Estimating the Economic Impact of the EU-Japan Economic Partnership Agreement

Jens Wrona*

*Mercator School of Management and Institute for East Asian Studies
University of Duisburg-Essen, CESifo, and DICE

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What Have Economists to Say on the EU-Japan EPA?

The last decade saw significant progress in:

1. estimating the effects of free trade agreements,
2. quantifying the general equilibrium effects of trade policy.

How can these new insights be used to quantify the economic effects of the EU-Japan Economic Partnership Agreement?

Outlook

This presentation:

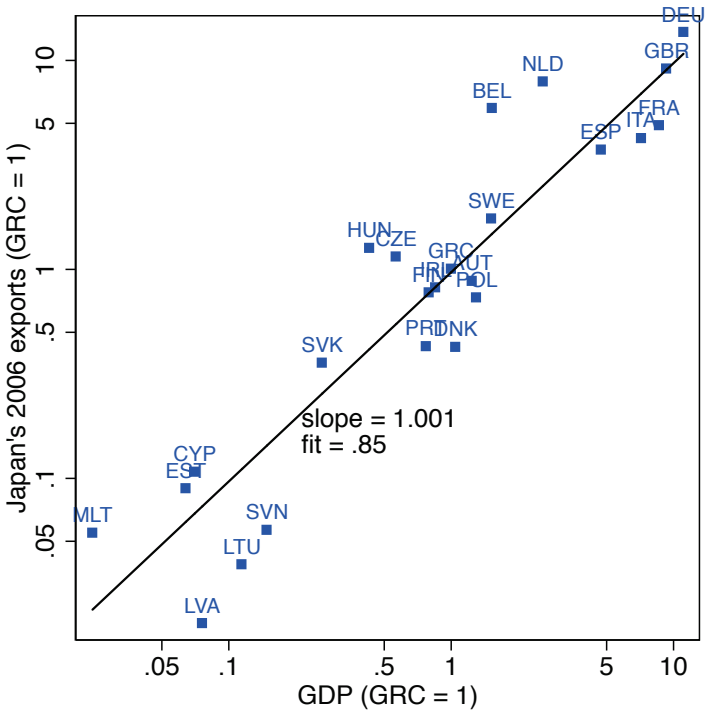
- What do we know about international trade?
- The gravity equation for international trade
- Quantifying general equilibrium effects of trade policy
- Predicting general equilibrium effects of the EU-Japan EPA
- Challenges in the ex-post evaluation of the EU-Japan EPA
- Brexit, COVID-19 and the future of the EU-Japan EPA

Stylized Facts (Trade and Market Size)

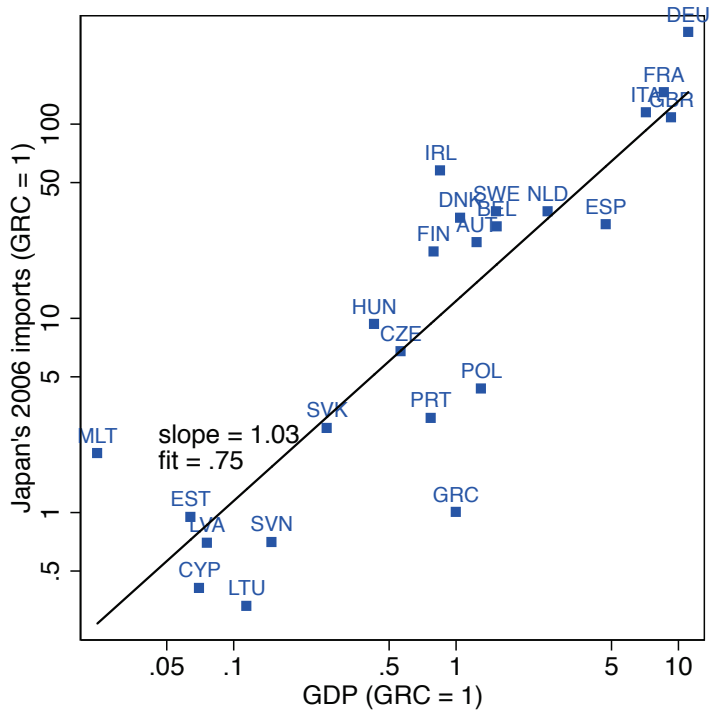
Stylized fact #1: Bilateral Trade proportional to market size.

Figure 1 – Trade is proportional to size

(a) Japan's exports to EU, 2006



(b) Japan's imports from EU, 2006



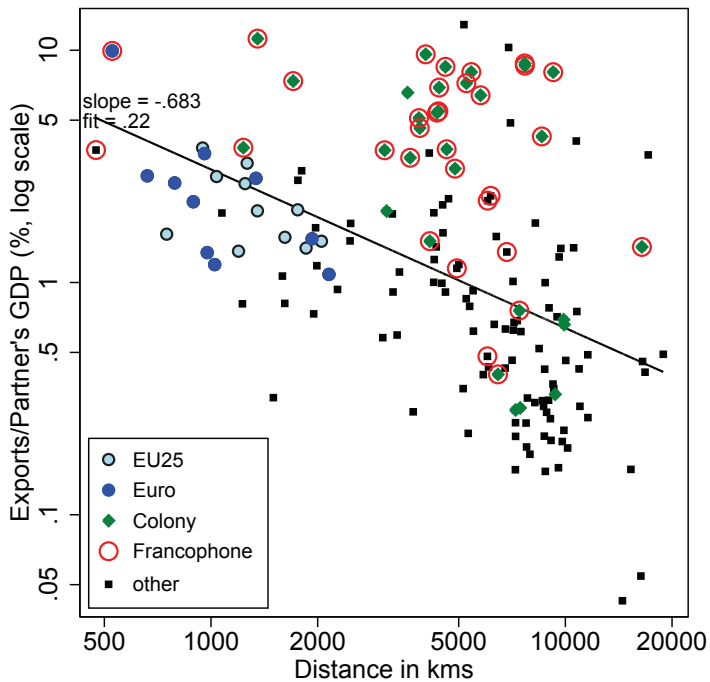
Source: Head, K. and T. Mayer (2009): "Chapter 3 - Gravity Equations: Workhorse, Toolkit, and Cookbook," in *Handbook of International Economics*, ed. by K. R. Elhanan Helpman and G. Gopinath, Elsevier, vol. 4, 131–95.

Stylized Facts (Trade and Bilateral Frictions)

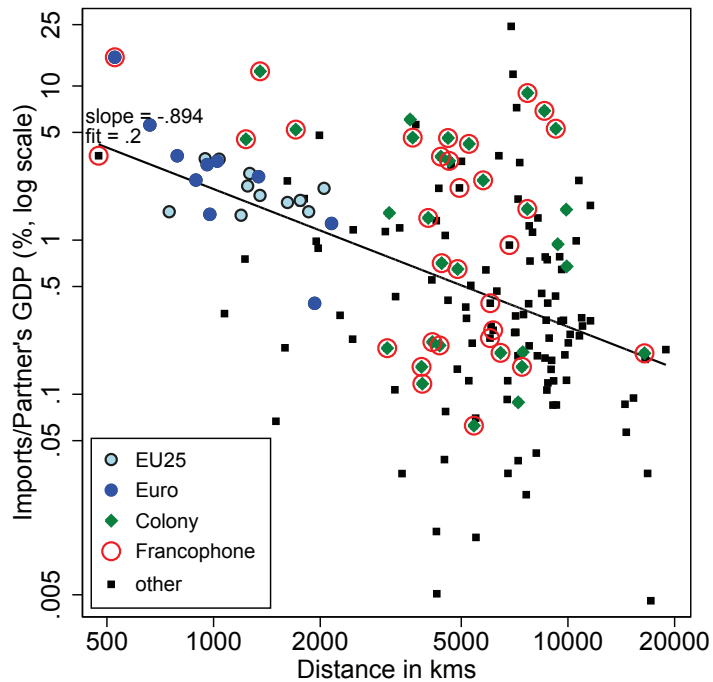
Stylized fact #2: Bilateral Trade inversely proportional to distance.

Figure 2 – Trade is inversely proportional to distance

(a) France's exports (2006)



(b) France's imports (2006)



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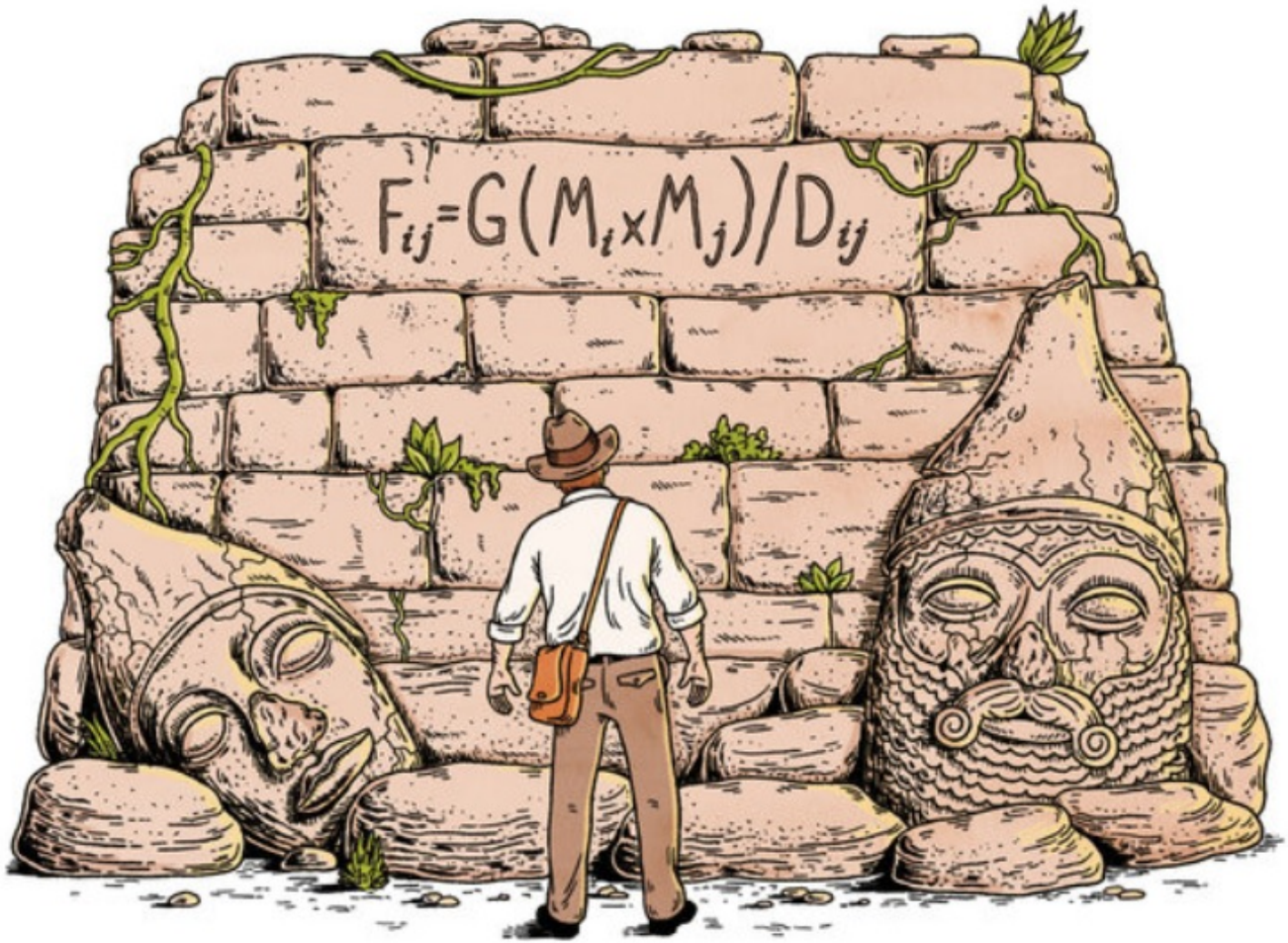
How to Explain these Stylized Facts?

Good news: Research has found a formula – the gravity equation



Gravity: Physics versus Trade

Newton's Law of Universal Gravitation	*Gravity Trade Model*
$F_{ij} = G\frac{M_i M_j}{D_{ij}^2}$	$X_{ij} = \tilde{G}\frac{Y_i E_j}{T_{ij}^{\theta}}$
where:	where:
– F_{ij}: gravitational force between objects i and j	– X_{ij}: exports from countries i and j
– G: gravitational constant	– $\tilde{G}$: inverse of world production $\tilde{G} \equiv 1/Y$
– M_i: object i's mass	– Y_i: country i's domestic production
– M_j: object j's mass	– E_j: country j's aggregate expenditure
– D_{ij}: distance between objects i and j	– T_{ij}^{θ}: total trade costs between countries i and j
	$T_{ij}^{\theta} \equiv \left(t_{ij}/\left(\Pi_i P_j\right)\right)^{\sigma-1}$

Based on the metaphor of Newton's Law of Universal Gravitation, the gravity model of trade predicts that international trade (gravitational force) between two countries (objects) is directly proportional to the product of their sizes (masses) and inversely proportional to the trade frictions (the square of distance) between them.

Source: Yotov, Y. V., R. Piermartini, J. A. Monteiro, and M. Larch (2016): "*An Advanced Guide to Trade Policy Analysis: The Structural Gravity Model*" co-published by UNCTAD and WTO.

Structural Gravity Equation

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

in which Π_i and P_j are the multilateral resistance (MR) terms:

$$\Pi_i^{1-\sigma} \equiv \sum_j \left(\frac{t_{ij}}{P_j} \right)^{1-\sigma} \frac{E_j}{Y} \quad \text{and} \quad P_j^{1-\sigma} = \sum_i \left(\frac{t_{ij}}{\Pi_i} \right)^{1-\sigma} \frac{Y_i}{Y}.$$

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- corresponds to the frictionless trade volume for $t_{ij} = 1$,

trade cost term: $(t_{ij} / \Pi_i P_j)^{1-\sigma}$,

- bilateral trade cost t_{ij} from i to j,
- outward multilateral resistance term Π_i: measures the ease of market access for exporter i,
- inward multilateral resistance term P_j: measures the ease of market access for importer j.

Quantifying General Equilibrium Effects of Trade Policy

Partial Equilibrium Effects

Free Trade Agreement (FTA) reduces bilateral trade costs t_{ij}:

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

holding fixed Y_i, E_j, and the multilateral resistance terms:

$$\Pi_i^{1-\sigma} \equiv \sum_j \left(\frac{t_{ij}}{P_j} \right)^{1-\sigma} \frac{E_j}{Y} \quad \text{and} \quad P_j^{1-\sigma} = \sum_i \left(\frac{t_{ij}}{\Pi_i} \right)^{1-\sigma} \frac{Y_i}{Y}.$$

Partial equilibrium: Only partner countries are directly affected.

Quantifying General Equilibrium Effects of Trade Policy

General Equilibrium Effects

Free Trade Agreement (FTA) also affects MR terms via t_{ij}:

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

holding fixed Y_i, E_j, and the multilateral resistance terms:

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General equilibrium: Partner and non-partner countries are indirectly affected via the MR terms Π_i and P_j.

Quantifying General Equilibrium Effects of Trade Policy

General Equilibrium Effects Cont'd

Induced changes in MR terms Π_i and P_j require adjustment in expenditure and income levels E_j and Y_i:

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

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General equilibrium: Partner and non-partner countries are indirectly affected via changes in Π_i, P_j, E_j and Y_i.

Quantifying General Equilibrium Effects of Trade Policy

General Equilibrium Effects of NAFTA

	Partial equilibrium	General Equilibrium			
	%Δ Exports	%Δ Exports	%Δ Real GDP	%Δ IMRs	%Δ OMRs
USA	18.33	14.88	0.15	-0.18	0.33
CAN	55.05	37.46	1.84	-1.48	3.40
MEX	56.65	43.51	1.30	-2.40	3.81
JPN	0.00	-0.35	-0.03	-0.02	-0.01
KOR	0.00	-0.41	-0.02	-0.01	-0.02
DEU	0.00	-0.17	-0.01	0.00	-0.01
GBR	0.00	-0.23	0.00	0.01	-0.01
FRA	0.00	-0.13	0.00	0.00	-0.01
⋮	⋮	⋮	⋮	⋮	⋮

Source: Yotov, Y. V., R. Piermartini, J. A. Monteiro, and M. Larch (2016): "*An Advanced Guide to Trade Policy Analysis: The Structural Gravity Model*" co-published by UNCTAD and WTO.

Quantification of the EU-Japan EPA

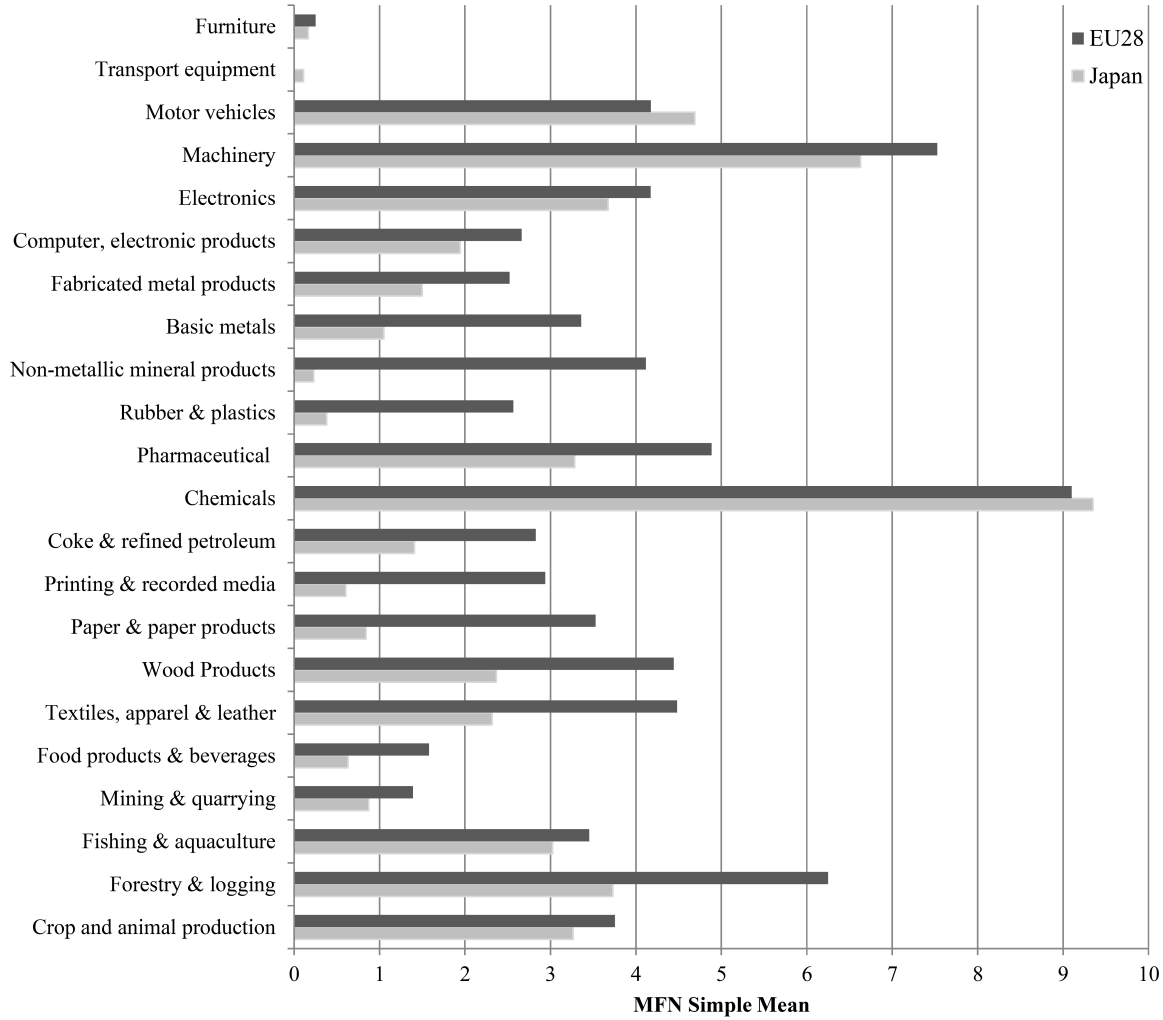
Based on: Felbermayr, G., F. Kimura, T. Okubo, M. Steininger (2019): "Quantifying the EU-Japan Economic Partnership Agreement," *Journal of the Japanese and International Economies*, vol. 51(C), 110-128.

Same basic gravity framework as before + multiple sectors (including services) + input-output linkages.

Forecast based on the EU-Korean Free Trade Agreement (2011).

Quantifies the trade-creating effect of reducing non-tariff barriers.

Average Import tariffs EU versus Japan



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Estimating Non-tariff Barriers

NTBs are estimated from the sectoral gravity equation:

$$X_{ij,t}^{k} = \exp\left[\frac{\delta_1^k}{\theta^k} EUKOR_{ij,t} + \frac{\delta_2^k}{\theta^k} KOREU_{ij,t} + \frac{1}{\theta^k}(1+\tau_{ij,t}^{k}) + \frac{\delta_3^k}{\theta^k}\mathbf{Z}_{ij,t} + \pi_{i,t}^{k} + \chi_{j,t}^{k} + \mu_{ij}^{k}\right] + \varepsilon_{ij,t}^{k}$$

with identifiers i, j (origin, destination), t (time), k (sector), and:

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Trade-creating Effects of Reducing Non-tariff Barriers

	Trade Creation Effects in %			
	Mean EU(%)	p-value	Mean KOR(%)	p-value
Agrifood	32.24	0.02	25.63	0.07
Raw Materials	43.20	0.07	38.67	0.01
Textiles & Apparel	13.00	0.48	21.05	0.08
Energy	76.30	0.00	44.80	0.00
Chemicals	547.00	0.00	130.00	0.00
Metals	57.10	0.01	12.67	0.65
Automotive	53.60	0.00	30.60	0.02
Machinery and Equipment	50.15	0.03	15.45	0.49
Electronic Equipment	31.00	0.00	24.20	0.01
Other Manufacturing	60.50	0.00	15.40	0.17
Trade and Transportation	158.32	0.07	-11.20	0.11
Financial & Business Services	57.13	0.00	24.03	0.12
Other Services	54.49	0.00	15.25	0.52

Source: Felbermayr, G., F. Kimura, T. Okubo, M. Steininger (2019): "Quantifying the EU-Japan Economic Partnership Agreement," *Journal of the Japanese and International Economies*, vol. 51(C), 110-128.

Implied Real Income Changes of the EU-Japan EPA

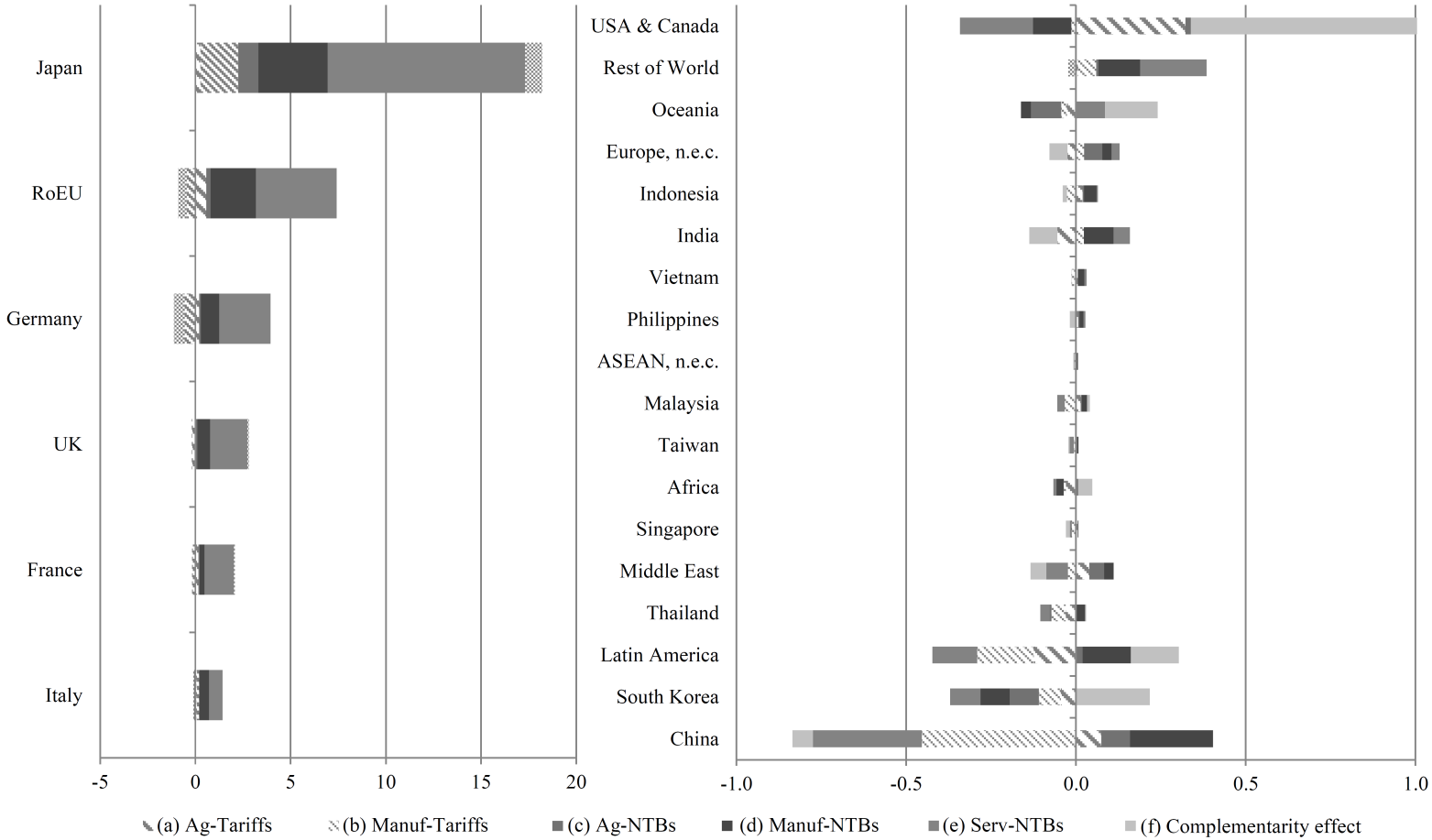
S1: EU-Jap. EPA; S2: EU-Jap. EPA + Brexit; S3: EU-Jap. EPA + TPP.

	Real Income Changes in %				Real Income Changes in %		
	S1	S2	S3		S1	S2	S3
Japan	0.31	0.30	0.31	Europe, n.e.c.	0.00	0.00	0.00
UK	0.11	0.12	0.11	India	0.00	0.00	0.00
RoEU	0.10	0.10	0.10	Middle East	-0.00	-0.00	-0.00
Germany	0.08	0.08	0.07	Africa	-0.00	-0.00	-0.00
France	0.07	0.07	0.07	Latin America	-0.00	0.00	0.00
Italy	0.06	0.06	0.07	ASEAN, n.e.c.	-0.00	-0.00	-0.01
Vietnam	0.01	0.01	0.00	Malaysia	-0.01	-0.00	-0.01
Rest of World	0.01	0.01	0.01	China	-0.01	-0.00	-0.01
Oceania	0.01	0.01	0.00	Singapore	-0.01	-0.01	-0.01
Philippines	0.00	0.01	0.00	South Korea	-0.01	-0.01	-0.01
USA & Canada	0.00	0.00	-0.00	Thailand	-0.02	-0.02	-0.02
Indonesia	0.00	0.00	0.00	Taiwan	-0.03	-0.03	-0.03
World	**0.05**	**0.05**	**0.05**				

Source: Felbermayr, G., F. Kimura, T. Okubo, M. Steininger (2019): "Quantifying the EU-Japan Economic Partnership Agreement," *Journal of the Japanese and International Economies*, vol. 51(C), 110-128.

Decomposing the Welfare Effects of the EU-Japan EPA

Non-tariff barriers are much more important that tariffs.



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Challenge: Ex post Evaluation of the EU-Japan EPA

Identification and Quantification: too early... more data needed!

Identifying the trade-creating effect of NTBs:

1. Endogenous selection into the EU-Japan EPA.
2. NTBs identified as residual (unobserved heterogeneity).
3. COVID pandemic affects bilateral trade costs (simultaneity).

Quantifying the general equilibrium effects the EU-Japan EPA:

- Joint analysis of int. trade and multinational production.

Brexit, COVID-19, and the future of the EU-Japan EPA

Brexit:

- Brexit lowers Japan's gains from the EU-Japan EPA.
- Negligible effect on EU gains from the EU-Japan EPA.

COVID-19:

Has globalization reinforced the negative economic effects of COVID-19? Would re-nationalization be preferable?

Sforza and Steininger (2020): No... the COVID-19 pandemic is already a global shock... transmission is a second order concern.

Conclusion

Predicted effects of the EU-Japan EPA:

- Moderate overall gains (role of distance and non-tradables).
- Lager gains for Japan than for EU (pre-existing asymmetries).
- Negligible third-country effects for non-member countries.
- Non-tariff barriers much more important than tariffs.

Future importance of the EU-Japan EPA:

- depends on U.S.-China trade war,
- general globalisation trend (re-nationalization),
- the future of deep trade agreements (including BITs).