Consequences of Brexit and Options for "Global Britain"

Tristan Kohl

University of Groningen, The Netherlands

The presentation is based on a paper co-authored with Steven Brakman (University of Groningen) and Harry Garretsen (University of Groningen).

Consequences of Brexit and Options for "Global Britain"

Steven Brakman, Harry Garretsen and Tristan Kohl[1]

[1]University of Groningen

wiiw Seminar
May 15, 2017

Timeline

- 2013-01-23: PM Cameron announces in-out referendum if Conservatives are re-elected into government.
- 2015-05-07: Tories re-elected.
- 2015-05-28: Bill passed to enable in-out referendum.
- 2015-11-15: PM Cameron announces Britain's goals in EU reform negotiations.
- 2016-02-22: PM Cameron announces the date of the in-out referendum and discusses the outcome of renegotiation of EU membership in the House of Commons.
- 2016-04-13: "Vote Leave" is official Out campaign.
- 2016-06-23: Referendum.
- 2016-06-24: Leave wins (51.9% of votes, turnout 72.2%).

2017-03-29: HM Government 2017, p. 8

- ▶ UK aims to "forge a new strategic partnership with the EU, including a wide-reaching, bold and ambitious free trade agreement". . .
- ▶ . . . and "forge ambitious free trade relationships across the world."

Key question: What are viable options for the UK?

Contribution

- Quantify consequences of Brexit for UK *and* other major economies
- Explore viability of trade policy options for the UK
- Results in terms of countries' trade, in particular value added exports

METHODOLOGY

Structural Gravity

- ► Starting point: Structural Gravity with CES preferences across countries for national varieties differentiated by place of origin (Armington 1969, Anderson 1979).

- ► Related applications: Egger & Larch (2011 EER), Head & Mayer (2014).

- ► Today, specific methodology set out in recent papers by Anderson, Larch and Yotov (see a.o. Anderson, Larch & Yotov 2015; Anderson & Yotov 2016 JIE; Larch & Yotov 2016).

Structural Gravity

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

$$\Pi_i^{1-\sigma} = \Sigma_j(\frac{t_{ij}}{P_j})^{1-\sigma}\frac{E_j}{Y} \qquad (2)$$

$$P_j^{1-\sigma} = \Sigma_i(\frac{t_{ij}}{\Pi_i})^{1-\sigma}\frac{Y_i}{Y} \qquad (3)$$

$$p_i = (\frac{Y_i}{Y})^{\frac{1}{1-\sigma}}\frac{1}{\beta_i \Pi_i} \qquad (4)$$

$$E_i = \phi_i Y_i = \phi_i p_i Q_i \qquad (5)$$

Procedure

- ▶ Estimate baseline gravity equation.
- ▶ Predict baseline trade costs.
- ▶ Introduce counterfactual change in trade costs (e.g. Brexit).
- ▶ Iteratively solve to obtain counterfactual MRTs, trade and output.
- ▶ Calculate % change in normalized trade (welfare) w.r.t. baseline.

Procedure

Step 1: Baseline

$$X_{ijt} = exp[\pi_i + p_j + \eta_1 ln(DIST_{ij}) + \eta_2 CNTG_{ij} + \eta_3 BRDR_{ij} + \eta_4 TA_{ijt}] + \epsilon_{ijt}$$

$$\hat{t}_{ijt}^{BSLN} = exp[\hat{\eta_1} ln(DIST_{ij}) + \hat{\eta_2} CNTG_{ij} + \hat{\eta_3} BRDR_{ij} + \hat{\eta_4} TA_{ijt}] + \epsilon_{ijt}$$

Step 2: Counterfactual

$$\hat{t}_{ijt}^{CFL} = exp[\hat{\eta_1} ln(DIST_{ij}) + \hat{\eta_2} CNTG_{ij} + \hat{\eta_3} BRDR_{ij} + \hat{\eta_4} TA_{ijt}^{CFL}] + \epsilon_{ijt}$$

Step 3: Solve the Baseline and Counterfactual Model

Solution (see Anderson et al., 2016)

Partial equilibrium for given MRTs, production and expenditure

$$X_{ij} = \frac{Y_i E_j}{Y} \left(\frac{\hat{t}_{ijt}^{CFL}}{\Pi_i P_j} \right)^{1-\sigma}$$

Conditional general equilibrium for changed MRTs, given production and expenditure

$$\Pi_i^{1-\sigma} = \Sigma_j \left(\frac{\hat{t}_{ijt}^{CFL}}{P_j} \right)^{1-\sigma} \frac{E_j}{Y}$$

$$P_j^{1-\sigma} = \Sigma_i \left(\frac{\hat{t}_{ijt}^{CFL}}{\Pi_i} \right)^{1-\sigma} \frac{Y_i}{Y}$$

Solution (see Anderson et al., 2016)

Full endowment general equilibrium

$$p_i = \left(\frac{Y_i}{Y}\right)^{\frac{1}{1-\sigma}} \frac{1}{\beta_i \Pi_i}$$

$$E_i = \phi_i Y_i = \phi_i p_i Q_i$$

DATA

Value Added Exports

▶ Value Added Exports (à la Johnson & Noguera 2012) is more closely linked to incomes of countries involved in gross exports, including (non-tradable) services used in producing tradable goods.

  - Example: UK's final demand for cars with German and Polish intermediate goods.
  - Example: Austria's final demand for Dutch chemicals using British financial services.
  - For simplicity, we make no distinction between manufacturing and services.

WIOD Country Coverage

Europe			**Asia and Pacific**	**North America**	**Latin America**
Austria	Germany	Norway	Australia	Canada	Brazil
Belgium	Greece	Poland	China	USA	Mexico
Bulgaria	Hungary	Portugal	India		
Croatia	Ireland	Romania	Indonesia		
Cyprus	Italy	Slovakia	Japan		
Czech Republic	Latvia	Slovenia	Korea		
Denmark	Lithuania	Spain	Russia		
Estonia	Luxembourg	Sweden	Taiwan		
Finland	Malta	Switzerland	Turkey		
France	Netherlands	United Kingdom			

Data

- World Input-Output Database, 43 countries, 2014. Ca. 85% of world output.
- Geographic distance, common border (Mayer and Zignano, 2011).
- Trade agreements (binary indicators from Kohl 2014; WTO).
- Robustness: gross exports, and VAX from both TIVA and WIOD for different years — qualitatively similar conclusions.

SCENARIOS

I. Consequences of Brexit

- ► Hard Brexit: abandon FTAs with EU-partners
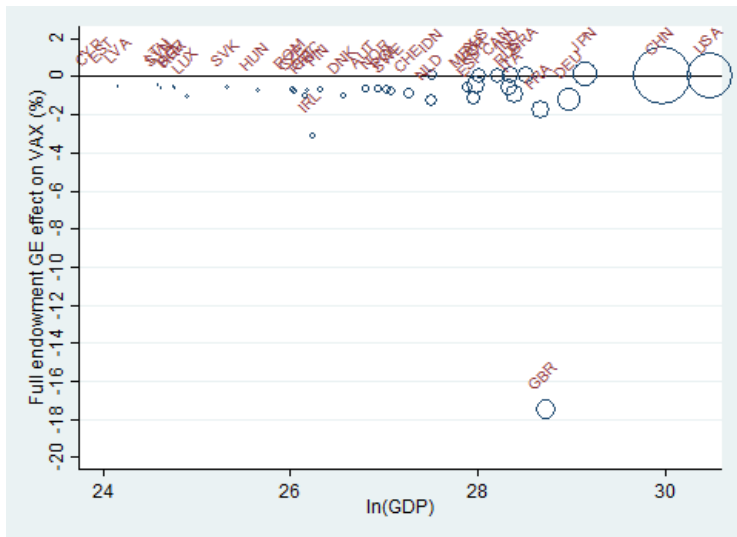- ► Soft Brexit: retain FTAs with EU-partners

Figure: "Hard Brexit". Bubbles proportional to VAX in 2014.
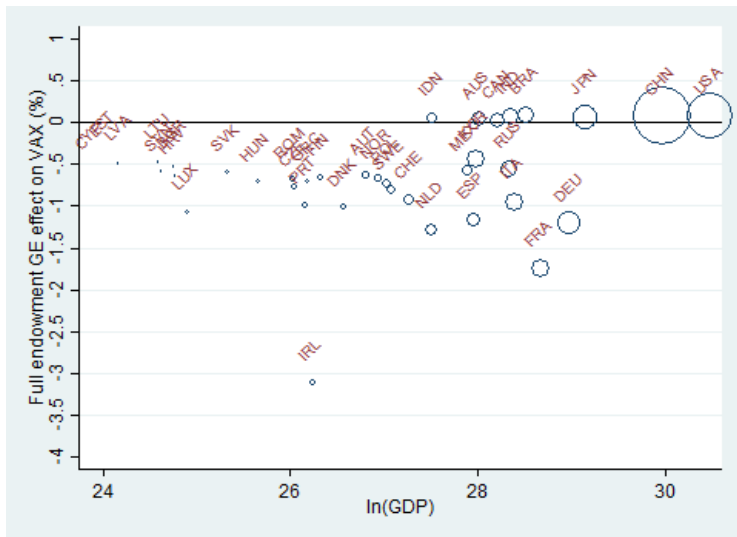
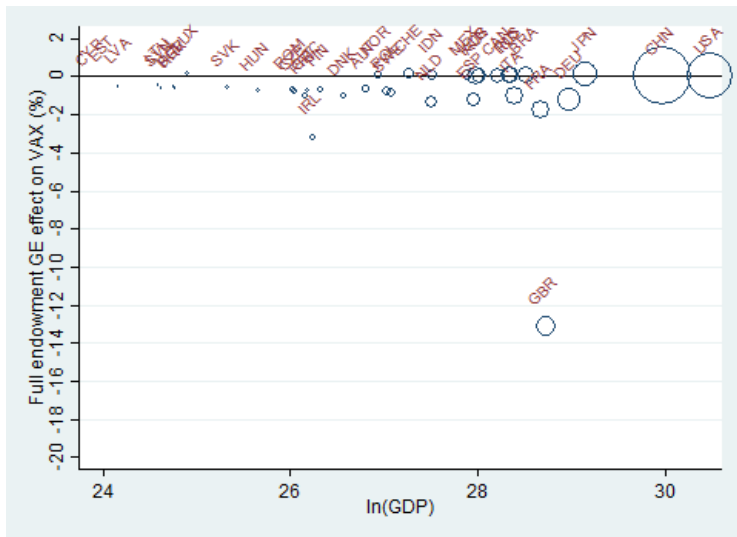Figure: "Hard Brexit". Bubbles proportional to VAX in 2014.

Figure: "Soft Brexit". Bubbles proportional to VAX in 2014.

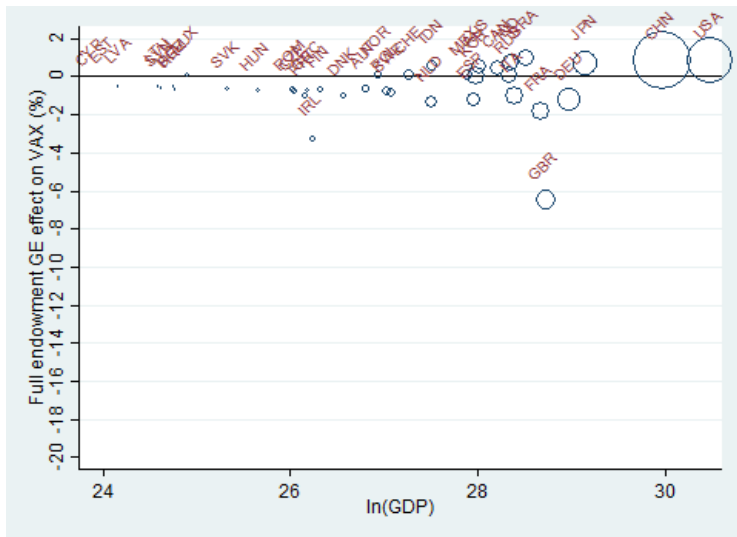# II. Options for Global Britain

- ► UK-US TA.
- ► All-But-EU TA.

Figure: "UK-US TA". Bubbles proportional to VAX in 2014.

Figure: "All-But-EU TA". Bubbles proportional to VAX in 2014.

III. Is It Raining or Pouring?

- ▶ US terminates NAFTA membership.
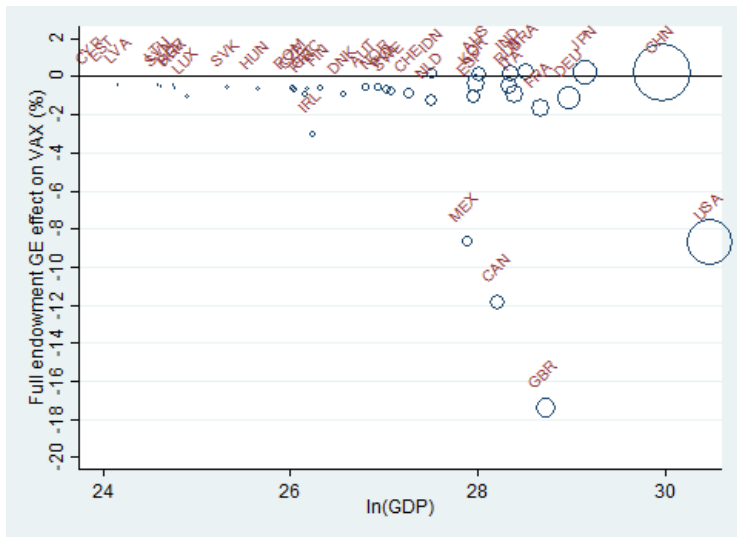- ▶ Brexit, Frexit. . . EU collapses.
- ▶ Abolition of all TAs.

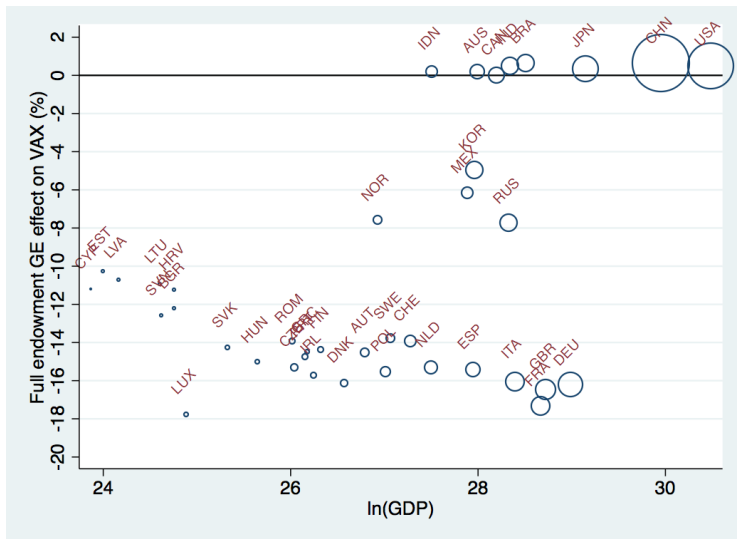Figure: "Amexit NAFTA". Bubbles proportional to VAX in 2014.

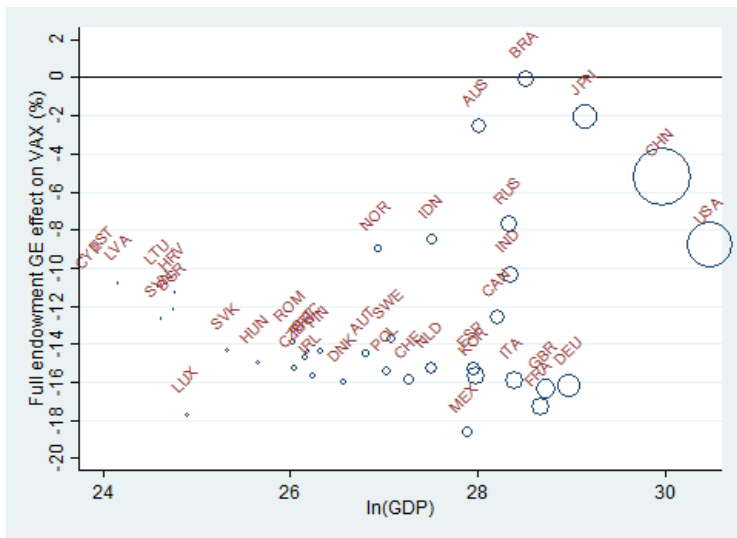Figure: "Collapse EU". Bubbles proportional to VAX in 2014.

Figure: "Collapse TAs". Bubbles proportional to VAX in 2014.

CONCLUSION

Conclusion

- ▶ Uncertainty about what PM May's envisioned "optimal outcome" should be (or is).
- ▶ Paradoxical outcome: UK needs FTA with EU to "break even" in a post-Brexit world.

Further Reading

► Baldwin, RE (ed.), 2016. "Brexit Beckons: Thinking Ahead by Leading Economists." CEPR Press.

► Dhingra, S, H Huang, G Ottaviano, J-P Pessoa, T Sampson, and J Van Reenen, 2017. "The Costs and Benefits of Leaving the EU: Trade Effects." CEP Discussion Paper No. 1478.

► Larch, M. and YV Yotov, 2016. "General Equilibrium Trade Policy Analysis with Structural Gravity." CESifo Working Paper No. 6020.

► Los, B, P McCann, J Springford, and M Thissen, 2017. "The Mismatch Between Local Voting and the Local Economic Consequences of Brexit." *Regional Studies* 51(5): 786–799.

Thanks for your attention!

Consequences of Brexit and Options for "Global Britain"

CESifo Working Paper 6448

Steven Brakman, Harry Garretsen and Tristan Kohl

www.tristankohl.org