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New Measures of (UK) Trade Dependence

Based on ESCoE paper: “Measuring Bilateral Exports of Value Added: A Unified Approach and Application”

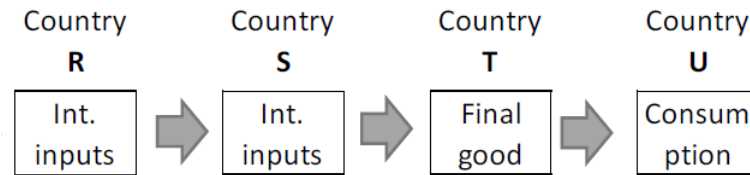
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Presentation at the ESCoE Conference on Economic Measurement 2018, May 17



Definition *Trade dependence* of country R on country i is defined as: *value added in country R related to demand in country i .*

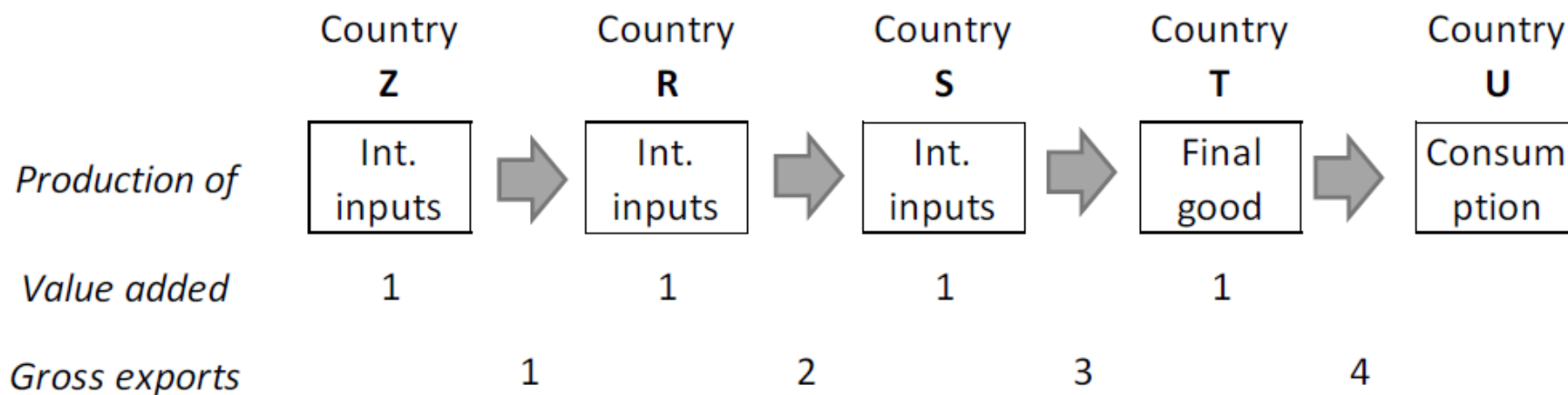


Context: world in which international production sharing is pervasive (Global Value Chains).

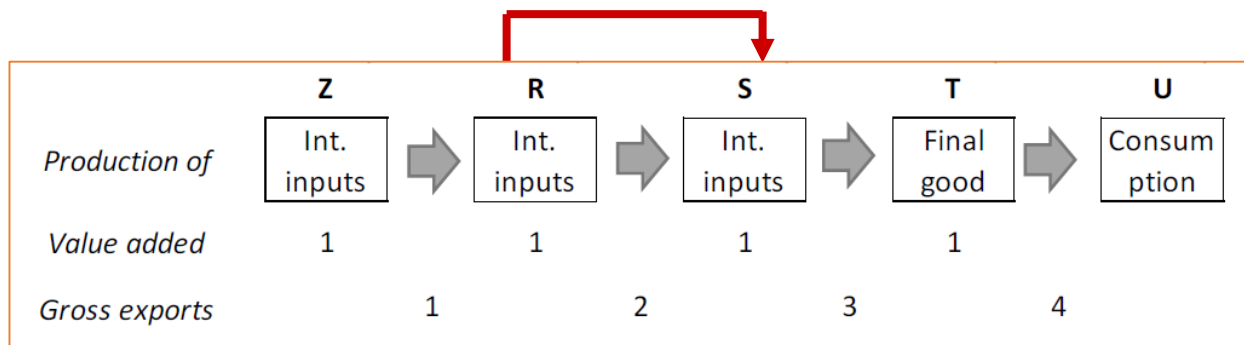
Measurement strategy Short run effect of closing down particular bilateral trade flows (through so-called hypothetical extraction in a Leontief demand driven model)



Figure 1 Example of sequential production chain

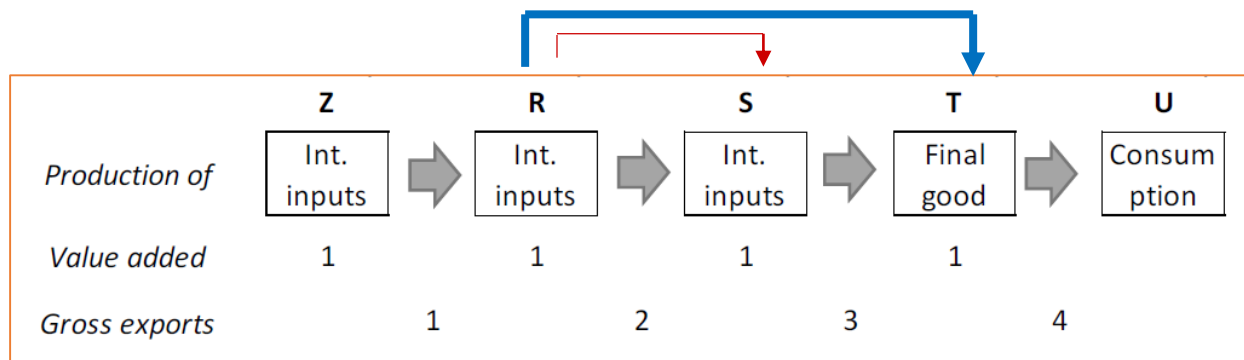


Note: This GVC is a “pure snake” (Baldwin and Venables, 2013, *JIE*), but validity of indicators does not depend on shape of GVCs



VAX-D: Value added exports for direct use.

How much GDP of *R* is related to exports to *S*?

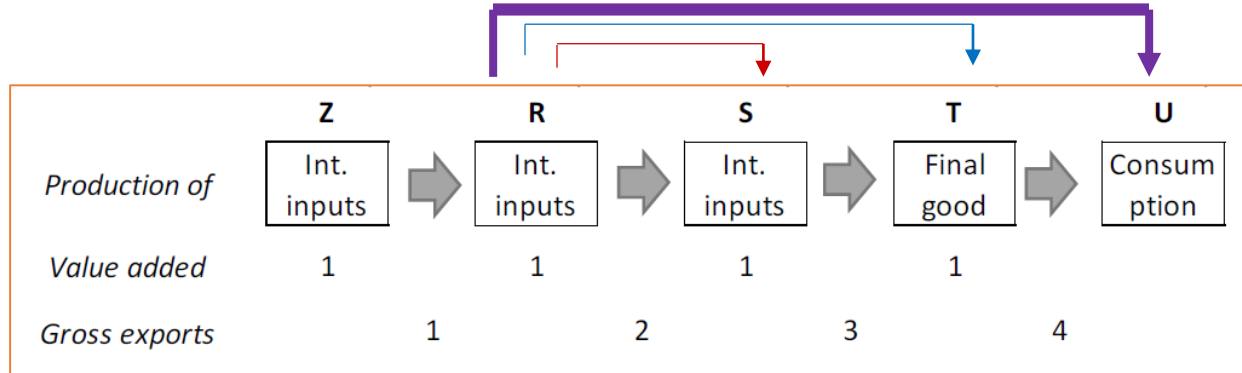


VAX-D: Value added exports for direct use

VAX-P: Value added exports for final stage production

How much GDP of R is related to *final output* produced in T? (e.g. Blanchard et al., 2017, *NBER-WP*)

Note: These are non-direct exports



VAX-D: Value added exports for direct use

VAX-P: Value added exports for final stage production

VAX-C: Value added exports for consumption

How much GDP of *R* is related to final demand from *U*?
(e.g. collapse 2008/09 analysed in Bems et al., 2011, 2013)



Unified framework to measure exports of R to i

Hypothetical extraction method (Los et al., *AER*, 2016):

$$\mathbf{GDP}_R = \mathbf{v} (\mathbf{I} - \mathbf{A})^{-1} \mathbf{f}$$

with \mathbf{v} value added to gross output by industry, \mathbf{A} world input requirements matrix and \mathbf{f} world final demand vector

Compute **hypothetical GDP*** of R through extraction of a particular trade flows (of intermediates and/or final goods) involving country i ,

$$\mathbf{GDP}_R^* = \mathbf{v} (\mathbf{I} - \mathbf{A}^*)^{-1} \mathbf{f}^*$$

$$\mathbf{VAX}_{Ri} = \mathbf{GDP}_R - \mathbf{GDP}_R^*$$



Unified framework to measure exports of R to i

$$\text{GDP}_R^* = \mathbf{v} (\mathbf{I} - \mathbf{A}^*)^{-1} \mathbf{f}^*$$

- For **VAX-D**: set exports from R to i to zero in input coefficients matrix (\mathbf{A}) and in final demands matrix (\mathbf{f})
- For **VAX-P**: set final output sales of i to zero in \mathbf{f}
- For **VAX-C**: set final demand by i to zero in \mathbf{f}



Partner countries for exports by the UK (in mil US\$, 2014)

	GX	VAX-D	VAX-P	VAX-C
United States	85,559	64,519	47,428	77,249
Germany	54,147	40,702	25,403	36,615
France	46,573	36,845	25,954	34,209
Ireland	34,477	27,275	13,478	14,828
China	27,405	19,194	18,140	29,480
Luxembourg	23,757	20,654	8,153	2,404
Netherlands	23,602	17,874	8,065	12,956

Source: Authors' computations based on WIOD, 2016 release



Application: potential effects of Brexit

Value added in UK “At Risk” through Brexit. (2014 data)

VAX-D to Region		
EU	227,851	39%
US+Can+Aus+India	89,501	15%
Rest of the world	264,020	45%
Total	581,373	100%

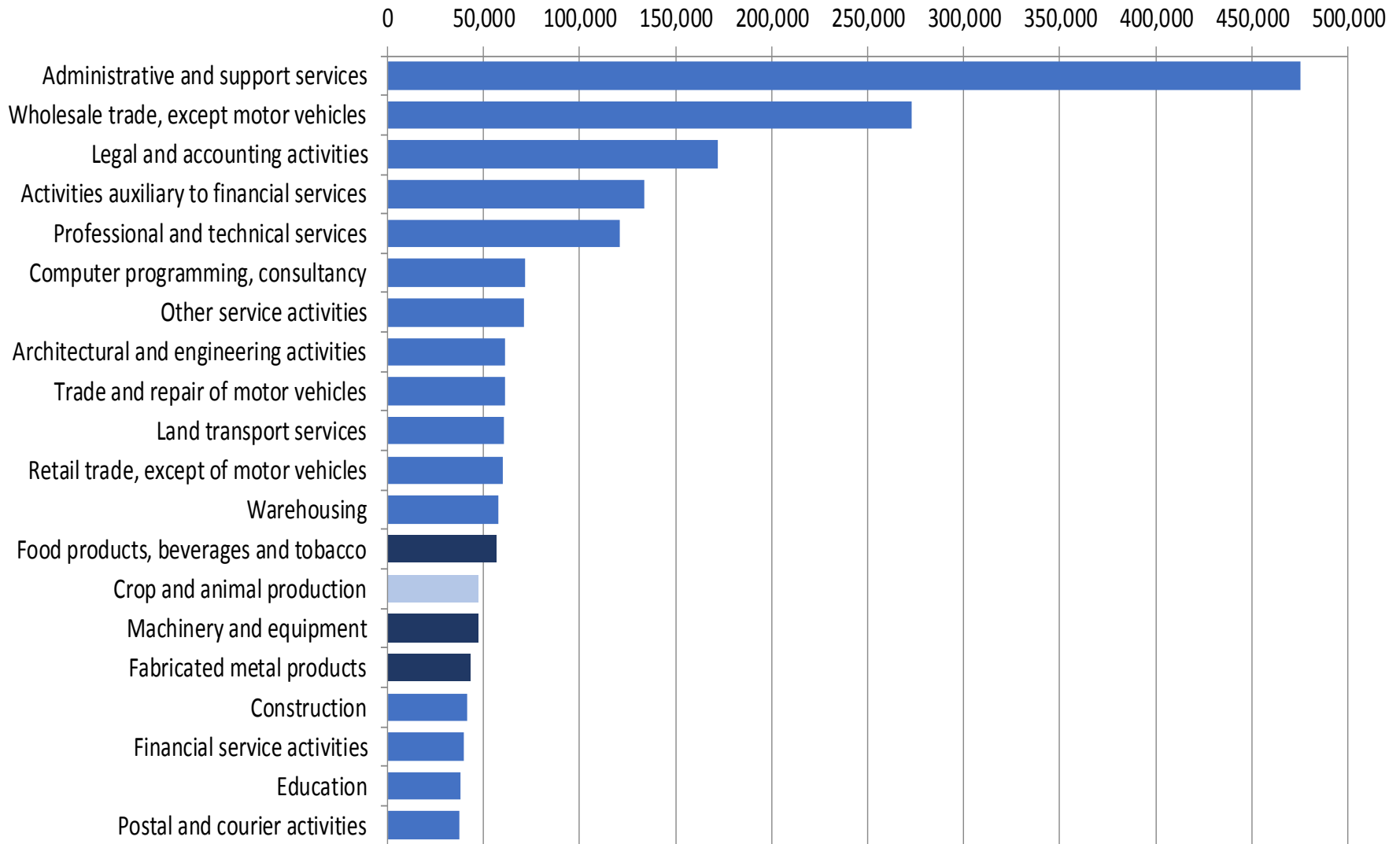
Source: summing entries from previous table



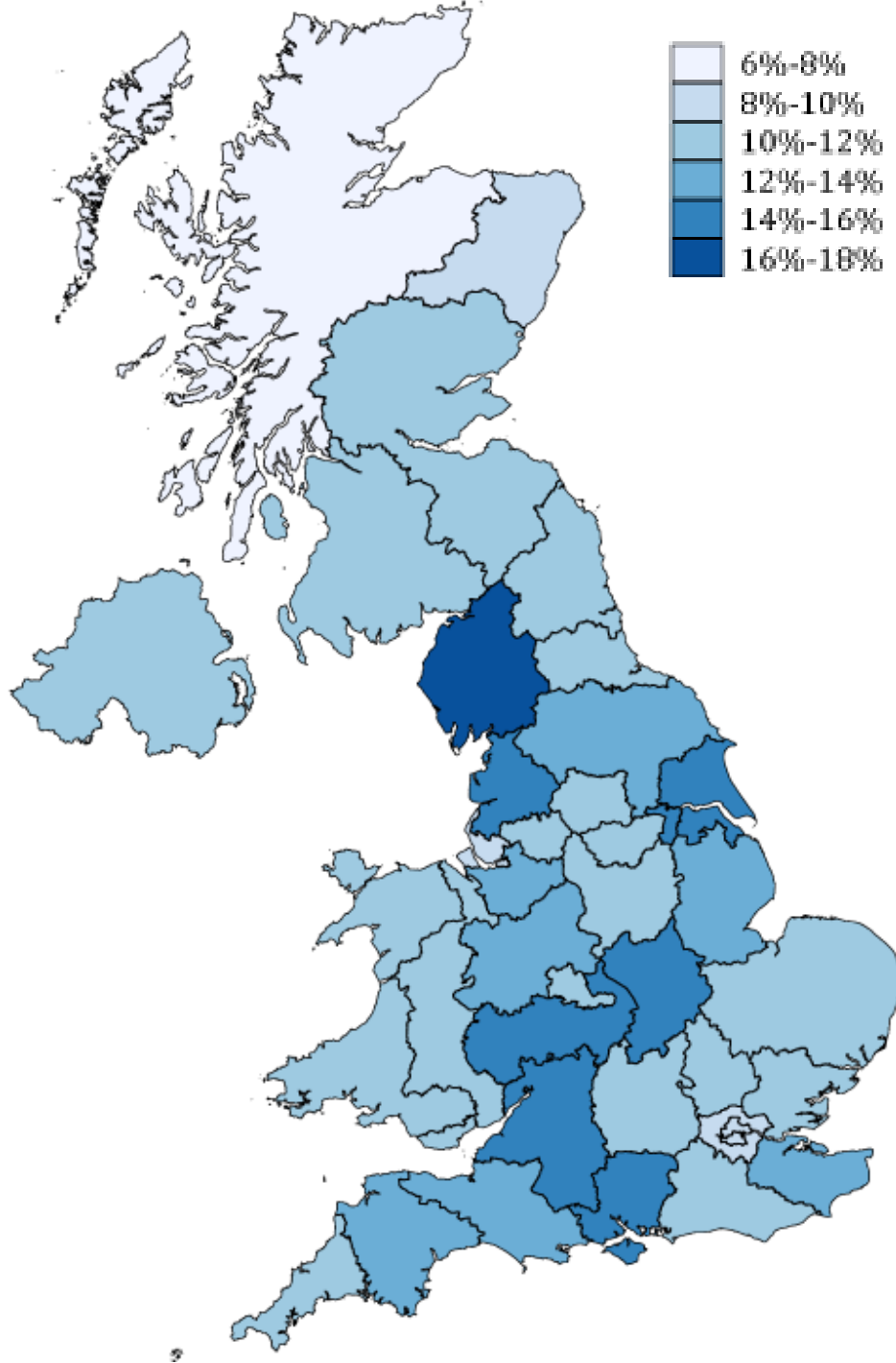
**Share of UK value added exports for consumption (VAX-C)
to non-EU countries *that flows through EU* (2014 data)**

Destination market (VAX-C)	Share
US	9.4%
China	14.5%
Switzerland	16.9%
Russia	15.3%
Canada	7.6%
Japan	13.4%
Australia	9.2%

Jobs “At Risk” in UK Sectors, 2014



Note: VAX-D to the EU, converted to jobs using value added per worker ratios for detailed UK industries. See Los et al. (2017, *City-REDI Policy Briefing*)



Regions “at risk” (2010)

Share of regional labor income exported to the EU (VAX-D). Based on regional input-output tables.

Source: Chen, W, B Los, P McCann, R Ortega-Argilés, M Thissen and F van Oort (2017), "The Continental Divide? Exposure to Brexit in Regions and Countries on Both Sides of the Channel", *Papers in Regional Science*