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The economic implications for Scotland and RUK from leaving the EU: A CGE simulation

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AMOS Computable General Equilibrium models

- A Macro-micro model Of the Scotland
- First very basic model developed in late 1980's, extension of regional linear multi-sectoral models (IO and SAM)
- Developed to a suite of CGE models including Scottish/RUK, UK, environmental extension
- Essentially modelling framework that has been applied also to other economies
- Supported by academic (UK Research Councils) and policy (Scottish Government, Scottish Parliament, Scottish Enterprise, UK Government, EU)

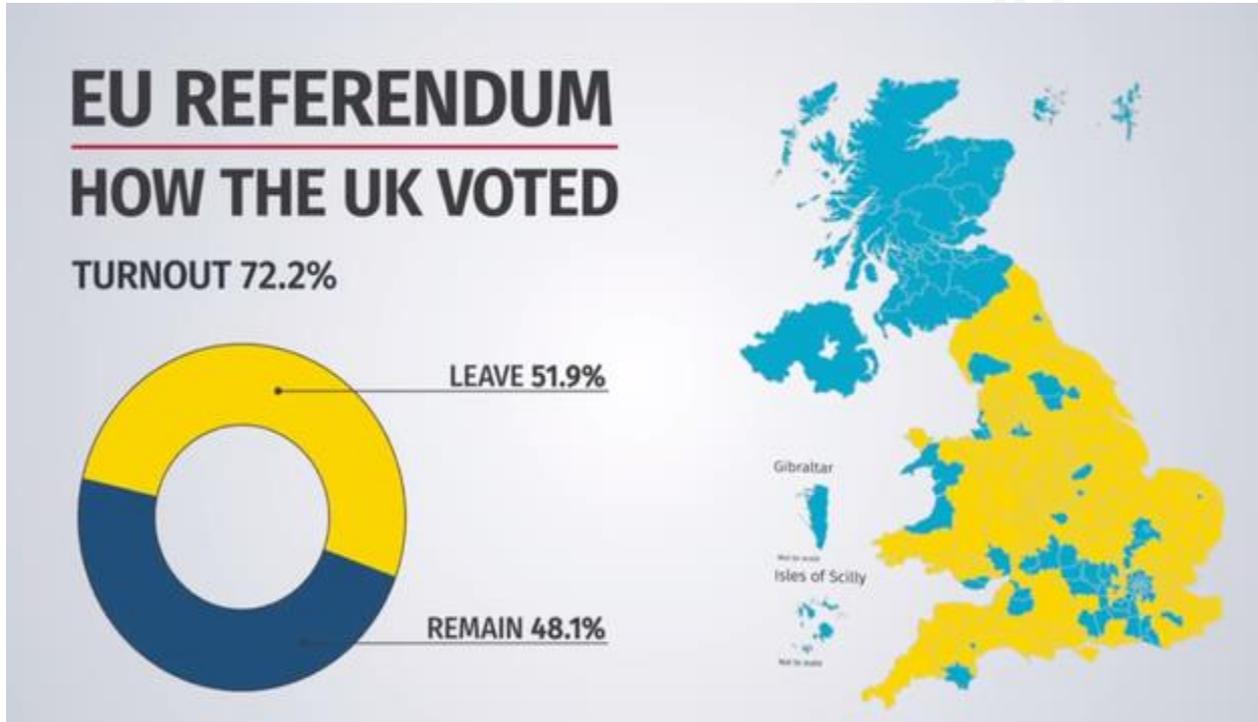
Characteristics of CGEs: Numerical tool for conceptual understanding and policy advice

- Strengths:
 - Macro/micro focus
 - Demand and supply-side shocks
 - Flexibility
 - Model characteristics
 - Parameter sensitivity
 - Theoretical rigour
- Weaknesses:
 - Data accuracy: misleading precision
 - Structure
 - Parameters
 - Require policy to be translated to exogenous model shocks
 - Often complementary to detailed micro analysis of direct effects
 - Sensitivity to “hidden” assumptions
 - Closure rules (saving and investment, labour market)

Introduction to Leave simulations

- This work commissioned by the Scottish Parliament's European and External Relations Committee
- Considers some of the regional development and policy issues using a two-region CGE model AMOSRUK, focusing primarily on Scotland.
- Extends existing UK macroeconomic evaluations of leaving the EU
 - Spatial
 - Sectoral

Spatial heterogeneity



Inter-regional modelling leaving the EU

- We focus on the likely long-term effects, using the NIESR estimates for exogenous shocks (Ebell and Warren, 2016)
- The direct exogenous impacts on both Scotland and RUK, where appropriate, are:
 - Adverse impact on Scottish and RUK exports to the EU
 - Impact of the UK smaller contributions to the EU budget - relaxing fiscal stance in both Scotland and RUK
 - Potentially higher tariffs on Scotland and RUK trade with non-EU countries;
 - Potentially adverse productivity impact in both regions through reduced openness.
- Not considered FDI or population impacts

Brexit means Brexit:3 'stylised' scenarios

- Norway
 - membership of the European Economic Area (EEA);
 - full access to the Single Market but outside customs union and therefore subject to 'economic border' including 'rules of origin';
 - obliged to make a financial contribution to the EU and accept majority of EU laws;
- Switzerland
 - membership of the European Free Trade Association (EFTA) but not the EEA;
 - access to EU market governed by series of bilateral agreements, covering some but not all areas of trade (in particular, services are excluded). Outside customs union and therefore subject to 'economic border' including 'rules of origin';
 - making a financial contribution to EU but smaller than Norway's;
 - no general duty to apply EU laws but has to implement some EU regulations to enable trade;
- WTO
 - WTO rules for international trade that apply to all members;
 - some tariffs would be in place on trade with the EU;
 - trade in services would be restricted;
 - no financial contribution to EU; and,

Impact on UK exports to the EU: (Baier *et al.* 2008, van der Marel and Shepherd, 2013, Ceglowski, 2006, and Egger *et al.* 2011)

The Norway Scenario

	Optimistic	Pessimistic
Goods	-25%	-38%
Services	-19%	-28%

The Switzerland Scenario

	Optimistic	Pessimistic
Goods	-25%	-38%
Services	-45%	-54%

The WTO Scenario

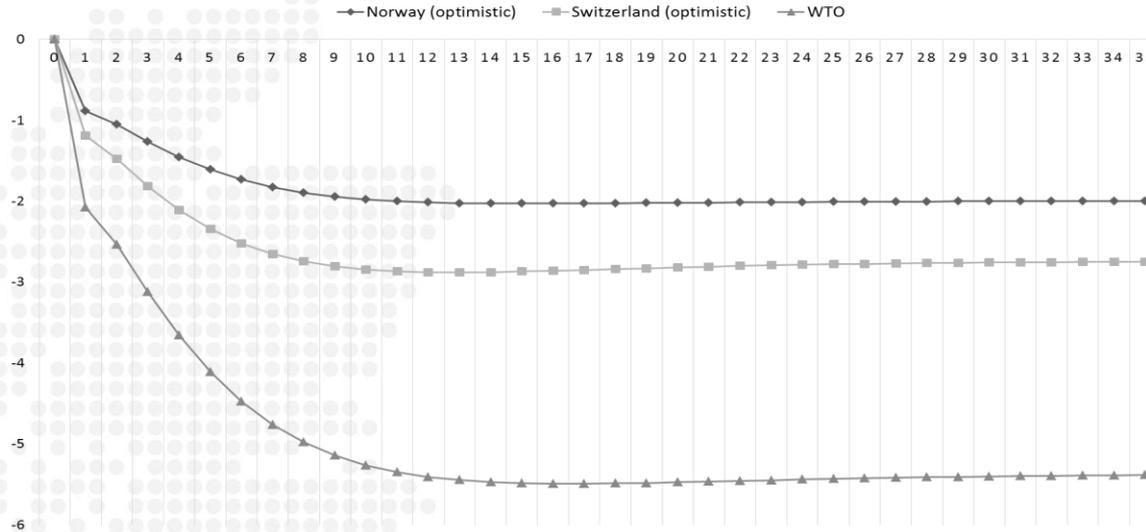
Goods	-53%
Services	-63%

Scottish impacts “Norway optimistic”: period by period results

	<i>Optimistic</i>					<i>Pessimistic</i>				
	SR	2	5	10	LR	SR	2	5	10	LR
<i>GDP</i>	-0.88	-1.05	-1.61	-1.98	-2.00	-1.32	-1.58	-2.44	-3.05	-3.10
<i>CPI</i>	-3.13	-3.25	-3.14	-2.97	-2.95	-4.75	-4.93	-4.77	-4.49	-4.44
<i>Investment</i>	-3.52	-3.46	-3.14	-2.47	-2.19	-5.25	-5.21	-4.82	-3.86	-3.40
<i>Household consumption</i>	-1.75	-2.03	-2.53	-2.87	-2.93	-2.61	-3.03	-3.78	-4.32	-4.43
<i>Regional exports</i>	-1.83	-4.24	-4.61	-4.79	-4.83	-2.74	-6.32	-6.90	-7.19	-7.27
<i>Total exports</i>	-3.15	-3.34	-3.91	-4.31	-4.36	-4.81	-5.09	-5.98	-6.61	-6.72
<i>Regional imports</i>	-0.63	-0.98	-1.54	-1.87	-1.95	-0.90	-1.42	-2.31	-2.85	-3.00
<i>Total imports</i>	-3.95	-4.24	-4.61	-4.79	-4.83	-5.88	-6.32	-6.90	-7.19	-7.27
<i>Nominal wage</i>	-4.08	-4.78	-5.31	-5.63	-5.78	-6.11	-7.11	-7.87	-8.31	-8.54
<i>Real wage</i>	-0.98	-1.58	-2.24	-2.74	-2.92	-1.43	-2.29	-3.26	-4.00	-4.29
<i>Unemployment level</i>	0.09	0.16	0.23	0.29	0.31	0.14	0.24	0.35	0.45	0.49
<i>Employment</i>	-0.58	-0.57	-0.94	-1.18	-1.15	-0.87	-0.86	-1.45	-1.86	-1.84
<i>Government revenue</i>	-0.74	-0.97	-1.52	-1.92	-1.99	-1.04	-1.37	-2.21	-2.86	-2.99
<i>Government expenditure</i>	0.23	-0.04	-0.85	-1.48	-1.58	0.49	0.11	-1.13	-2.16	-2.36
<i>Government balance</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

“Democracy is the theory that the common people know what they want, and deserve to get it good and hard” H.I.Mencken

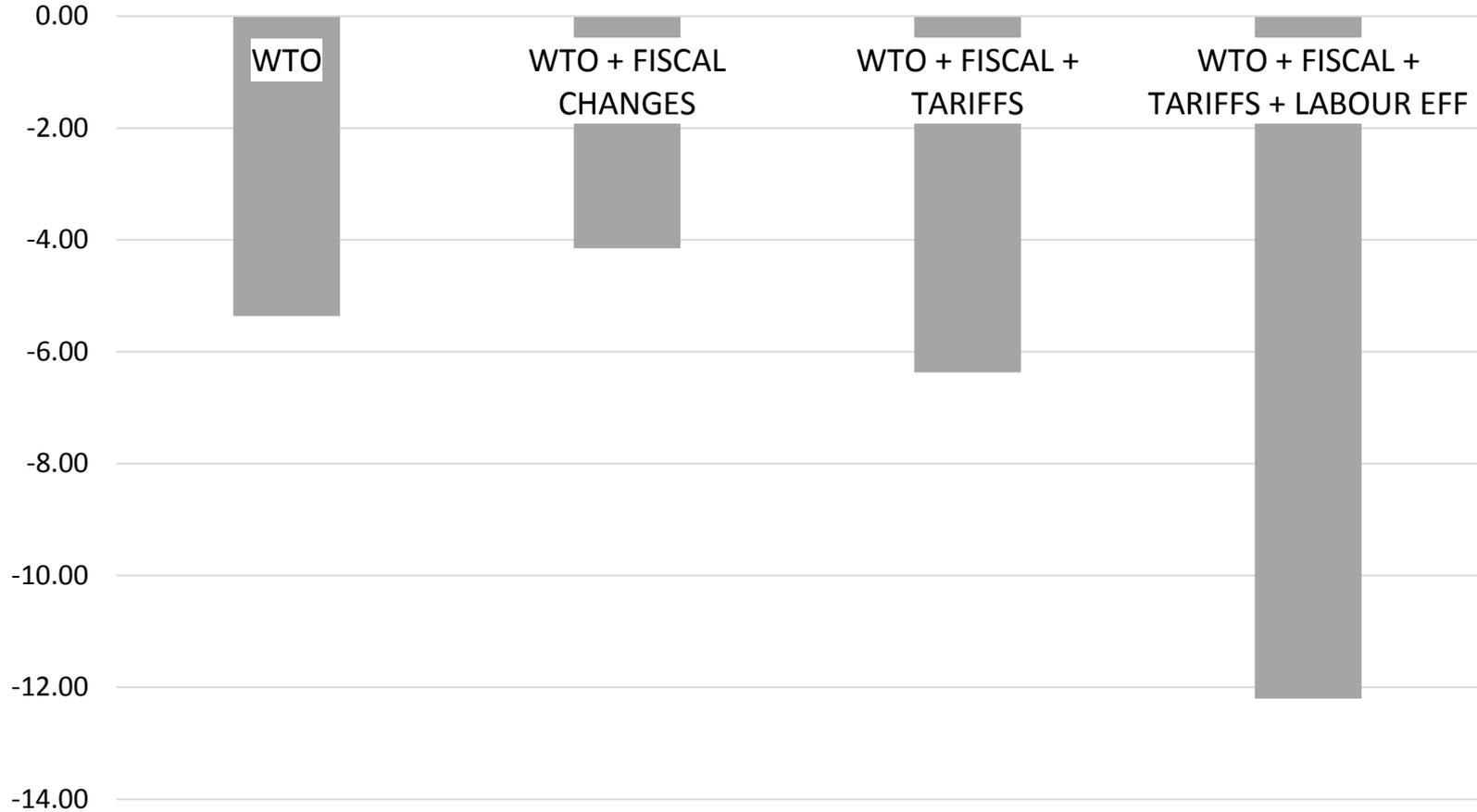
Figure 13. GDP year by year percentage change from the baseline



EU referendum: Budget and other impacts



Figure 16. Percentage change in long-run GDP under WTO scenarios

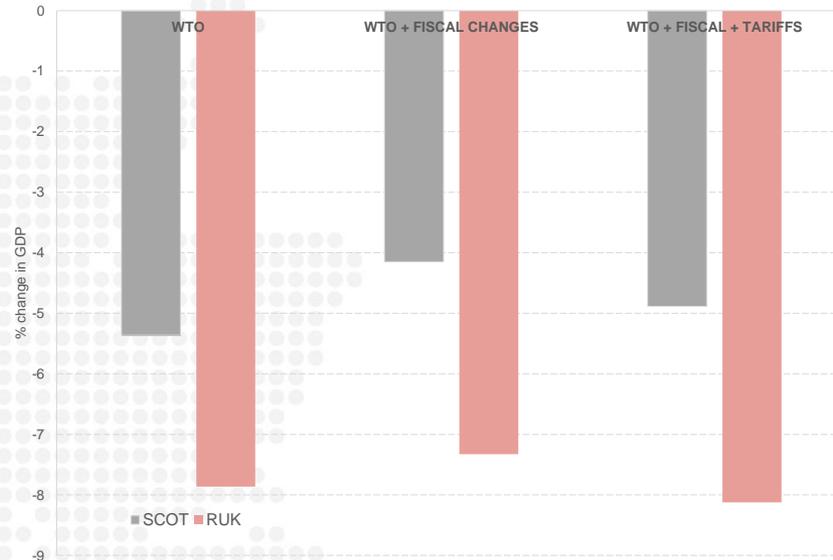


UK regional impacts

- Quantifying the impact on Scotland implies simultaneously modelling the effect on RUK because of strong regional interaction.
- We identify a bigger proportionate impact on the rest of the UK than on Scotland.
- The differential impact across regions is difficult to explain.
- One concern is the quality of the data (and specifically inter-regional trade data).

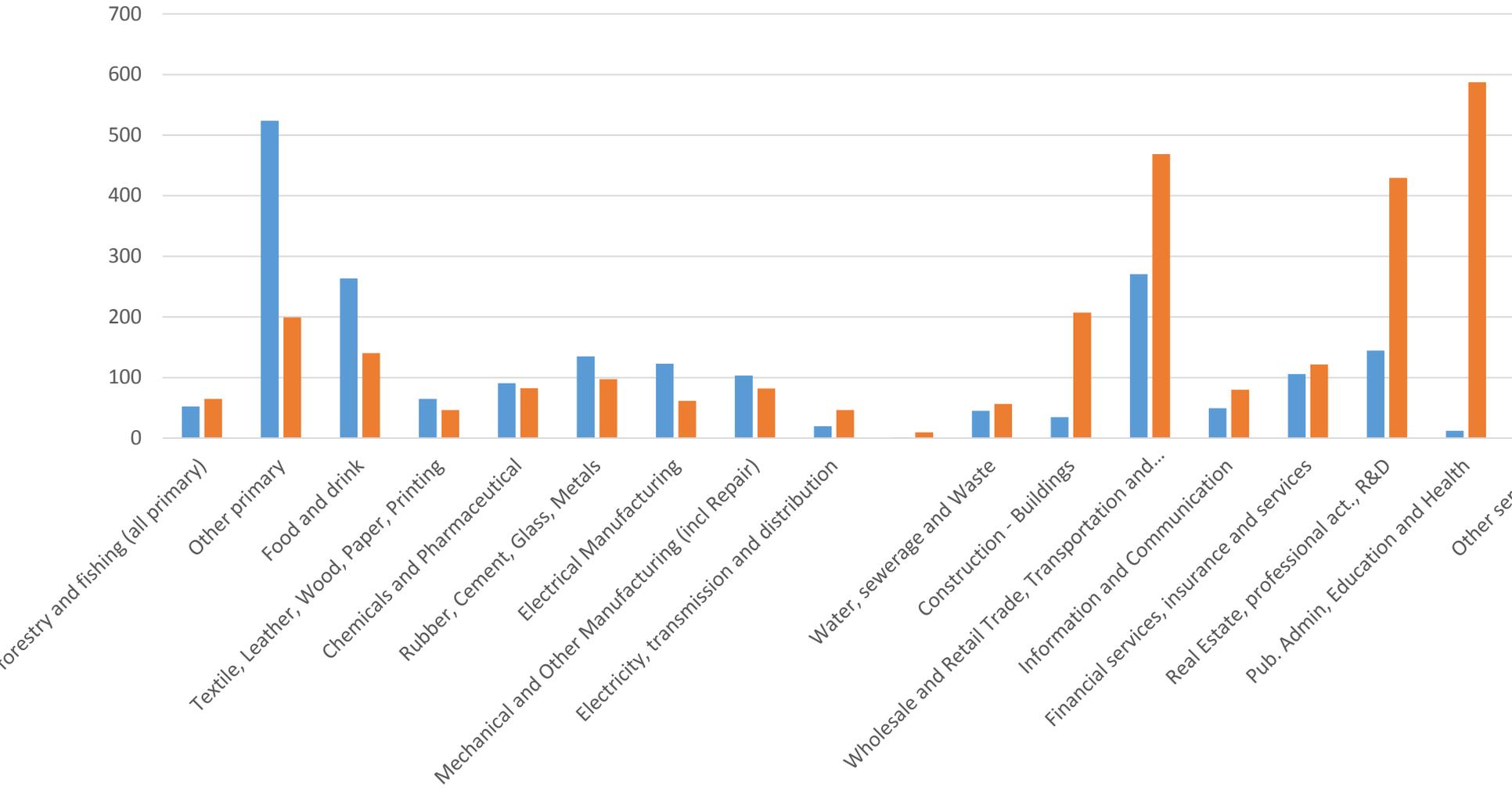
WTO Example

Figure: Percentage change in long-run GDP in Scotland and rUK in 'WTO Scenario'



Source: Fraser of Allander Institute

exports reduction in the Norway Scenario



Conclusions

- On all conventional models, leaving the EU has negative economic impacts.
- These impacts are likely to vary across space.
- The vote has been interpreted as reflecting a rational and /or expressive reaction to status quo.
- This raises challenges for the UK government:
 - Support for leaving the EU is geographically concentrated
 - UK regional data and modelling are weak.
 - Needs to be a more concerted regional policy and spatial strategy.