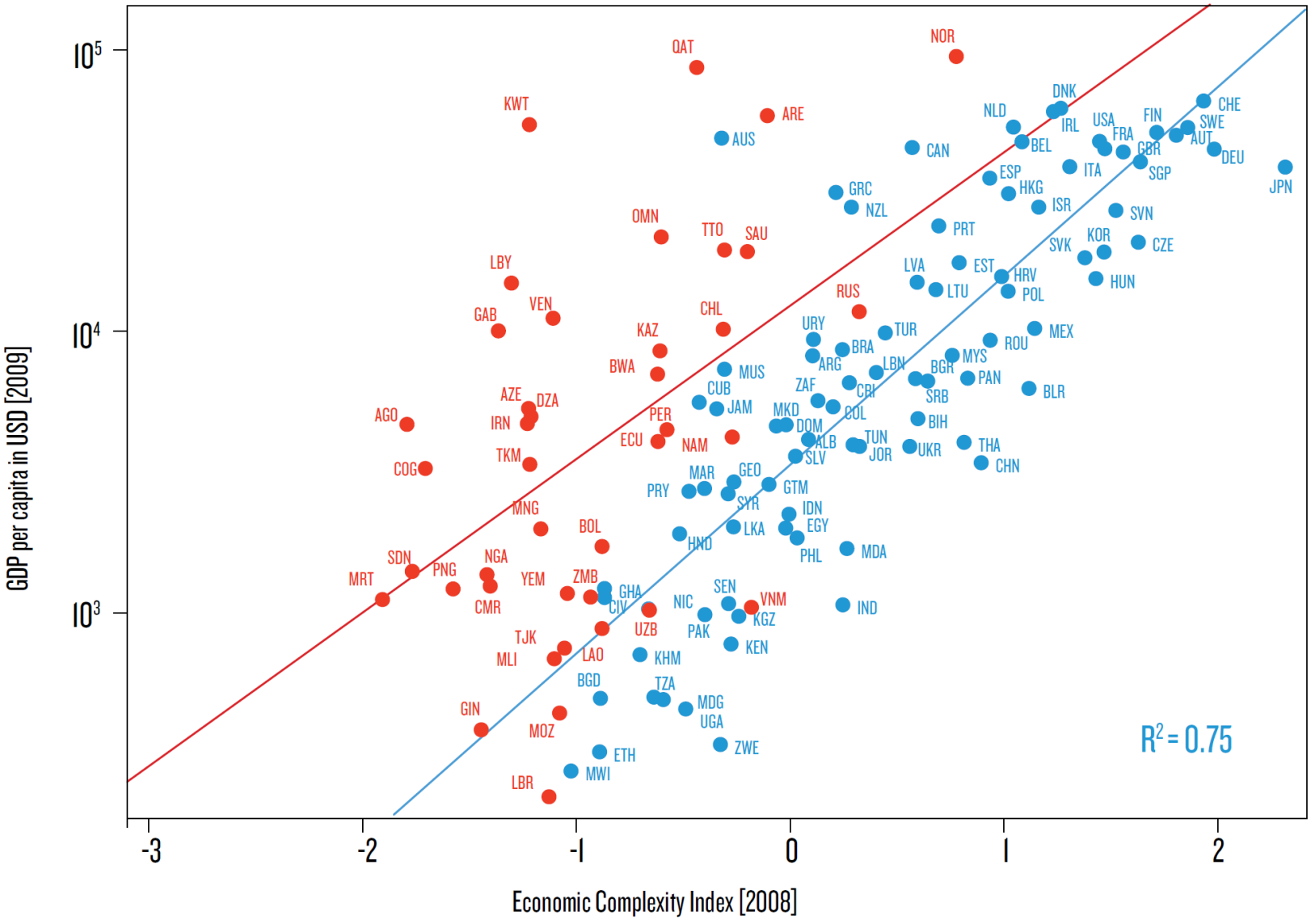
$$\text{Ubiquity} \equiv k_{p,o} = \sum_{c} M_{cp}$$

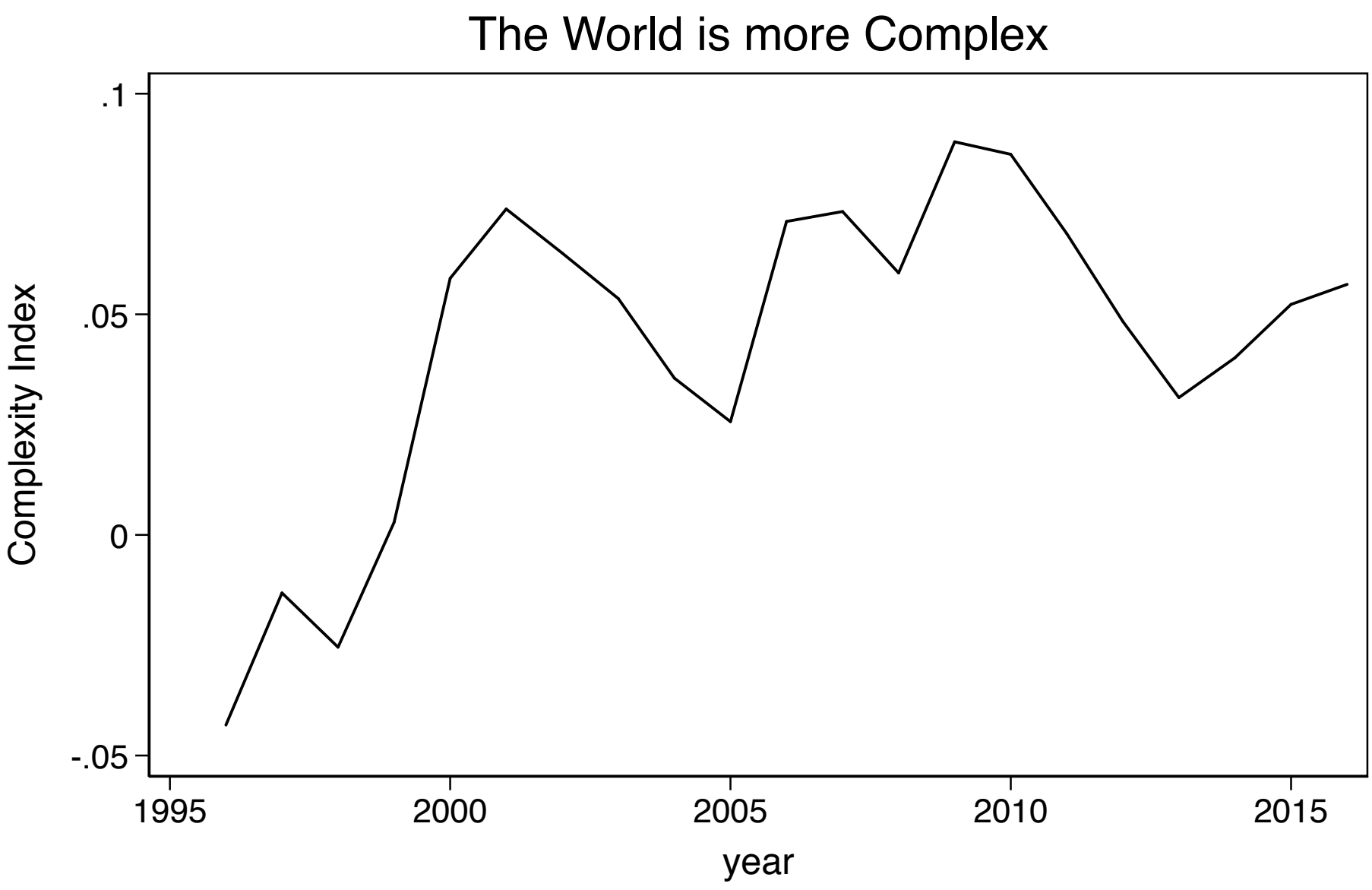
Economic Complexity index: Diversification and Ubiquity

DIVERSITY ($k_{c,0}$): Diversity is related to the number of products that a country is connected to. This is equal to the number of links that this country has in the network. In this example, using a subset of the 2009 data, the diversity of Netherlands is 5, that of Argentina is 3, and that of Gana is 1.

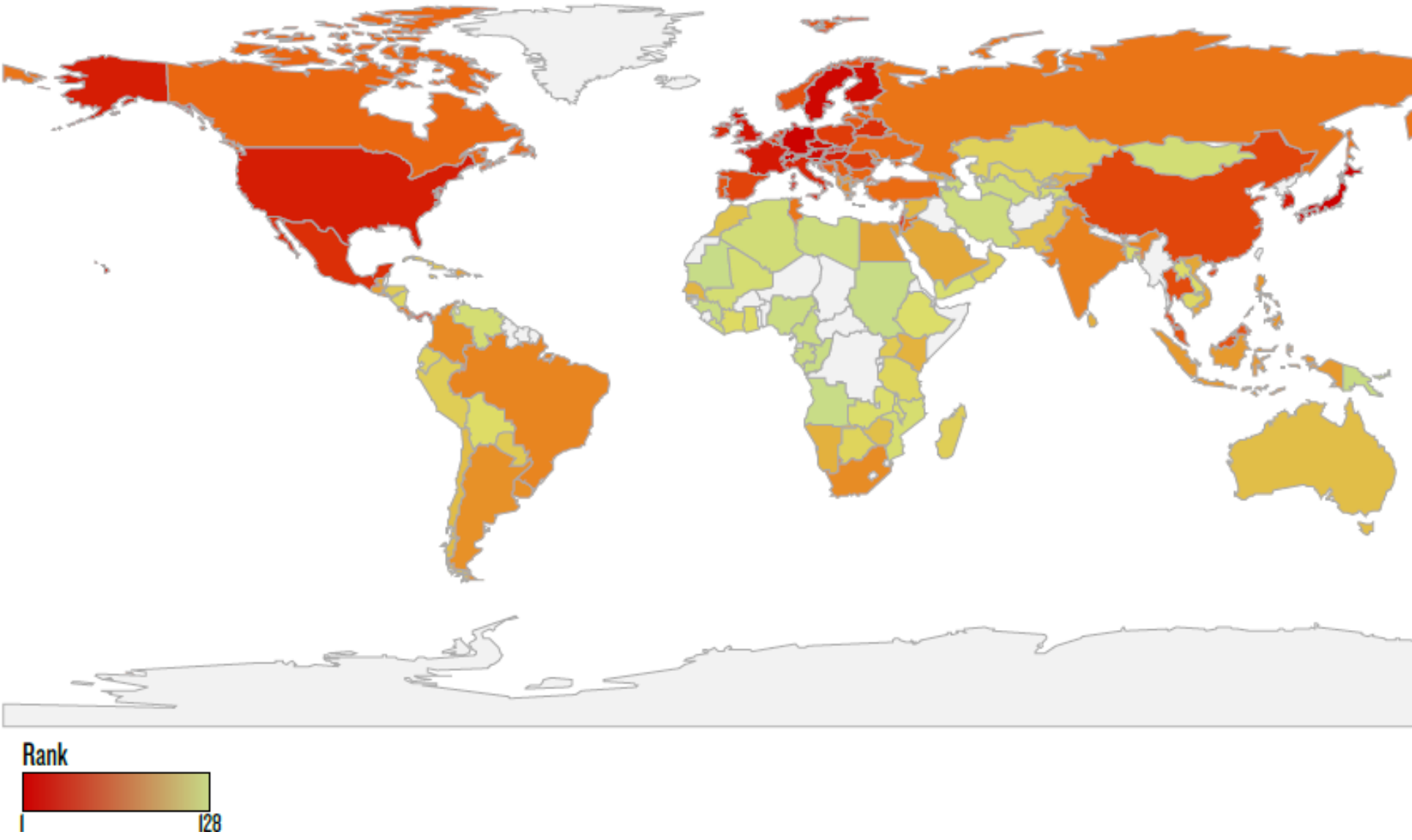


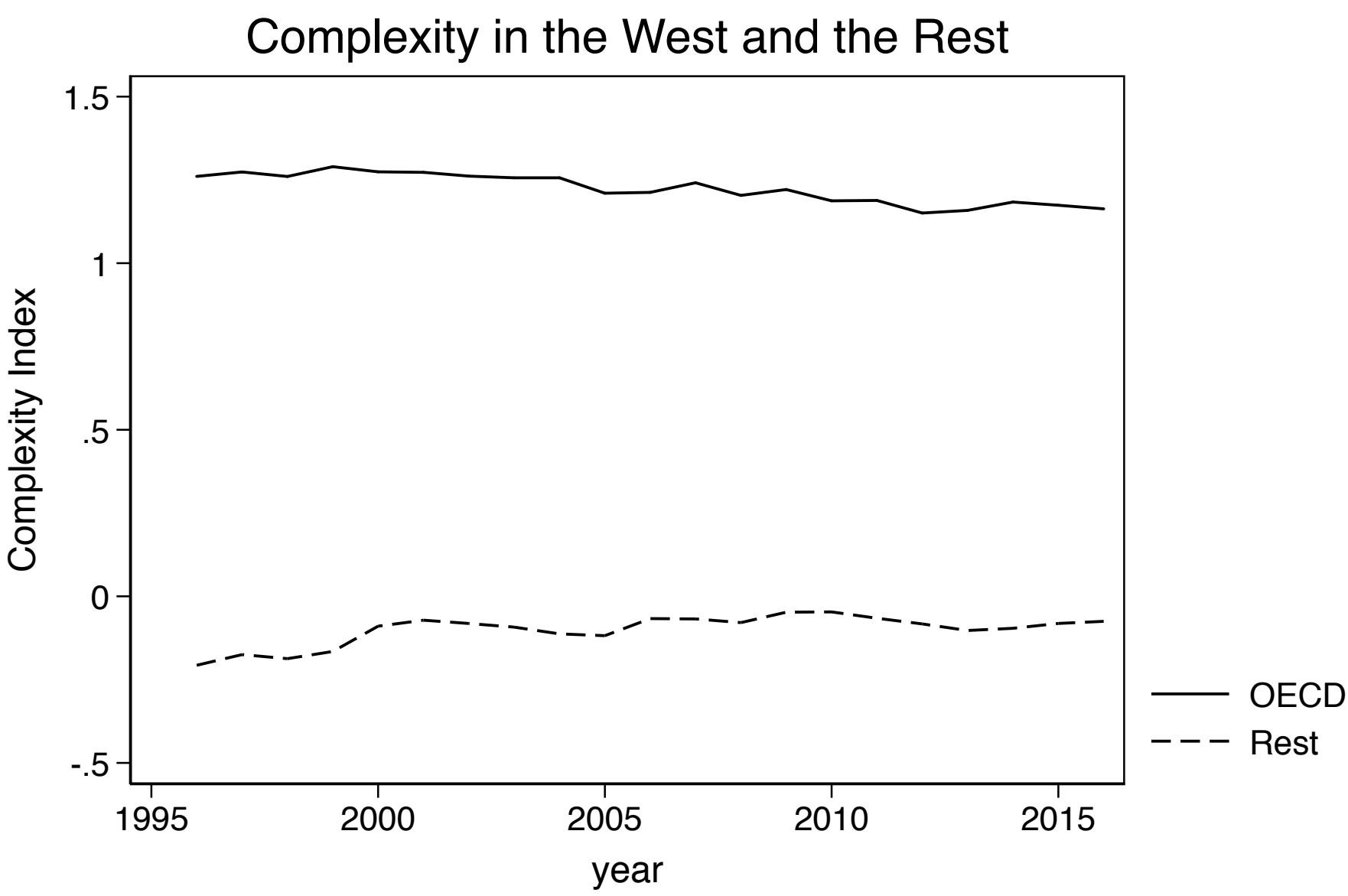
UBIQUITY ($k_{p,0}$): Ubiquity is is related to the number of countries that a product is connected to. This is equal to the number of links that this product has in the network. In this example, using a subset of the 2009 data, the ubiquity of Cheese is 2, that of Fish is 3 and that of Medicaments is 1.


GDP per capita in USD [2009]
10^5
10^4
10^3
-3
-2
-1
0
1
2
Economic Complexity Index [2008]
$R^2 = 0.75$
QAT
NOR
KWT
ARE
AUS
CAN
DNK
NLD
IRL
CHE
SWE
FIN
USA
FRA
AUT
BEL
GBR
DEU
SGP
ITA
ESP
JPN
HKG
GRC
NZL
ISR
SVN
OMN
TTO
SAU
PRT
SVK
KOR
CZE
LBY
LVA
EST
HRV
HUN
LTU
POL
VEN
GAB
RUS
CHL
KAZ
URY
TUR
MEX
ROU
BRA
BWA
MUS
ARG
LBN
MYS
BGR
PAN
CUB
ZAF
CRI
SRB
BLR
AZE
DZA
JAM
MKD
COL
AGO
IRN
PER
DOM
BIH
ECU
NAM
ALB
TUN
THA
TKM
SLV
JOR
UKR
CHN
COG
MAR
GEO
PRY
GTM
SYR
IDN
MNG
EGY
BOL
LKA
HND
PHL
MDA
SDN
NGA
MRT
PNG
YEM
ZMB
GHA
SEN
VNM
CMR
CIV
NIC
IND
UZB
PAK
KGZ
TJK
KEN
MLI
LAO
KHM
BGD
TZA
MDG
GIN
UGA
MOZ
ZWE
ETH
MWI
LBR

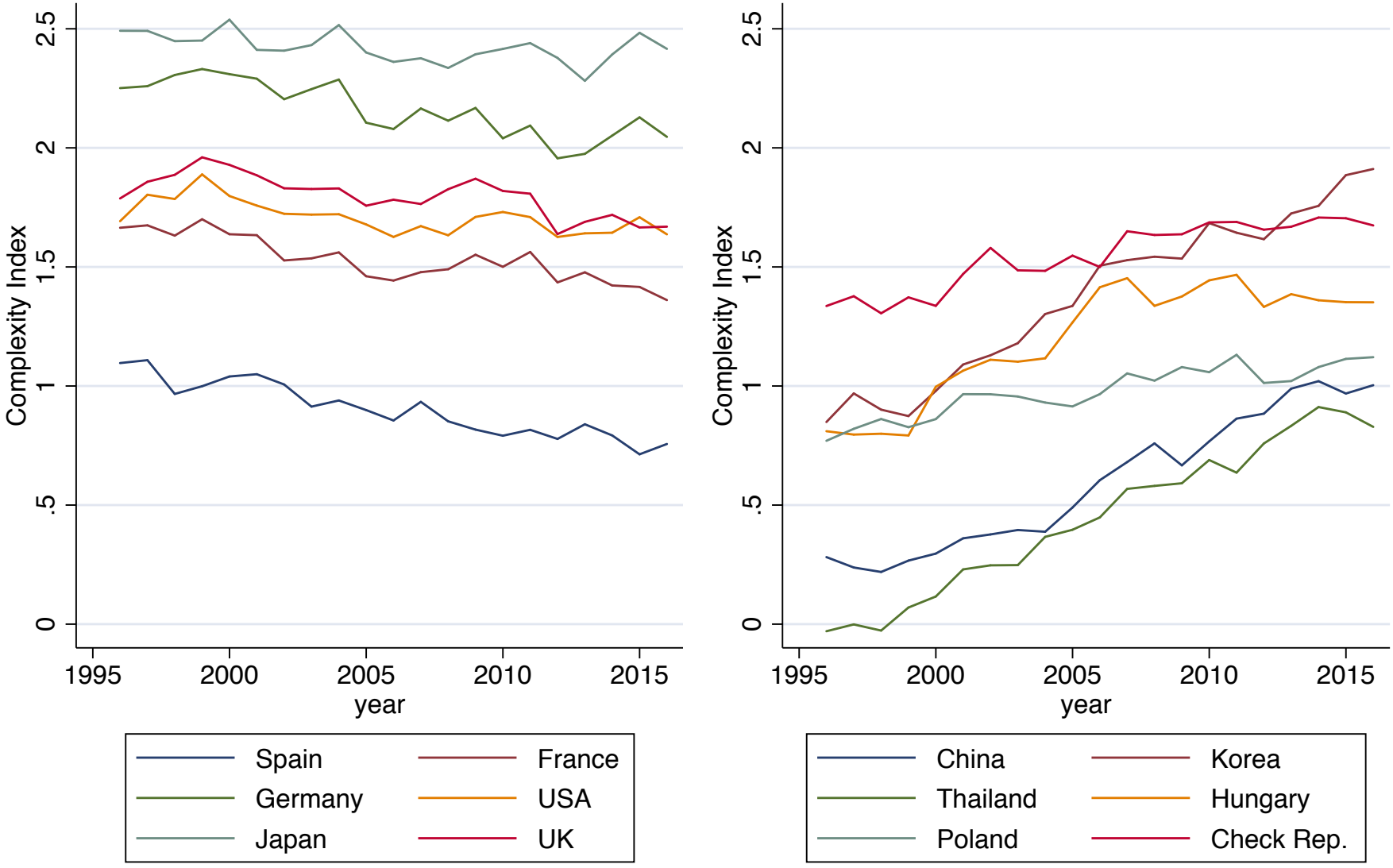

The World is more Complex
Complexity Index
.1
.05
0
-.05
1995
2000
2005
2010
2015
year

Map of the World colored according to ECI Ranking.




Complexity in the West and the Rest
Complexity Index
1.5
1
.5
0
-.5
1995
2000
2005
2010
2015
year
OECD
Rest

Reversal of Compelexities



Outline

What do I do?

- My aim today:
  - Share simple ideas about economic complexity, trade and welfare
  - Present estimates, theoretical results, quantification
- I study the partial and general equilibrium effects of complexity on trade
  1. I estimate partial effects with structural gravity
  2. I develop a model that delivers sharp predictions on the effects of increasing and shifting shifting complexity on trade and GDP
  3. I obtain trade-induced welfare quantifications with distributional implications

Related Literature

1. "Trade, law, and product complexity" (Berkowitz et al., 2006 RES, Myburgh & Paniagua, 2016 JL&E; Gil-Pareja et al., 2020 WE)
   - "Does FDI boost production complexity in host countries?" (Javorcik et al., 2018 EJ)
2. "Economic complexity theory and applications"(Hidalgo, 2021 NAT)
   - Trade models with technological change (Acemoglu et al., 2015 AEJ:M; Krugman, 1979 JPE)
3. "Border Effects" (Bergstrand et al., 2015 EER; Heid et al., 2021 CJE)

Complexity shifting from the West to the Rest

¿Does complexity shifting=Offshoring reduce welfare in the West?

- Samuelson (2004): YES, if it implies technology transfer from West to the rest. West loses rents from initial technological stance
  - Reduction of complexity for developed countries would negatively affect their exports of goods, the contrary of what would happen for developing countries (quasi-Rybczynski effect). (Romalis 2004 AER; Morrow, 2010 JIE).
- New Trade Theory: NO, West react by altering their specializations in four main ways:
  1. Deeper horizontal intra-industry specialization within each manufacturing industry, multiplying the number of varieties of each product.
  2. A shift to deeper vertical ITT, with an improvement in the quality of their products – in those cases where greater complexity does not imply higher quality
  3. A move to services intensive in knowledge would be expected.
  4. Shift to the rest, while increasing complexity in the west.

ITPD-E 2000-2018 w/o Domestic trade

	(1)	(2)	(3)	(4)	(5)
FTA	0.071***	0.076***	0.138***	0.149***	0.103***
	(0.02)	(0.02)	(0.03)	(0.03)	(0.03)
$(ECI_{it} \times ECI_{it})^{1/2}$	0.136***				
	(0.02)				
$\lvert ECI_{it} - ECI_{it} \rvert$		0.214***			
		(0.08)			
ECI_{it}			0.441***		0.435***
			(0.05)		(0.05)
ECI_{jt}				0.328***	0.338***
				(0.04)	(0.04)
Obs	324487	324487	536417	524515	324487
R^2	0.992	0.992	0.985	0.985	0.984
ImpxYearFE	Yes	Yes	No	No	No
ExpxYearFE	Yes	Yes	No	No	No
PairFE	Yes	Yes	Yes	Yes	Yes
Domestic	No	No	No	No	No
Global	No	No	No	No	No

Robust standard errors in (), clusted by country pair

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Structural Gravity

Structural gravity

Recommendations for Estimating Structural Gravity (Yotov et al., 2016 WTO)

- **Recommendation 1:** *Use Panel Data*.
  - Estimation efficiency and pair-fixed-effects methods for endogeneity
- **Recommendation 2**: *Allow for Adjustment in Trade Flows?*
  - adjustment in bilateral trade flows in response to trade policy or not (Egger et al., 2020)
- **Recommendation 3**: *Include Intra-national Trade Flows.* Intra-national
  - consistency with gravity theory & identification of the effects of bilateral trade policies
  - Identification of the effects of country-specific trade policies
    - The effects on international trade are measured relative to the effects on intra-national trade
- **Recommendation 4:** *Use Directional Time-varying Fixed Effects*
  - importer-time and exporter-time fixed effects
- **Recommendation 5**: *Employ Country-Pair Fixed Effects*
  - Endogeneity and all time-invariant bilateral trade costs
- **Recommendation 6:** Estimate Gravity with PPML
  - Heteroskedasticity, zero trade flows and ensures that the gravity fixed effects are identical to their corresponding structural terms)

Structural Gravity

$$X_{ijt} = \exp\left(\begin{matrix}\chi_{ijt} + \mathrm{BRDR}_{ijt} + ECI_{jt} \times \mathrm{BRDR}_{ij} \\ \lambda_{it} + \lambda_{jt} + \lambda_{ij}\end{matrix}\right) + e_{ijt}.$$

Identifying country-specific effects in structural gravity

Heid et al (2020) & Beverelli et al (2018)

#	i	j	η_1	η_2	μ_1	μ_2	μ_3	$BRDR_{ij}$	$IQ_j \times BRDR_{ij}$
1	A	B	1	0	0	1	0	1	IQ_B
2	A	C	1	0	0	0	1	1	IQ_C
3	B	A	0	1	1	0	0	1	IQ_A
4	B	C	0	1	0	0	1	1	IQ_C
5	C	A	0	0	1	0	0	1	IQ_A
6	C	B	0	0	0	1	0	1	IQ_B
7	A	A	1	0	1	0	0	0	0
8	B	B	0	1	0	1	0	0	0
9	C	C	0	0	0	0	1	0	0

- $\texttt{BRDR}_{ij}$ is a dummy that identifies international flows
- $ECI_{jt} \times \texttt{BRDR}_{ij}$ is not collinear with MRT and can be used to identify the effect of ECI
  - More specifically the effect of the ECI on international relative to domestic trade flows

ITPD-E 2000-2018 w/ Domestic trade

	(1)	(2)	(3)	(4)	(5)
$ECI_{jt} \times BRDR$	0.518***	0.534***	0.345***	0.516***	0.384***
	(0.04)	(0.04)	(0.07)	(0.07)	(0.08)
$ECI_{jt}^2 \times BRDR$					-0.018
					(0.02)
BRDR	-4.035***				
	(0.15)				
FTA	0.206***	0.196***	0.216***	0.167***	0.157***
	(0.07)	(0.07)	(0.04)	(0.04)	(0.04)
log DIST	-0.495***	-0.498***			
	(0.05)	(0.05)			
contiguity	0.404***	0.404***			
	(0.08)	(0.08)			
language	0.369***	0.371***			
	(0.06)	(0.06)			
Relig	0.724***	0.720***			
	(0.11)	(0.11)			
Obs	484614	484614	538673	538673	538673
R^2	0.986	0.986	0.998	0.998	0.998
ImpxYearFE	Yes	Yes	Yes	Yes	Yes
ExpxYearFE	Yes	Yes	Yes	Yes	Yes
PairFE	NO	NO	Yes	Yes	Yes
Domestic	Yes	Yes	Yes	Yes	Yes
Global	No	Yes	No	Yes	No

Robust standard errors in (), clusted by country pair

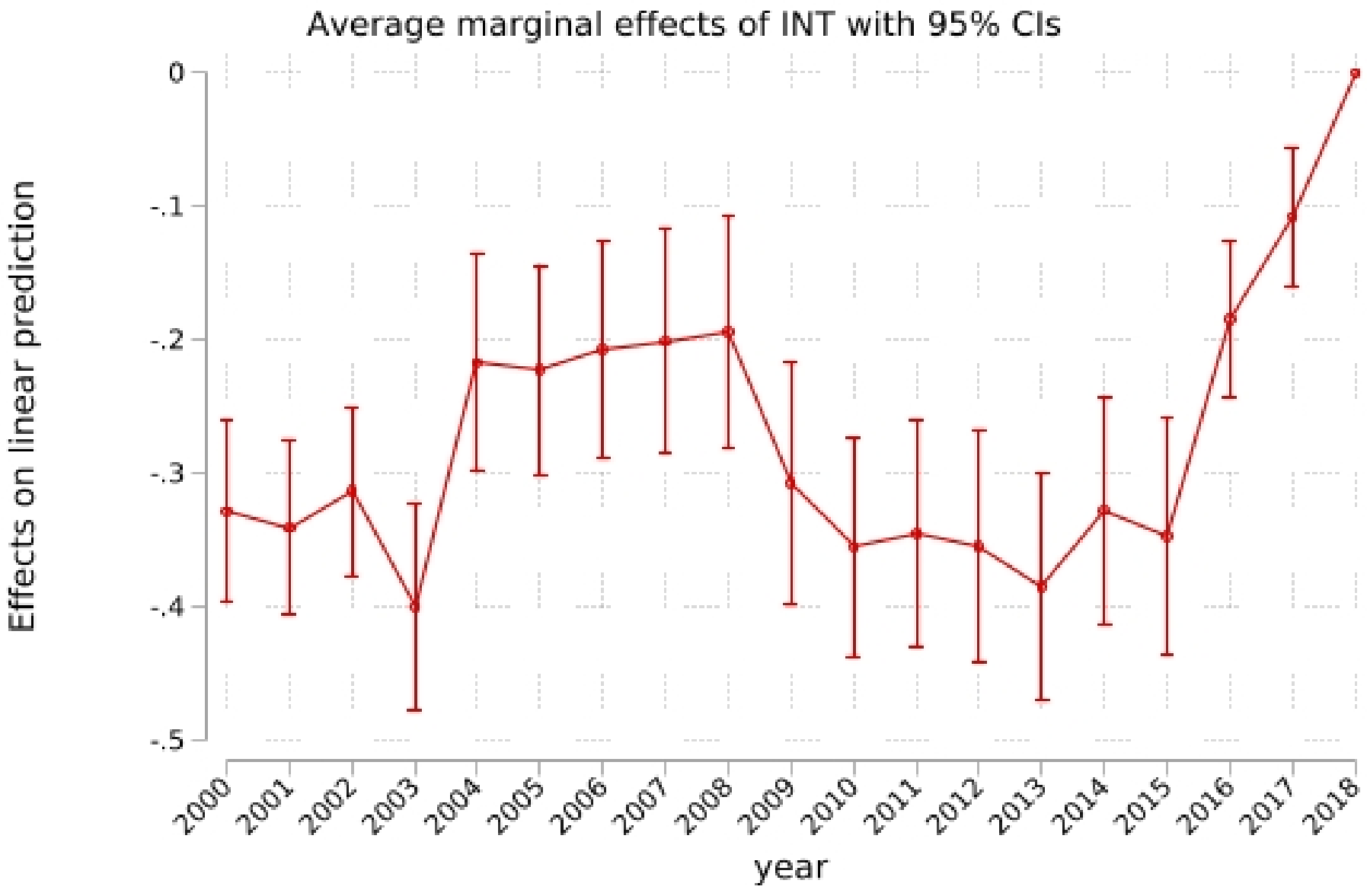
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

IV using capital announcements as an instrument

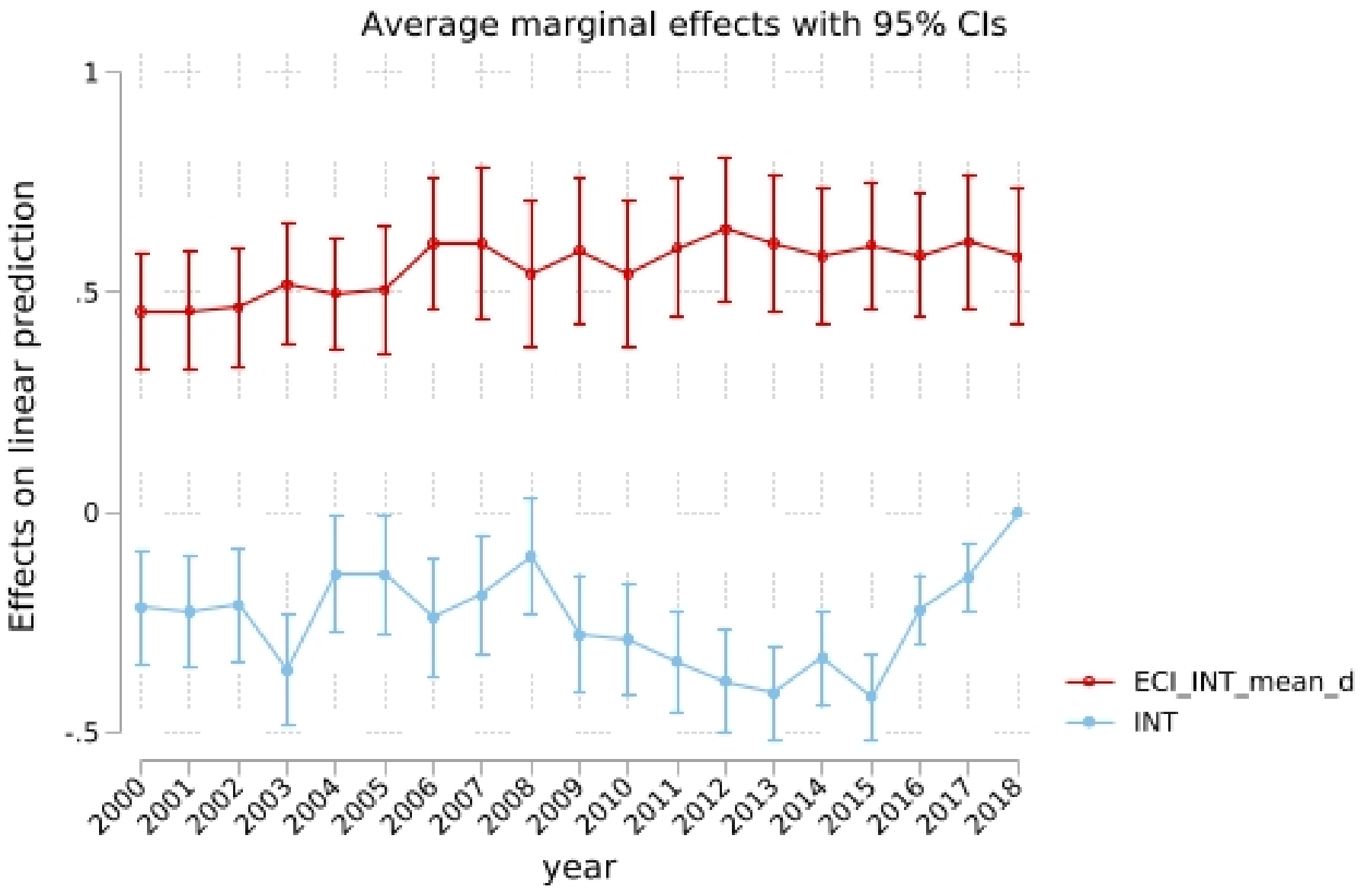
Dep. Variable →	(1) First stage (OLS) $ECI_{jt} \times BRDR$	(2) Second stage (OLS) asinh(trade)
$FDI_{i \neq jt} \times BRDR$	0.004^{***}	
	(0.0002)	
$\widehat{\text{ECI}}$		5.416^{**}
		(0.01)
Observations	542575	4455
ImpxYearFE	Yes	Yes
ExpxYearFE	Yes	Yes
PairFE	Yes	Yes
Global	Yes	Yes
Cragg-Donald Wald F	547	
Anderson LM statistic	585^{***}	

Robust standard errors in parentheses, clustered by country pair

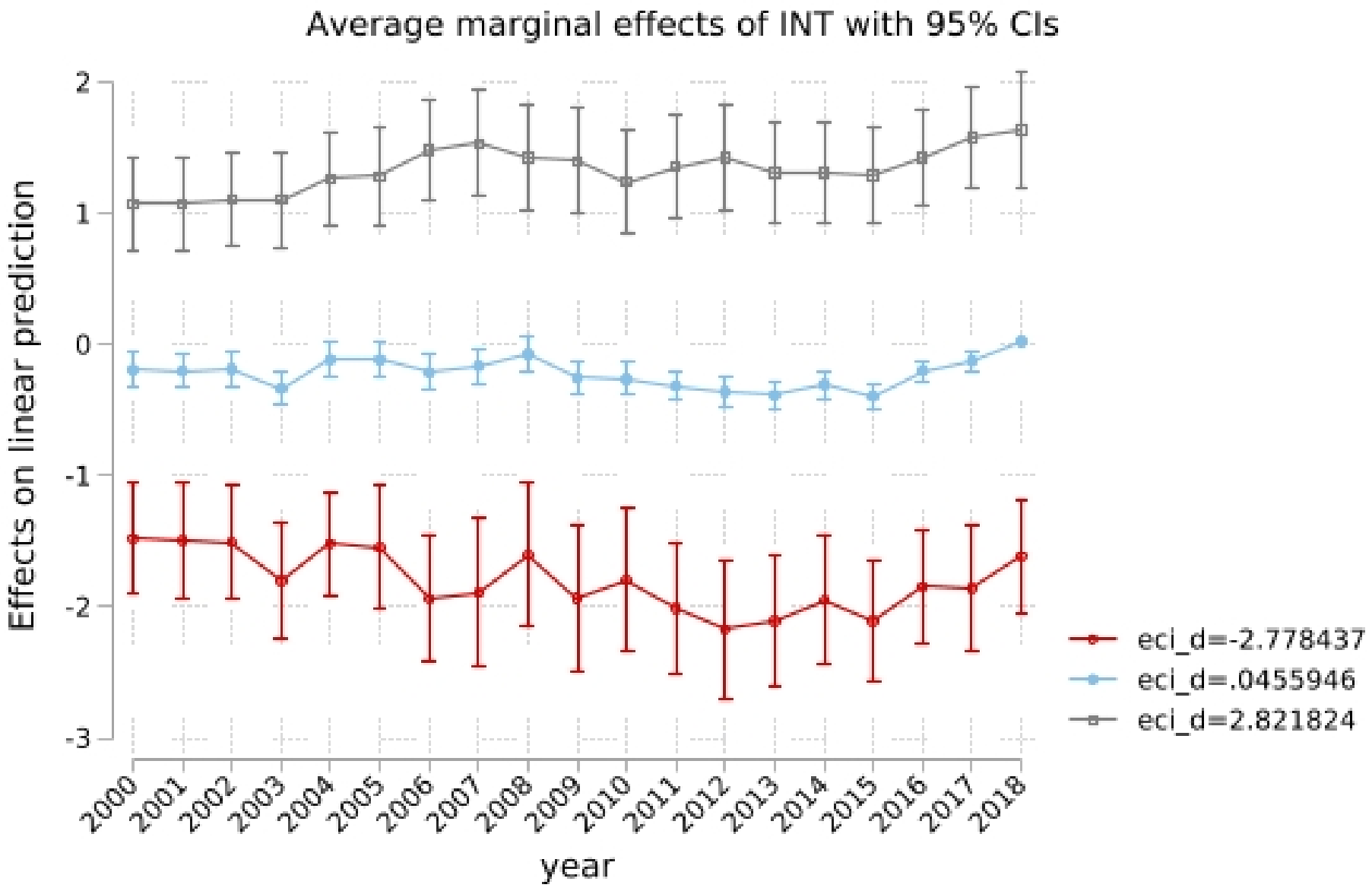
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$


Average marginal effects of INT with 95% CIs
Effects on linear prediction
0
-.1
-.2
-.3
-.4
-.5
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
year

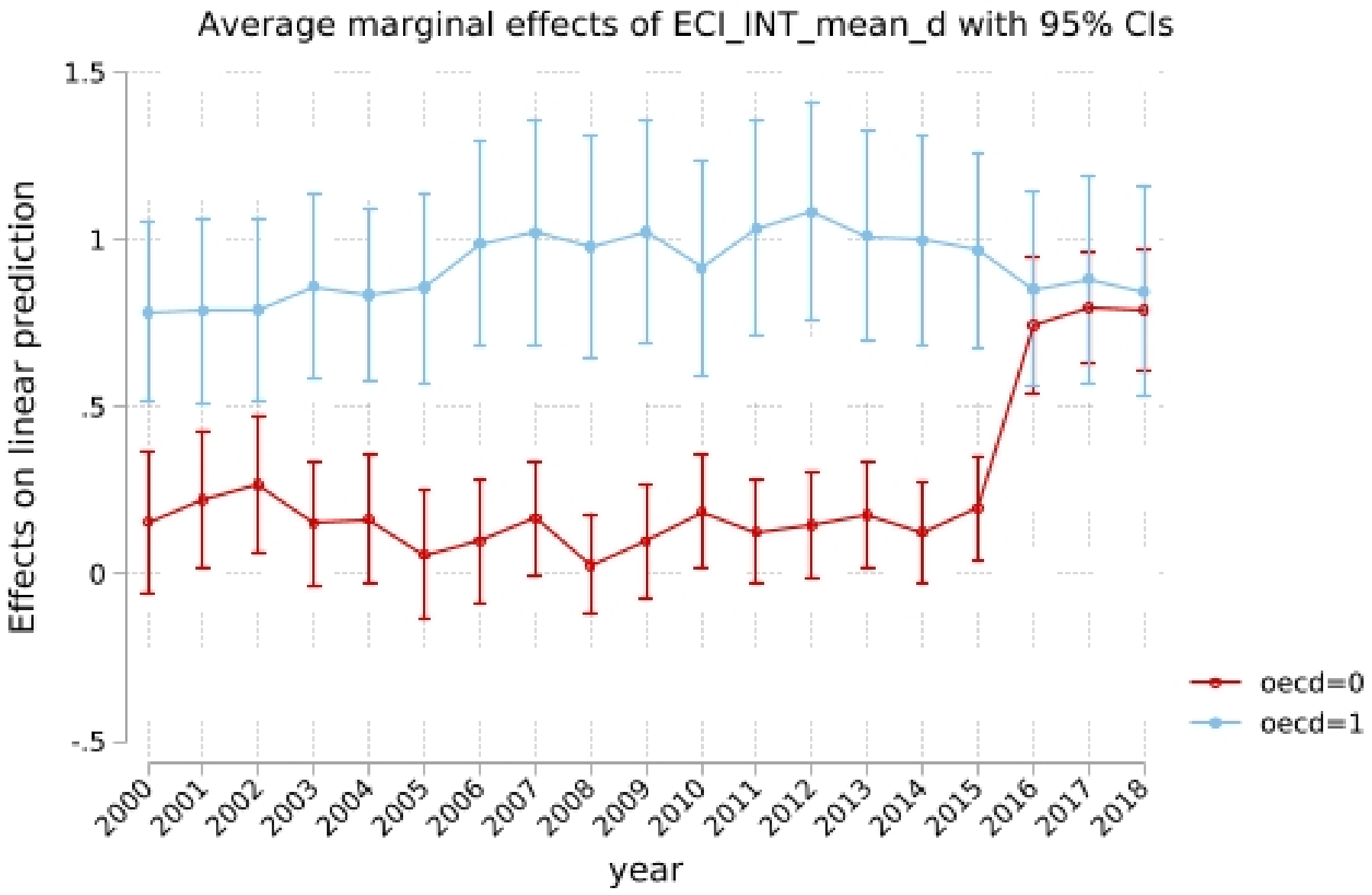
Globalization & average complexity



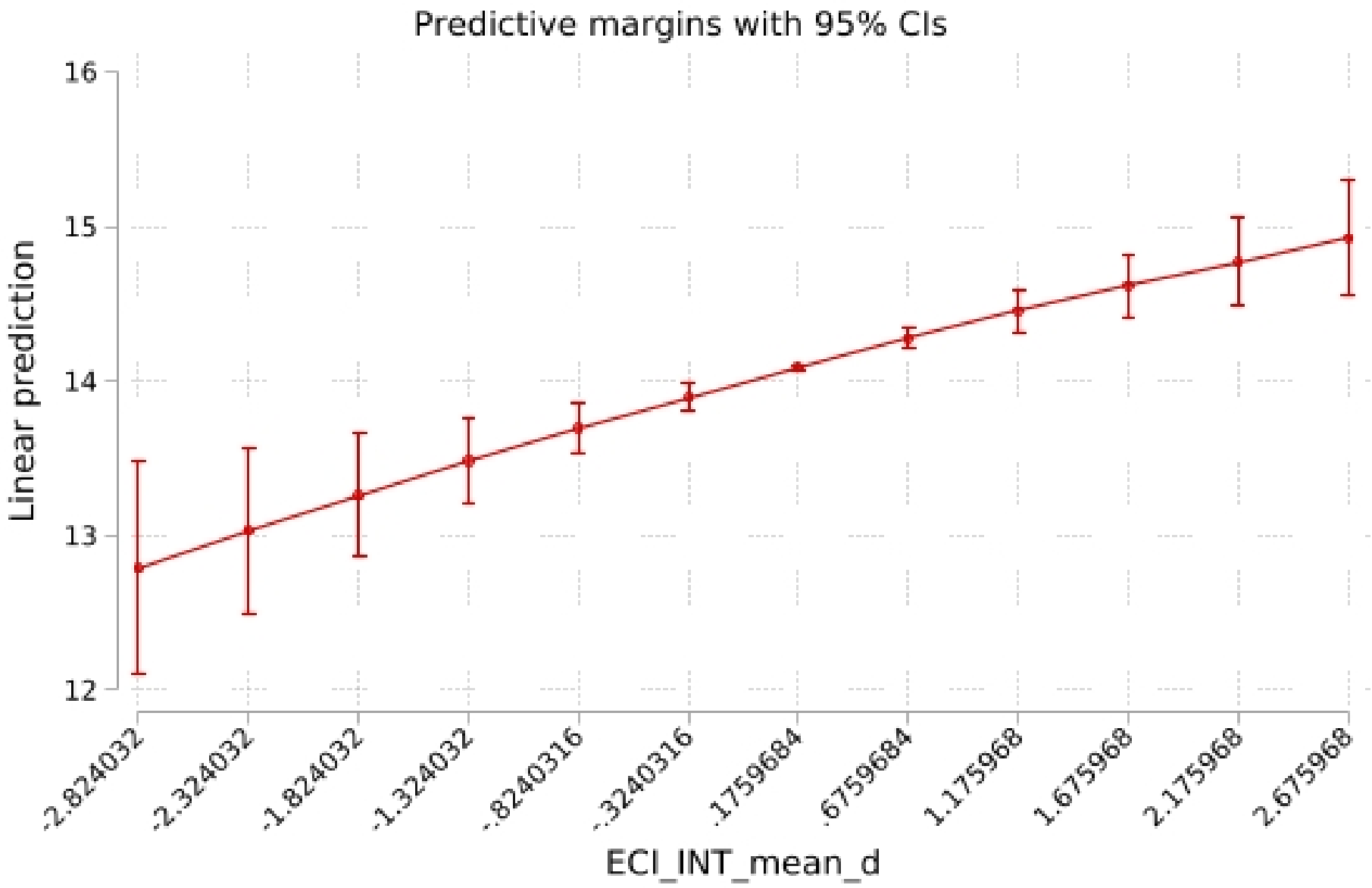
Globalization by complexity levels



The west vs. the rest



Has globalization [complexity] gone too far?



Robustness

- DoT 1962-2013
  - ⏩ DoT
- COMTRADE (Manufacturing) w/ & w/o Domestic trade (1986-2006)
  - ⏩ COMTRADE
- Exporter ECI
  - ⏩ exporter ECI

The model in 71 words ⏩ Setup equilibrium

- I develop a stylized Ricardian model with technological change in line with Acemoglu et al., (2015 AEJ:M), Rodriguez-Clare (2010 AEJ:M) and Krugman (1979 JPE)
- The model simplifies(*) and extends(**) Acemoglu et al., (2015 AEJ:M)
  - Two countries, one final good, many intermediates, one type of worker(*)
  - Workers in the West have positive production spillovers(**)
  - Trade(**)
- Results:
  - Complexity shifting increases welfare (up to a threshold)
  - Increasing complexity in the West increases welfare (+ changes threshold)
  - Complexity shifting increases trade

Shifting and increasing complexity

Result 1: Production increases in κ up to $\bar{\kappa}$
Result 2: Production increases in η

- World's production:

$$Y^{\alpha} = A^{\alpha}\left[(\kappa)^{1-\alpha}(L^{*})^{\alpha} + (\eta(1-\kappa))^{1-\alpha}L^{\alpha}\right]. \tag{1}$$

- R1: Effect of complexity shifting

$$\frac{\partial Y^{\alpha}}{\partial \kappa} = (1-\alpha)A^{\alpha}\left[\left(\frac{L^{*}}{\kappa}\right)^{\alpha} - \eta\left(\frac{L}{(1-\kappa)}\right)^{\alpha}\right] > 0.$$

  if κ is below the limit of (which ensures that $w > w^{*}$):

$$\kappa < \bar{\kappa} = \frac{L^{*}}{\xi^{\frac{1}{\alpha}}L + L^{*}}$$

- R2: Effect of increasing complexity:

$$\frac{\partial Y^{\alpha}}{\partial \eta} = A^{\alpha}\left[\left(\frac{1-\kappa}{\eta^{\alpha/(1-\alpha)}}\right)^{1-\alpha}L^{\alpha}\right] > 0$$

Ideas & skills

Result 3: $\bar{\kappa}$ decreases with η and in σ

- R3: This is easily shown by:

$$\lim_{\eta \to \infty} \bar{\kappa} = 0 \text{ and } \lim_{\sigma \to 1} \bar{\kappa} = 0.$$

- If workers in the West generate high spillovers (productivity, ideas) or intermediates are not easily sustituible, the limit to profitable complexity shifting ($\bar{\kappa}$) decreases.
- η increases world output and reduces profitable complexity shifting

Trade effects

Result 4: Trade increases in κ up to $\bar{\kappa}$ and in η

- Now if we want to determine the frictionless trade between the two countries, we plug the production shares into the standard gravity equation:

$$X_{ij} = \frac{YY^*}{Y} = A^2 \left(\eta\kappa(1-\kappa)\right)^{\frac{1-\alpha}{\alpha}} (LL^*). \tag{2}$$

- R4.1: Effect of shifting complexity:

$$\frac{\partial X_{ij}}{\partial \kappa} > 0 \text{ if} \kappa < \bar{\kappa}$$

- R4.2: Effect of increasing complexity in the West

$$\frac{\partial X_{ij}}{\partial \eta} > 0$$

General Equilibrium effects

GEPPML: Anderson et al (2018 WE)

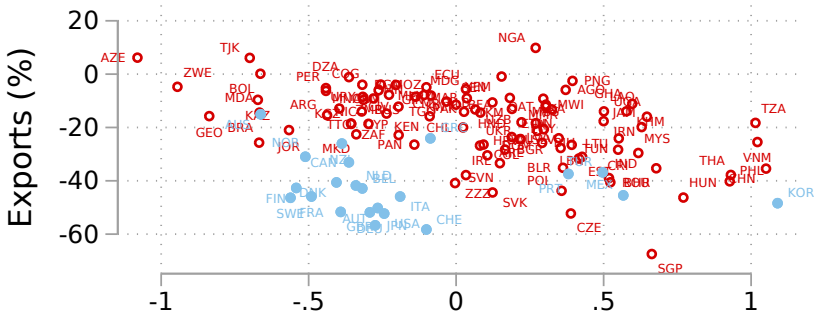
⏩ GE with Structural gravity

- Structural gravity forces account for 100% of variation in product/importer/time and product/exporter/time fixed effects estimated from empirical gravity equations with PPML (Fally 2015 JIE)
- GEPPML uses this useful property to recover consumer and producer prices from MRT
  - PPML translate the initial response of factory-gate prices into changes in the gravity fixed effects
  - Endogenizes the value of output to estimate a structural GE gravity counterfactuals
- GEMPPL needs domestic trade data (for total output and expenditure)

Reversal of Fortunes

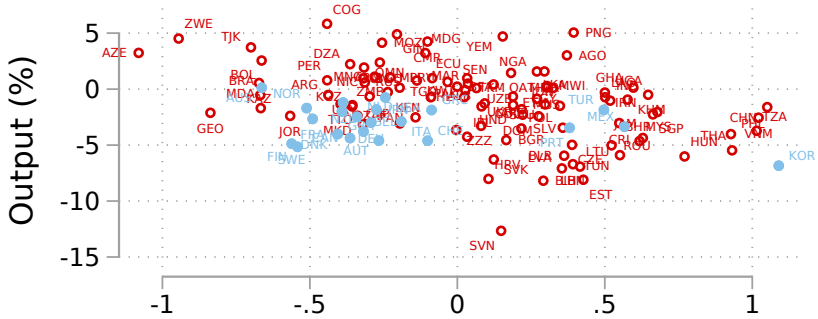
Complexity in 1995 2018

Exports



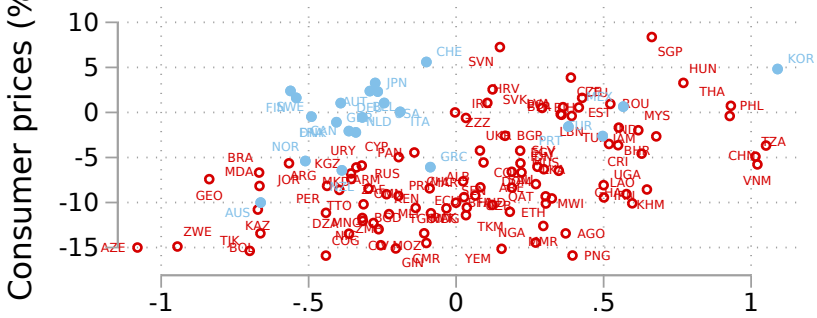
Export Change:
World: -44.818%
OECD: -49.821%
non OECD: -30.693%

Output



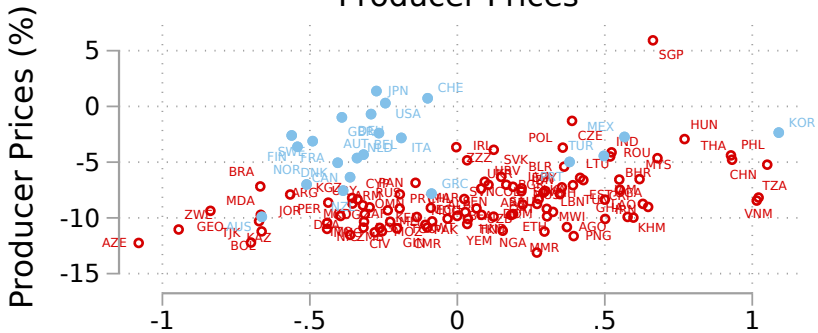
Output Change:
World -1.808%
OECD -0.019%
Non OECD -1.561%

Consumer prices



Consumer prices Change:
World -6.059%
OECD -0.675%
non OECD -7.228%

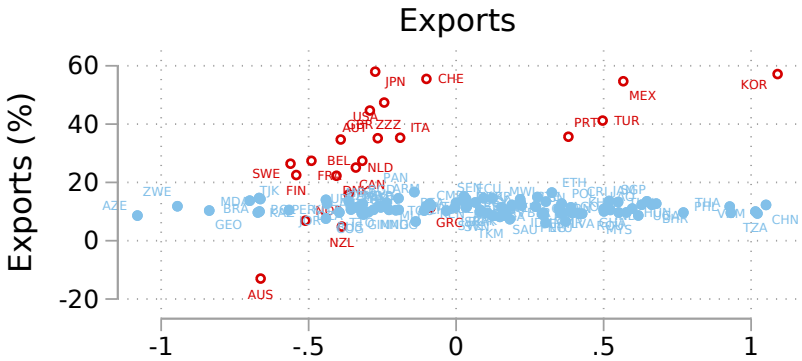
Producer Prices



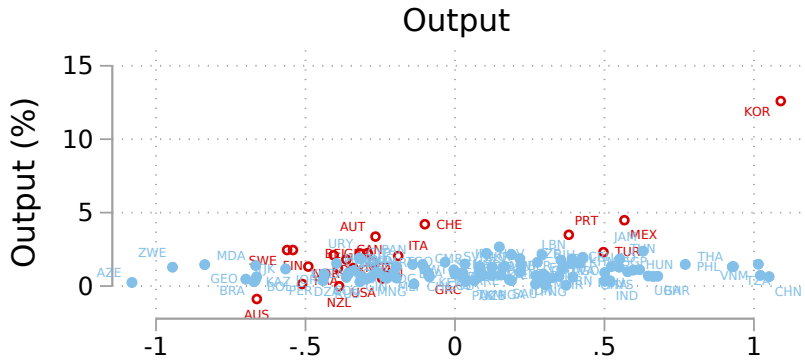
Producer prices Change:
World-7.583%
OECD -3.722%
non OECD -8.428%

Back to the future

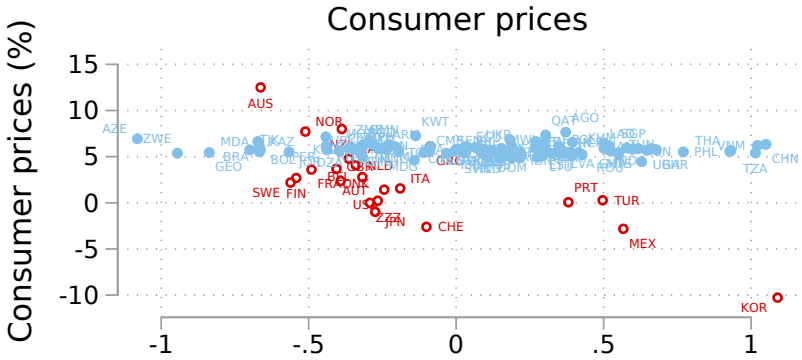
OECD Complexity in 1995 2018



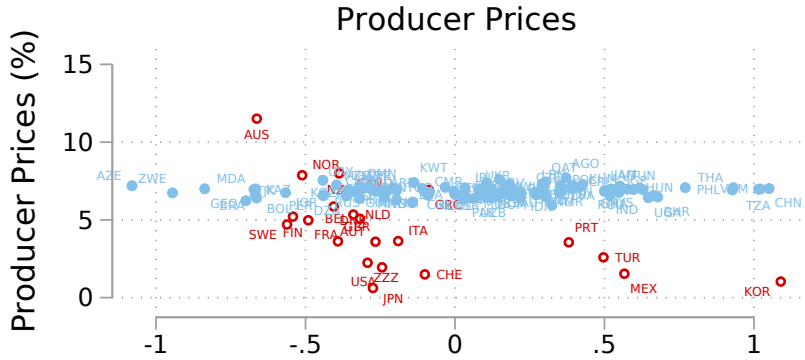
Export Change:
World: 34.360%
OECD: 42.232%
non OECD: 12.134%



Output Change:
World 1.248%
OECD 0.016%
Non OECD 0.671%



Consumer prices Change:
World 5.096%
OECD 2.056%
non OECD 5.792%

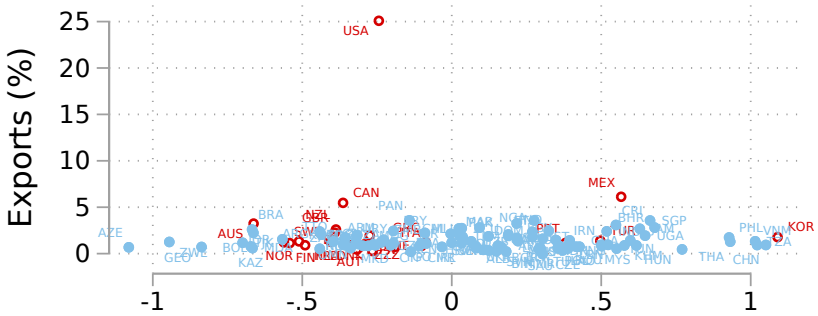


Producer prices Change:
World6.402%
OECD 4.421%
non OECD 6.853%

MAGA

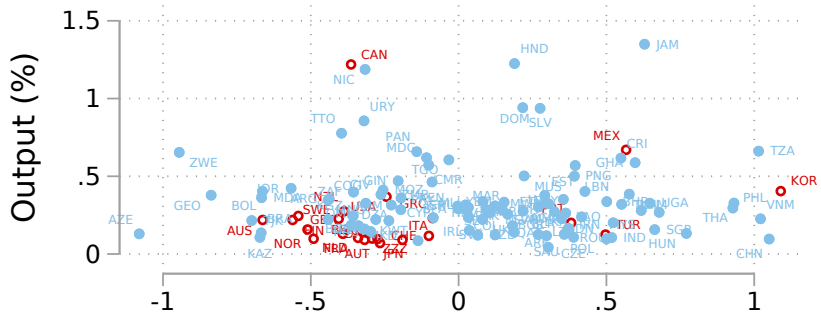
USA Complexity in 1995 2018

Exports



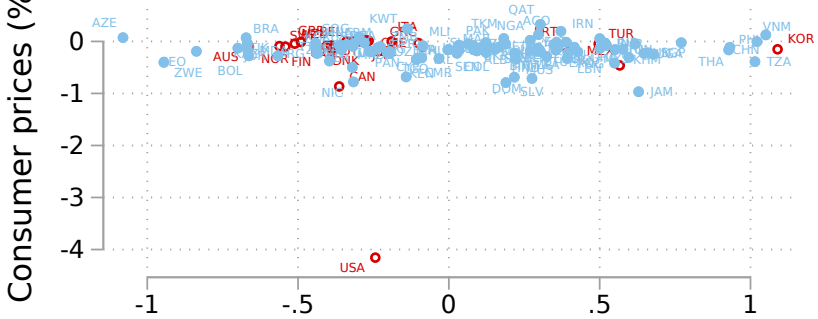
Export Change:
World: 9.098%
OECD: 11.764%
non OECD: 1.569%

Output



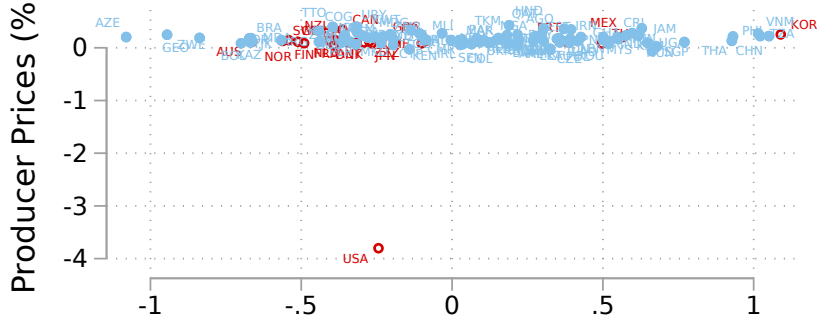
Output Change:
World 0.240%
OECD 0.003%
Non OECD 0.153%

Consumer prices



Consumer prices Change:
World -0.197%
OECD -0.299%
non OECD -0.174%

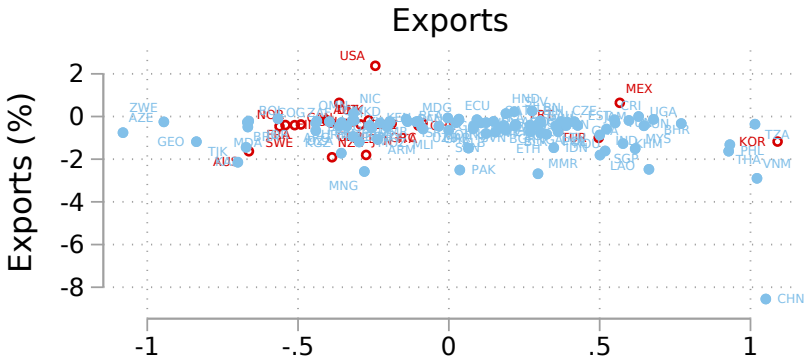
Producer Prices



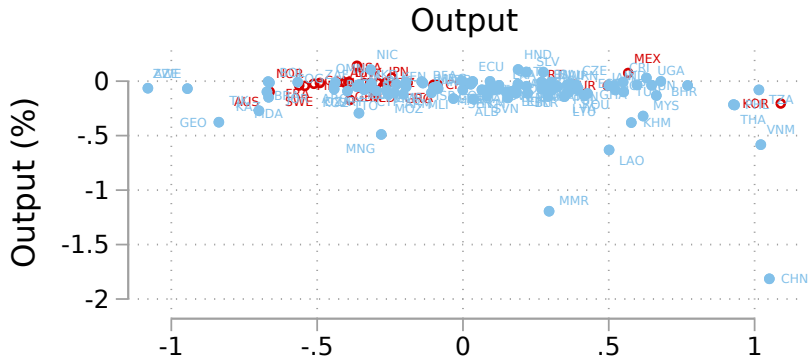
Producer prices Change:
World0.134%
OECD -0.052%
non OECD 0.176%

Bring Back Jobs (from China)

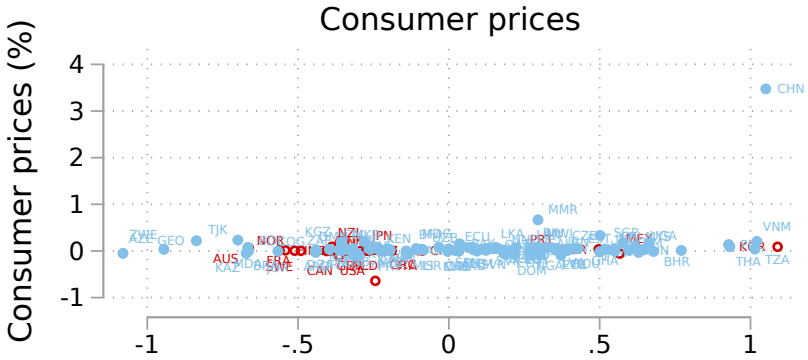
USA & CHN Complexity in 1995 2018



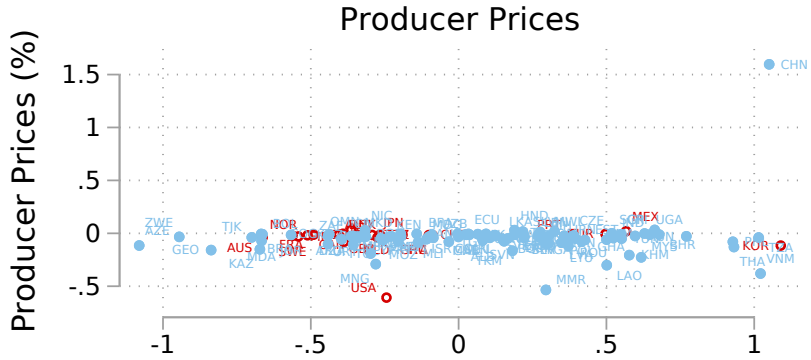
Export Change:
World: -0.099%
OECD: 0.704%
non OECD: -2.364%



Output Change:
World -0.321%
OECD 0.000%
Non OECD -0.827%



Consumer prices Change:
World 0.059%
OECD -0.019%
non OECD 0.076%



Producer prices Change:
World-0.044%
OECD -0.049%
non OECD -0.043%

Take-aways

1. First course: We can explain the effect of complexity on trade and output with a simple Ricardian model
   1. Complexity shifting increases output and trade up to a threshold
   2. Complexity increasing in the West increases output and trade, but changes the threshold
2. Second course:I use structural gravity to estimate the effects of increasing complexity on trade
   1. There seems to be room for more complexity shifting
3. Dessert: I use GE Counterfactuals to test the model predictions on output and prices
   1. Complexity shifting has increased world's GDP
   2. Increasing complexity in the west increases and tilt's world GDP
   3. Complexity shifting in USA and CHN comes at the expense of American consumers
4. In the menu:Migration, revisit trade disputes (litigation, arbitration)

Structural Gravity equation

back

$$X_{ij} = \left(\frac{t_{ij}}{\Pi_i P_j}\right)^{1-\sigma} Y_i E_j, \tag{3}$$

$$P_j^{1-\sigma} = \sum_i \left(\frac{t_{ij}}{\Pi_i}\right)^{1-\sigma} Y_i, \tag{4}$$

$$\Pi_i^{1-\sigma} = \sum_j \left(\frac{t_{ij}}{P_j}\right)^{1-\sigma} E_j, \tag{5}$$

$$p_j = \frac{Y_j^{\frac{1}{1-\sigma}}}{\gamma_j \Pi_j}. \tag{6}$$

where P_j is the CES consumer price index given by $P_j = \left[\sum_i (\gamma_i p_{ij})^{1-\sigma}\right]^{\frac{1}{1-\sigma}}$.
Empirically (3) becomes:

$$X_{ij} = \exp(\mathbf{T}_{ij} + \pi_i + \chi_j) \times \varepsilon_{ij} \tag{7}$$

GEPPML

back

- For our counterfactual analysis, we rely on the structure of the theoretical model described above and PPML's property highlighted by Fally (2015 JIE) that the estimates of the fixed effects from gravity estimations are perfectly consistent with the structural gravity terms.
- The MRT $\Pi_i^{1-\sigma}$ and $P_j^{1-\sigma}$ can be recovered from the fixed effects as follows:

$$\widetilde{\Pi_i^{1-\sigma}} = E_0 Y_i \exp\left(-\widetilde{\pi}_i\right), \tag{8}$$

and

$$\widetilde{P_j^{1-\sigma}} = \frac{E_j}{E_0} \exp\left(-\widetilde{\chi}_j\right), \tag{9}$$

where $\widetilde{\pi}_i$ and $\widetilde{\chi}_j$ are the estimated fixed effects from Equation (7), and E_0 denotes the expenditure of the country chosen as numéraire.

back

- The three-step GEPPML procedure from Anderson et al., (2018), uses equations (3), (8) and (9) to calculate counterfactual effects by changing the trade cost vectors and then obtain counterfactual values for
  - output, $Y_i^c = (p_i^c / p_i)\, Y_i$,
  - expenditures, $E_i^c = (p_i^c / p_i)\, E_i$
  - trade flows, $\widetilde{X}_{ij}^c$.
  - consumer and producer prices ($\left(\widetilde{\Pi_i^{1-\sigma}}\right)^c$ and $\left(\widetilde{P_j^{1-\sigma}}\right)^c$)
- The reported results are then the percentage changes between baseline and counterfactual values, i.e., for output
  $\text{Output}\% = (Y_i^c - Y_i)/Y_i \times 100$.

15+1 Reasons Why Gravity Should Be Estimated with Domestic Trade (Yotov, 2022)

back

- The use of domestic trade flows in gravity estimations is:

1. consistent with trade theory of the intensive margin of trade,
2. available and
    1. it does not matter much which to use! (Campos et al., 2021),
3. consistent with trade theory of the extensive margin of trade.
4. The use of domestic trade flows allows:
    - for estimation of the effects of international borders and home biases,
5. for estimation of heterogeneous domestic and regional trade costs,
6. for a systematic analysis of the determinants of domestic trade costs,
7. for country-specific asymmetries in the vector of international trade costs,
8. for identification of the trade-diversion effects of bilateral trade policies,
9. for identification of the effects of non-discriminatory trade policies on bilateral trade flows,
10. for identification of the effects of country-specific characteristics on bilateral trade flows,
11. for identification of the country-specific effects of trade policies,
12. to a solution to "The Distance Puzzle of International Trade",
13. for solving "The Missing Globalization Puzzle",
14. for solving the puzzle that "Larger Countries Should Be Richer than Smaller Countries",
15. for solving the puzzle of "The Missing WTO Effects".

Consumers

back

- The world consists of two countries, the West and the Rest(*). The West is populated by L units of workers and the East by L^* workers, both fixed in supply. The two countries differ in the technological stance to produce existing intermediates. New technologies are introduced in the West and can be transferred to the Rest after a paying an offshoring cost (Krugman 1979 JPE).
- Households supply labor inelastically and derive utility from consuming a unique final good. Preferences are identical and logarithmic. A representative household in this economy has preferences at time $t = 0$ given by:

$$U = \int_0^\infty e^{-\rho t} \ln C_t dt,$$

where $\rho > 0$ is the discount rate.

- Consumption satisfies standard Euler equation of $\dot{C}_t / C_t = r_t - \rho$ and the transversality condition of $\lim_{t\to\infty} \left[\exp\left(-\int_0^t r_s ds\right) W_t\right]$, where W_t is the wealth of consumers that comes from the ownerships of firms.

The final good

- The final good Y is used both for consumption and investment. and $P = Y = 1$,
- The production of the good requires intermediates, which are produced by workers following the Dixit-Stiglitz production function:

$$Y = (A)^{\frac{2\alpha-1}{\alpha}} \left(\int_0^A x_i^{\alpha} di \right)^{1/\alpha}, \tag{10}$$

where x_i: quantity of intermediate $i \in [0, A]$ and $\sigma \equiv 1/(1-\alpha) > 1$ is the elasticity of substitution between them. A represents the the state of the world's technology and grows endogenously over time (as in Romer, 1990 JPE).

The firm's problem

- After resolving the profit maximization problem of

$$\max_{x_i} \left\{ (A)^{\frac{2\alpha-1}{\alpha}} \left(\int_0^A x_i^{\alpha} di \right)^{1/\alpha} - \int_0^A p_i x_i di \right\},$$

the price of an intermediate is given by:

$$p_i = A^{2\alpha-1} Y^{1-\alpha} x_i^{\alpha-1}.$$

- Intermediates are produced in monopolistic competition with a constant returns to scale technology using labor as the only input:

$$x_i^* = l_i^*, \text{ and } x = \eta^{\frac{1-\alpha}{\alpha}} l_i$$

where η is a positive production externality of workers in the West
- Monopolists charges a markup of $1/\alpha$ over the marginal cost (wages).
  - Prices: $p_i = \omega/\alpha$, and in the Rest $p_i^* = \omega^*/\alpha$ where ω is the wages
  - Profits:$\pi_i = (1-\alpha) p_i x_i$.

Equilibrium

- As in Krugman (1979 JPE), I assume that the West could could potentially produce all products, and Rest can produce only a subset of intermediates $(1-\kappa)A$.
- Imposing labor market clearing with homogenous firms, the quantities produced in each country are:

$$x^* = \frac{L^*/A}{\kappa} \text{ and } x = \frac{\eta^{\frac{1-\alpha}{\alpha}} L/A}{(1-\kappa)}.$$

- κ: Complexity shifting
- Complexity in the Rest =(RCA)
- Complexity in the West=(RCA+spillover)

DoT 1948-2013 back

	(1) C-FE&YFE	(2) C-FE&YFE	(3) CP-FE&YFE	(4) C*Y-FE&CP-FE	(5) C*Y-FE&CP-FE
DIST	-0.777***	-0.779***			
	(0.0357)	(0.0356)			
CNTG	0.504***	0.503***			
	(0.0710)	(0.0709)			
RTA	0.515***	0.503***	0.281***	0.157***	0.156***
	(0.0535)	(0.0532)	(0.0556)	(0.0368)	(0.0368)
CU w/o EMU	-0.0519	-0.0469	0.349***	0.482***	0.480***
	(0.198)	(0.198)	(0.0905)	(0.105)	(0.104)
EMU	-0.0822	-0.0400	-0.104*	0.000174	0.0833
	(0.0608)	(0.0609)	(0.0569)	(0.0413)	(0.0528)
COMPLEX_o	0.328***	0.252***	0.330***		
	(0.0657)	(0.0478)	(0.0641)		
COMPLEX_o^2		0.145***			
		(0.0138)			
COMPLEX_od				0.105***	0.106***
				(0.0225)	(0.0225)
COMPLEX_od×EMU					-0.128**
					(0.0568)
Observations	581707	581707	580621	574107	574107

PPML estimation, Robust standard errors in parentheses, clustered by country pair

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

COMTRADE w/o Domestic trade (1986-2006)

back

	(1) C-FE&YFE	(2) C-FE&YFE	(3) CP-FE&YFE	(4) C*Y-FE&CP-FE	(5) C*Y-FE&CP-FE
DIST	-0.801***	-0.802***			
	(0.0293)	(0.0293)			
CNTG	0.517***	0.518***			
	(0.0697)	(0.0698)			
RTA	0.360***	0.353***	0.372***	-0.0756	-0.0757
	(0.0603)	(0.0598)	(0.0940)	(0.0587)	(0.0586)
CU w/o EMU	-0.729**	-0.736**	0.317	-0.0946*	-0.0947*
	(0.351)	(0.355)	(0.247)	(0.0528)	(0.0528)
EMU	0.112*	0.108	-0.0586	-0.0928**	-0.0302
	(0.0666)	(0.0672)	(0.0455)	(0.0365)	(0.0369)
COMPLEX_o	0.735***	1.366***	0.685***		
	(0.0993)	(0.210)	(0.0989)		
COMPLEX_o^2		-0.277***			
		(0.0615)			
COMPLEX_od				0.148***	0.150***
				(0.0374)	(0.0374)
COMPLEX_od×EMU					-0.0899**
					(0.0373)
Observations	91476	91476	91224	89838	89838

PPML estimation, Robust standard errors in parentheses, clustered by country pair

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Intl. & Domestic trade (1986-2006)

back

	(1) C-FE&YFE	(2) C-FE&YFE	(3) CP-FE&YFE	(4) C*Y-FE&CP-FE	(5) C*Y-FE&CP-FE
DIST	-1.896***	-1.896***			
	(0.0440)	(0.0440)			
CNTG	-0.955***	-0.950***			
	(0.0822)	(0.0817)			
RTA	-0.236*	-0.246**	0.728***	0.523***	0.523***
	(0.124)	(0.121)	(0.140)	(0.0794)	(0.0793)
CU w/o EMU	-1.241***	-1.247***	0.375***	0.124***	0.124***
	(0.333)	(0.335)	(0.0489)	(0.0430)	(0.0431)
EMU	-0.231*	-0.240**	0.186**	0.133***	0.183***
	(0.121)	(0.119)	(0.0898)	(0.0358)	(0.0622)
COMPLEX_o	0.737***	1.270***	0.300***		
	(0.195)	(0.318)	(0.0699)		
COMPLEX_o^2		-0.237***			
		(0.0875)			
COMPLEX_od				-0.114*	-0.113*
				(0.0580)	(0.0580)
COMPLEX_od×EMU					-0.0755
					(0.0777)
Observations	92904	92904	92904	91476	91476

PPML estimation, Robust standard errors in parentheses, clustered by country pair

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Intl. & Domestic trade & Globalization dummies (1986-2006)

back

	(1) C-FE&YFE	(2) C-FE&YFE	(3) CP-FE&YFE	(4) C*Y-FE&CP-FE	(5) C*Y-FE&CP-FE
DIST	-0.691***	-0.691***			
	(0.0589)	(0.0590)			
CNTG	0.764***	0.765***			
	(0.118)	(0.118)			
RTA	0.221***	0.217**	0.412***	0.249***	0.249***
	(0.0847)	(0.0850)	(0.0913)	(0.0676)	(0.0676)
CU w/o EMU	-0.639**	-0.641**	0.343	0.0373	0.0373
	(0.303)	(0.308)	(0.272)	(0.0400)	(0.0400)
EMU	0.207**	0.205**	-0.128**	-0.166***	-0.111*
	(0.0919)	(0.0917)	(0.0547)	(0.0359)	(0.0629)
COMPLEX_o	0.791***	1.225***	0.302***		
	(0.212)	(0.349)	(0.0647)		
COMPLEX_o^2		-0.193**			
		(0.0884)			
COMPLEX_od				0.00807	0.00931
				(0.0507)	(0.0506)
COMPLEX_od×EMU					-0.0812
					(0.0753)
INTL_BRDR_1986	-3.524***	-3.500***	-0.757***	-0.748***	-0.748***
	(0.171)	(0.168)	(0.177)	(0.0392)	(0.0392)
INTL_BRDR_2005	-2.786***	-2.784***	-0.0339	-0.0446***	-0.0444***
	(0.168)	(0.166)	(0.0324)	(0.00803)	(0.00800)
INTL_BRDR_2006	-2.761***	-2.754***			
	(0.180)	(0.179)			
Observations	92904	92904	92904	91476	91476

Intl. & Domestic trade & Globalization (1986(4)2006)

back

	(1) C-FE&YFE	(2) C-FE&YFE	(3) CP-FE&YFE	(4) C*Y-FE&CP-FE	(5) C*Y-FE&CP-FE
DIST	-0.713***	-0.713***			
	(0.0579)	(0.0580)			
CNTG	0.736***	0.737***			
	(0.115)	(0.115)			
RTA	0.199**	0.195**	0.452***	0.228***	-0.0706
	(0.0827)	(0.0831)	(0.0987)	(0.0728)	(0.0543)
CU w/o EMU	-0.563*	-0.573*	0.510	0.215***	0.116*
	(0.303)	(0.312)	(0.333)	(0.0416)	(0.0682)
EMU	0.241***	0.244***	-0.128**	-0.144***	-0.0321
	(0.0932)	(0.0930)	(0.0584)	(0.0360)	(0.0409)
COMPLEX_o	1.116***	1.686***	0.385***		
	(0.266)	(0.401)	(0.0974)		
COMPLEX_o^2		-0.256***			
		(0.0911)			
COMPLEX_od				-0.0191	0.157***
				(0.0586)	(0.0441)
COMPLEX_od×EMU					-0.0865**
					(0.0401)
INTL_BRDR_1986	-3.497***	-3.471***	-0.753***	-0.749***	
	(0.171)	(0.166)	(0.175)	(0.0383)	
INTL_BRDR_2002	-2.810***	-2.826***	-0.120	-0.164***	
	(0.154)	(0.152)	(0.0872)	(0.0145)	
INTL_BRDR_2006	-2.721***	-2.715***			
Observations	26544	26544	26472	26064	25668

PPML estimation, Robust standard errors in parentheses, clustered by country pair

Intl. & Domestic trade & Globalization (1986(4)2006): Exporter effects

back

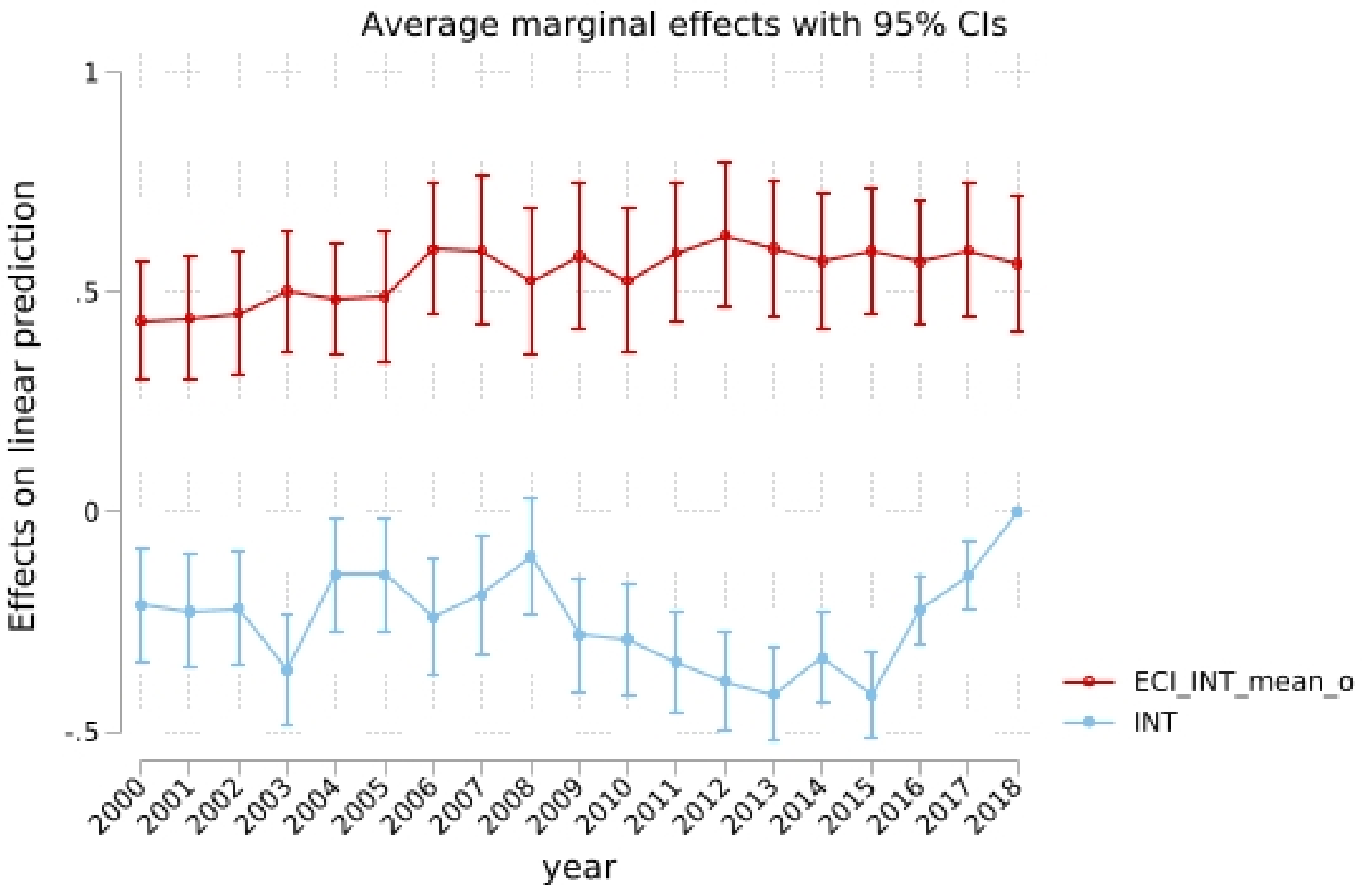
	(1) C*Y-FE&CP-FE	(2) C*Y-FE&CP-FE	(3) C*Y-FE&CP-FE
RTA	0.199***	0.199***	0.200***
	(0.0710)	(0.0710)	(0.0705)
CU w/o EMU	0.198***	0.198***	0.190***
	(0.0398)	(0.0398)	(0.0402)
EMUXBRDR_o	-0.0788*	-0.146	-0.0776*
	(0.0425)	(0.107)	(0.0432)
COMPXBRDR_o	0.326***	0.325***	0.597***
	(0.117)	(0.117)	(0.204)
EMUxCOMPL		0.0409	
		(0.0617)	
COMPXBRDR_o2			-0.122*
			(0.0630)
Observations	26460	26460	26460

PPML estimation, Robust standard errors in parentheses, clustered by country pair

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Globalization & average complexity

back



Globalization by complexity levels

back