The Economic Consequences of Brexit

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Treasury Predictions of the Consequences of Brexit

- In April 2016 the UK Treasury produced a report on the long-term effects of UK membership and the consequences for the economy that might follow from leaving the EU (HM Treasury, 2016). It examined three alternative scenarios of the likely consequences. The report attracted considerable attention during the referendum campaign when, amid many other warnings, George Osborne quoted a prediction of one of the scenarios. The report concluded:
- *The analysis in this document shows that under all 3 models, the UK's economic openness and interconnectedness would be reduced. Trade and investment flows would be lower. The UK would be permanently poorer if it left the EU and adopted any of these models. Productivity and GDP per person would be lower in all these alternative scenarios, as the costs substantially outweigh any potential benefit of leaving the EU.* (HM Treasury, 2016: 8)

The Treasury Scenarios

- The ‘Norwegian’ Option – which involves staying inside the European Economic Area and the single market and accepting free movement of labour. This would also involve making continuing contributions to the EU budget (predicted losses of £2,600 per family by 2030)
- The ‘Canadian/Swiss’ option – this would involve a comprehensive trade agreement between the UK and EU without the free movement of labour. This would require the UK to be outside the single market (predicted losses of £4,300 per family by 2030)
- The ‘World Trade Organisation’ option – In this case the UK would be outside the customs union and single market and would not have a trade agreement with the EU. The UK would revert to WTO rules on tariffs and regulations (predicted losses of £5,200 per family by 2030)

The Predictions are very Likely to be Wrong!

- They are based on Gravity models which assume that countries with similar standards of living and close geographical and cultural ties are more likely to trade with each other. However a report published by the Centre for Business Research at the University of Cambridge last year concluded that:
- *Gravity model analysis by HM Treasury of the potential impact of various outcomes for trade outside the EU is examined and found wanting. The gravity model approach is replicated but with data only from the UK's main trade partners and not from a large number of emerging economies with which the UK does little trade. The results suggest that the approach is unstable but if anything the impact of EU membership on UK trade is much less than suggested by the Treasury* (Gudgin, Coutts and Gibson, 2017: 1).

They pay insufficient attention to the problem of uncertainty

- The famous economist, John Maynard Keynes wrote about uncertainty in the 1930s:
- *If we speak frankly, we have to admit that our basis of knowledge for estimating the yield ten years hence of a railway, a copper mine, a textile factory, the goodwill of a patent medicine, an Atlantic liner, a building in the City of London, amounts to little and sometimes to nothing* (Keynes, 1936: 149-150).
- The Treasury models essentially assume uncertainty is the same as risk. The latter refers to a future in which a known set of outcomes occurs, but with varying probabilities. The problem of uncertainty is that we do not know what the outcomes are likely to be. They are 'unknown unknowns'

There are fundamental problems with the underlying theory of the economy

- The unorthodox economist Hyman Minsky argued that the problem of instability in capitalist economies has not been solved by economic theory. His biographer summarizes Minsky's analysis:
- *'The neoclassical approach that provides the foundation for mainstream macroeconomics is applicable only to an imaginary world, an economy focused on market exchange based on a barter paradigm. Money and finance are added to the model as an afterthought – they really do not matter. Because an invisible hand supposedly guides rational individuals who have perfect foresight towards an equilibrium in which all resources are efficiently allocated, there is little role for government to play. The current crisis has shown this approach to be irrelevant for the analysis of the economy in which we live'.* (Randall Wray, 'Why Minsky Matters' 2016: 60).

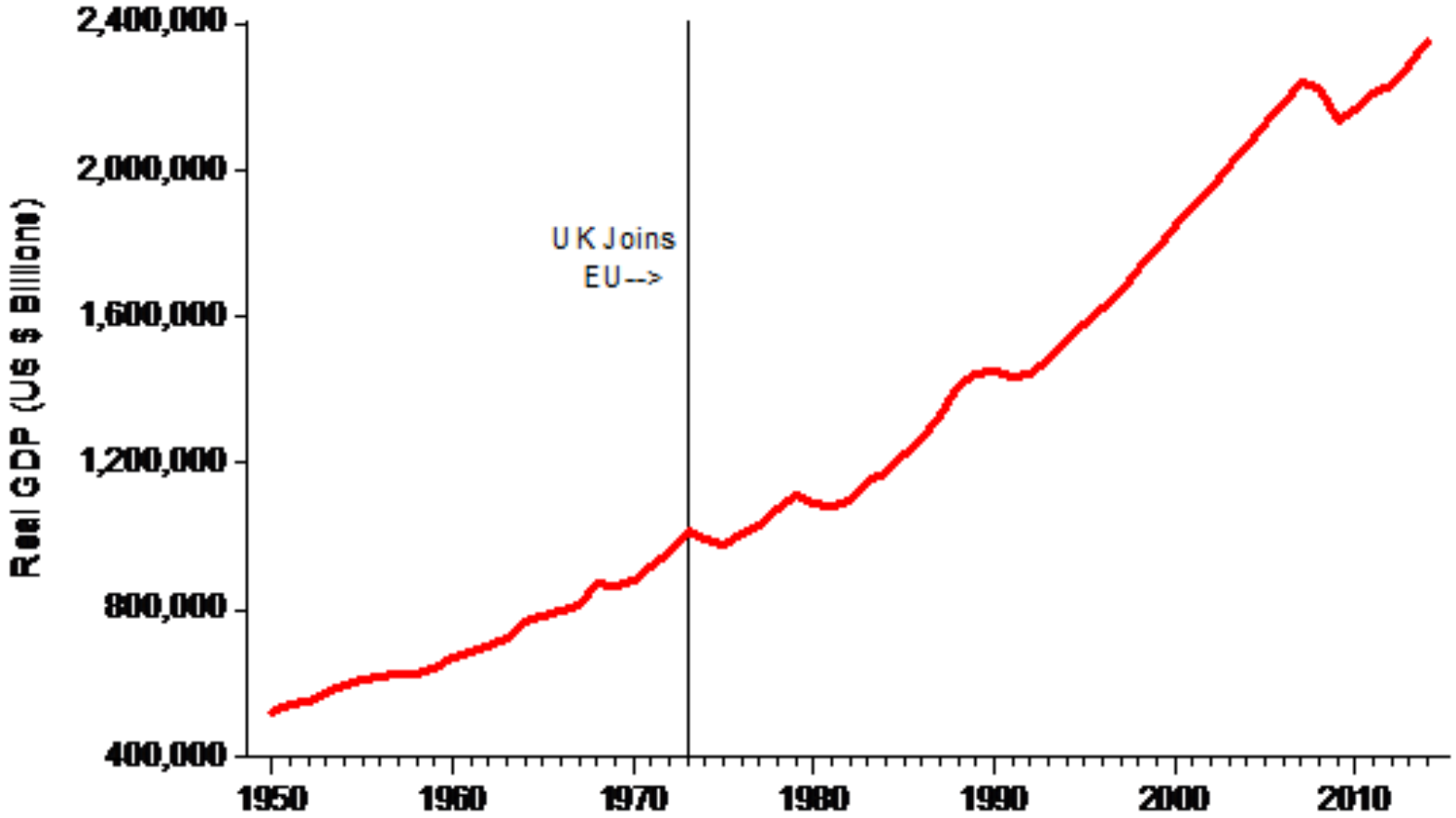
What Can be Said about Britain's Future Outside the EU?

- There are two approaches which can be taken to examine this question:
- The first looks at what happened in the past – if membership of the EU boosted growth and prosperity after Britain joined in 1973 it suggests that leaving might be quite damaging
- The second approach is to examine the performance of the UK economy during the eighteen months which have passed since the referendum vote in June 2016
- This approach gives us insights into the short term effects of the UK leaving the EU, and these may of course be different from the long-term effects.
- However, at the present time the long term effects are essentially unknowable.

Did Joining the EU boost the British Economy?

Economic Growth in Britain Before and After Joining the EU (GDP in Real Terms)

(Penn World Annual Data)



Modelling Economic Growth 1950-2014

- There is a very large literature on economic growth which goes back to Adam Smith's 'The Wealth of Nations' first published in 1776
- Levene and Renelt, 1992 conducted a meta-analysis of the empirical literature on growth and concluded that:
- *A vast literature uses cross-country regressions to search for empirical linkages between long-run growth rates and a variety of economic policy, political, and institutional indicators. This paper examines whether the conclusions from existing studies are robust or fragile to small changes in the conditioning information set. We find that almost all results are fragile. We do, however, identify a positive, robust correlation between growth and the share of investment in GDP and between the investment share and the ratio of international trade to GDP*. (AER, 1992: 942)
- Sala-i-Martin, Doppelhofer, and Miller, 2004) in a second meta-analysis were slightly more optimistic about robust effects but not much

The Growth Model

- We use Penn World Tables Annual Data for Britain to model the relationship between several variables and economic growth in real terms (see: https://fred.stlouisfed.org/categories/33402). Growth is measured in $dollars adjusted for inflation. The predictors are:
- Capital Investment
- Human Capital Investment (education and training)
- Employment rate
- Exchange rate (£/$)
- Economic Openness (imports plus exports)
- Dummy variable scoring 1 from 1973 when Britain joined the EU, and 0 earlier
- 'Shocks' including the 1970s oil crisis, the Monetarist experiment of 1981-82, the Sterling crisis of 1993 and the Great Recession of 2008-2012

Economic Growth in Britain 1950-2014

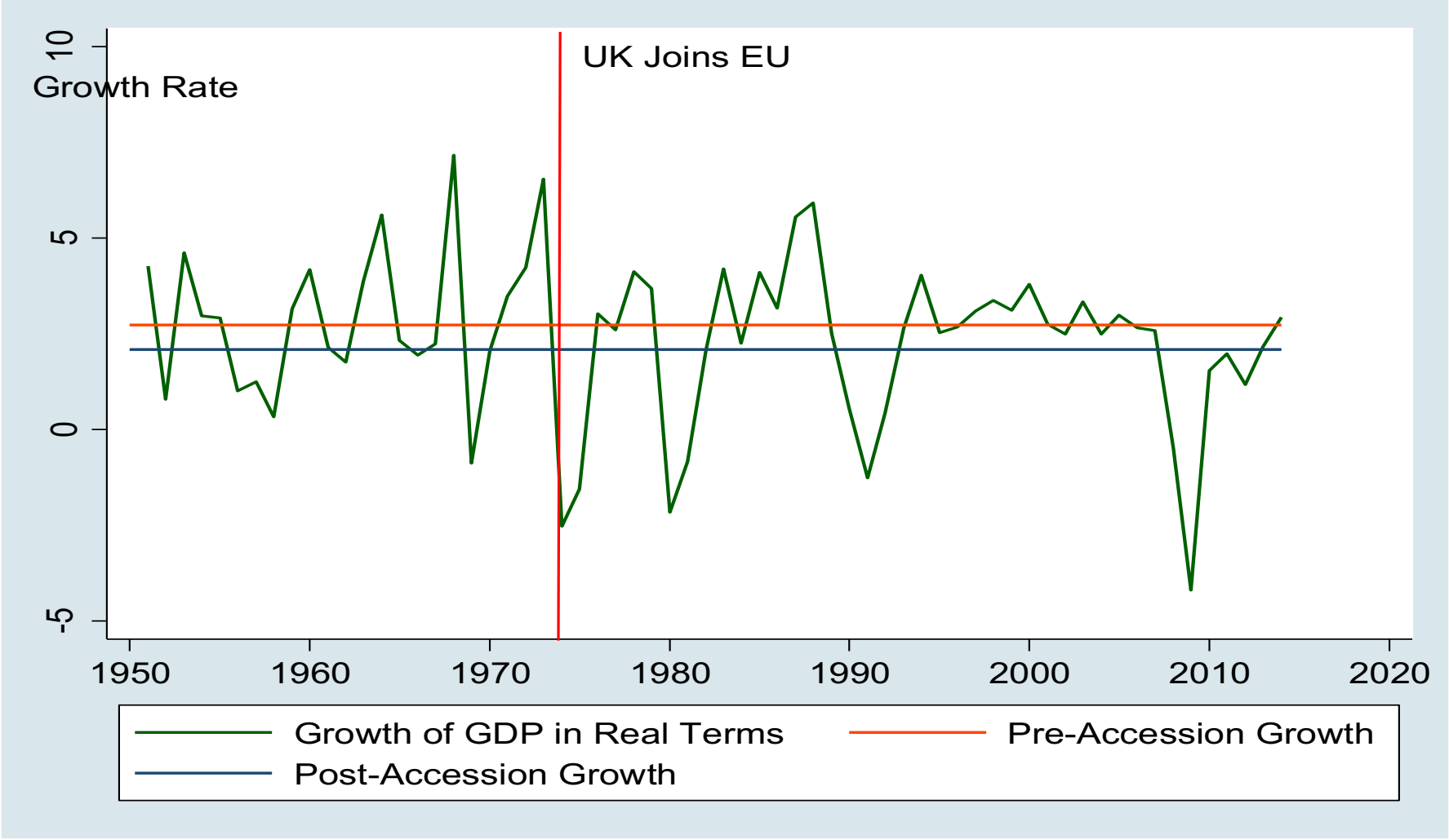
(Long-Term and Short-Term Effects)

Predictors	**Model A** **Δ Real GDP**	**Model B** **Δ Real GDP**	**Model C** **Δ Real GDP**
Real GDP (t-1)	-0.34***	-0.38***	-0.34***
Δ Employment Rate	35479.3***	32574.4***	38797.8***
Employment Rate (t-1)	-1812.78	-1158.7	----
Δ Human Capital Index	-210447***	-2370326***	-1979935***
Human Capital Index (t-1)	598880.8***	564409.5***	509102***
Δ Capital Stock	0.28***	0.23**	0.22***
Capital Stock (t-1)	-0.01	0.00	----
Δ Exchange Rate	-144786.3**	-127305.7**	-118717.8**
Exchange Rate (t-1)	-126598.8**	-177928.5***	-139607.4***
Δ Imports plus Exports (Openness)	-42209.3	-184751.8	----
Imports plus Exports (t-1)	171463.8	-17615.4	----
UK Joined the European Union	-21048.9	-7334.5	-11104.5
Oil Crisis 1974-1975		-29847.9**	-28905.2**
Monetarist Experiment 1981-1982		-21884.8	----
Sterling Crisis 1993		11089.8	----
Great Recession 2008-2012		-1069343***	-997642.9***
Adjusted R^2	0.64	0.71	0.72
Durbin Autocorrelation χ^2 test	0.11	0.18	0.15
Likelihood Ratio ARCH test	0.02	0.00	0.16
AIC	1443.8	1433.4	1426.4
BIC	1471.9	1470.1	1450.2

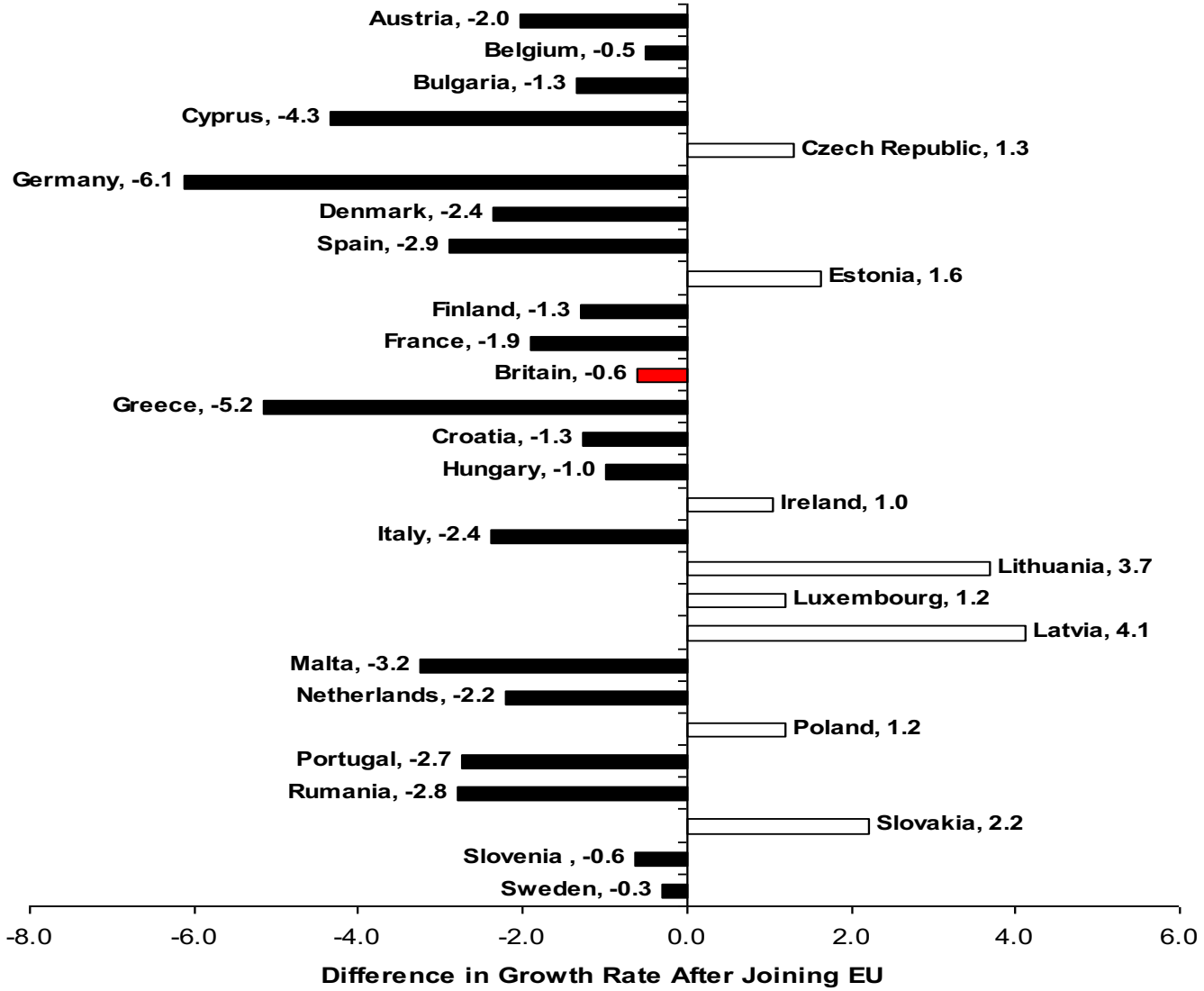
Findings from the Growth Model

- The results suggest that increased employment, capital investment, human capital investment, and the pound/dollar exchange rate all influence growth. Economic openness as measured by imports and exports did not appear to influence growth.
- Capital investment and changes in employment have short term effects on growth, whereas human capital investment and the exchange rate have both short-term and long-term effects.
- The impact of Britain joining the European Union in 1973 was negative but not statistically significant which means that EU membership had no significant impact on trends in UK economic growth.
- As regards the economic shocks, the 1970s oil crisis slowed growth as did the Great Recession

Economic Growth in Britain Before and After Joining the European Union



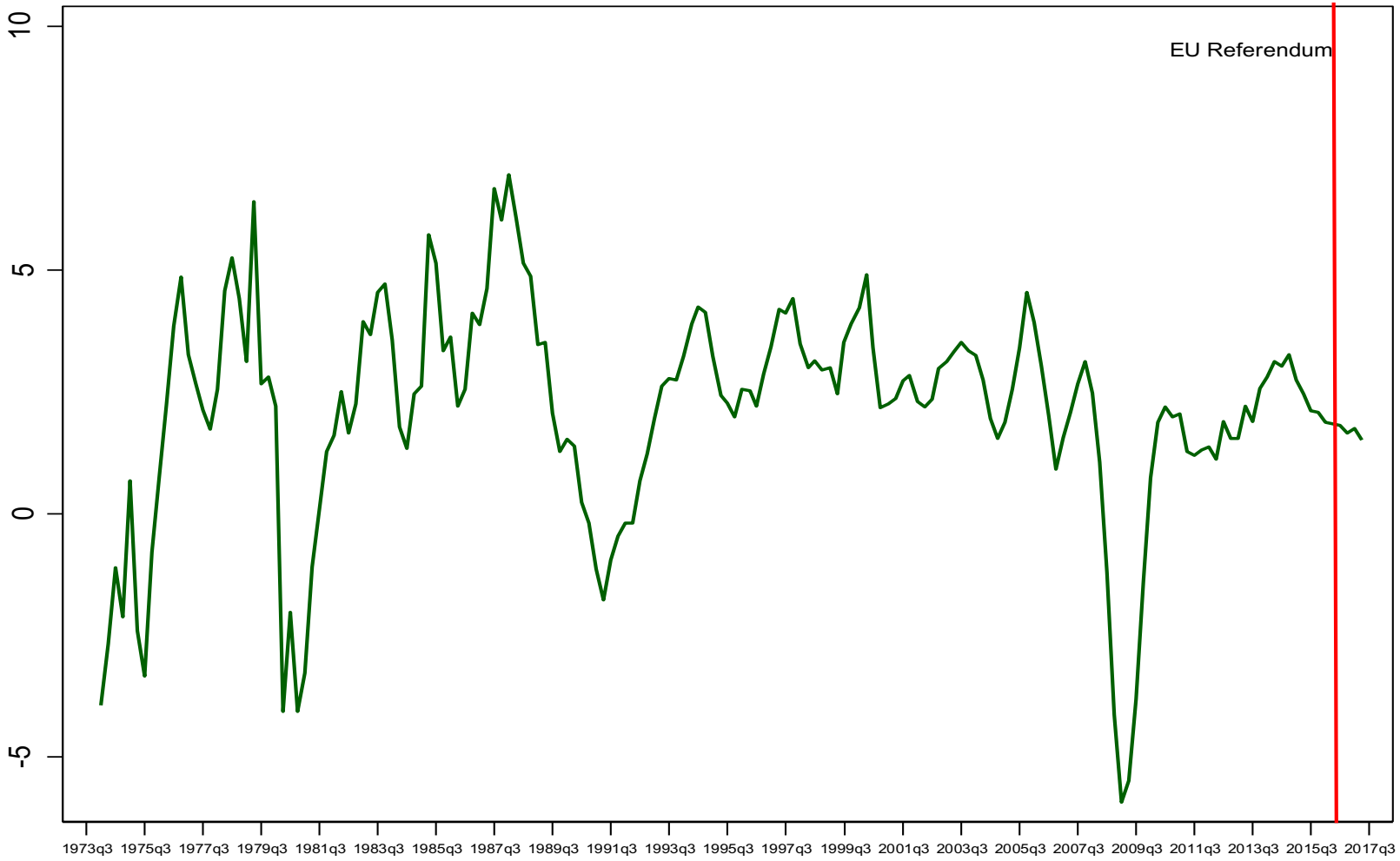
Has Membership Raised Growth in the EU?



Has the Referendum Changed Things?

GDP Growth in Britain 1974Q1 to 2017Q3

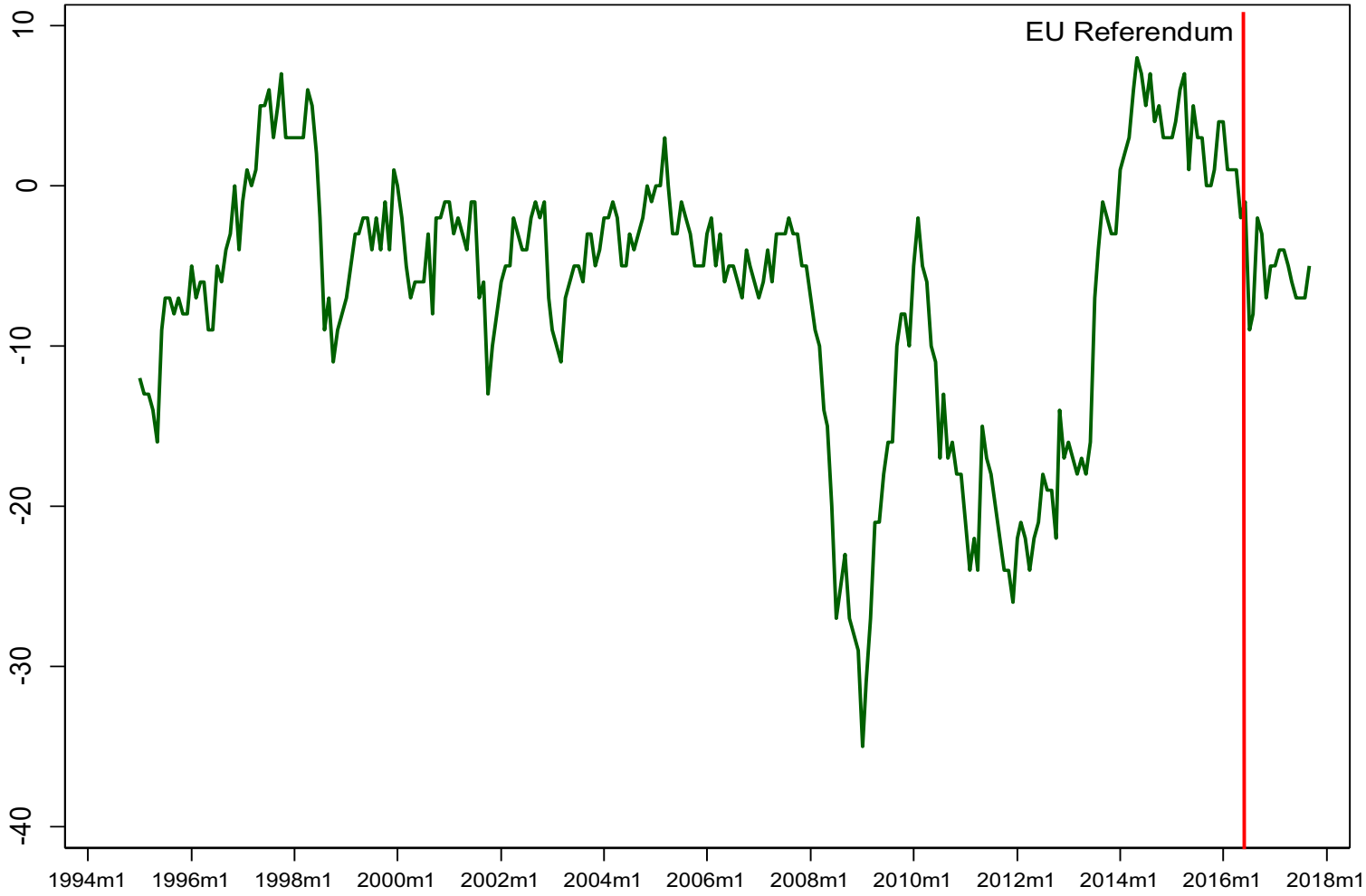
(quarterly observations)



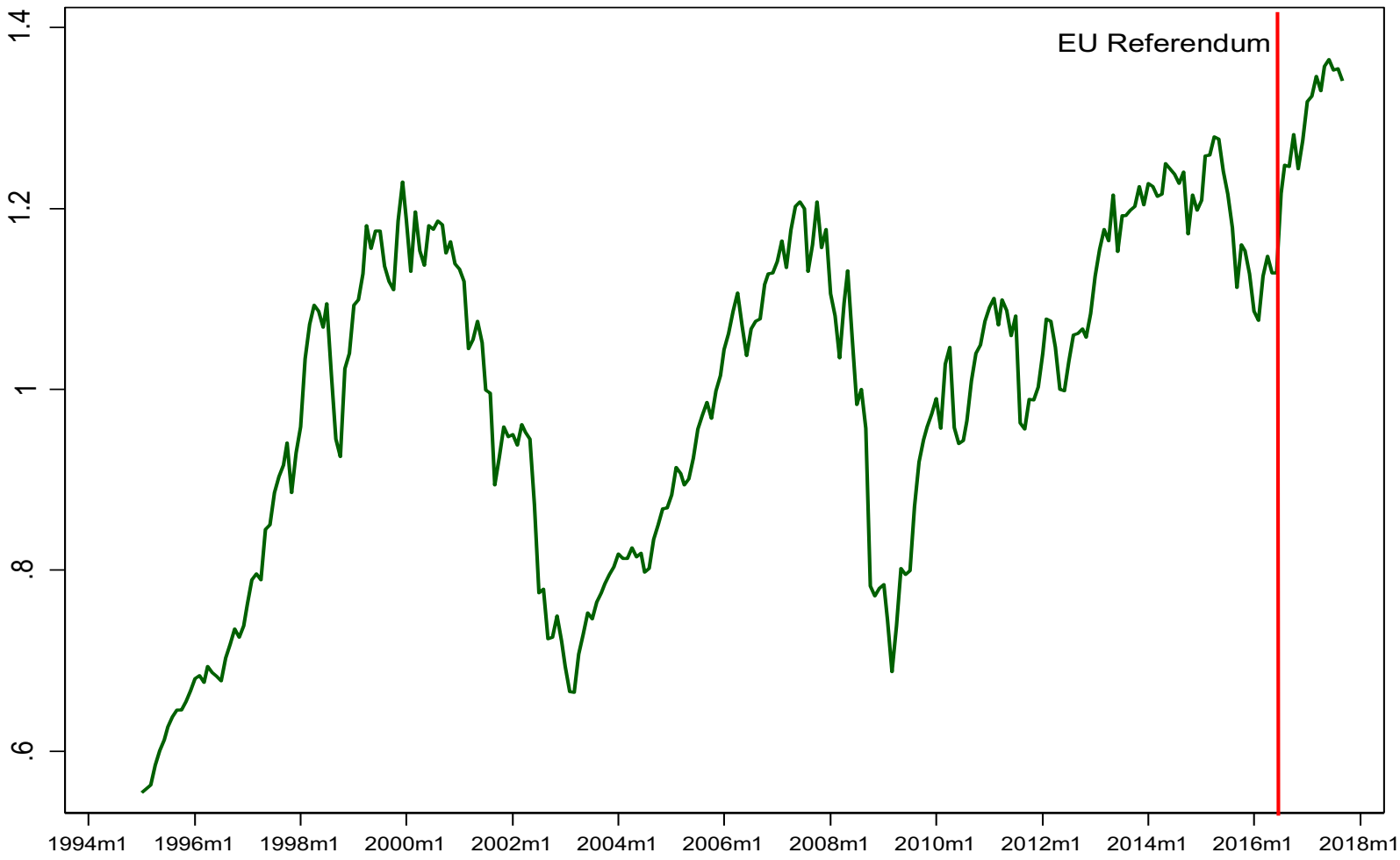
Dollar/Pound Exchange Rate 1995-2017

(monthly observations)

Consumer Confidence 1995 to 2017



Share Prices 1995 to 2017



The Consequences of Brexit up to 2017

- It appears that key indicators such as economic growth, consumer confidence and unemployment have been largely unaffected by the referendum vote since they continue to change at the same rate as before
- One key exception to this is the stock market since the All item index of stock prices has received a significant boost since the Brexit referendum
- But what does this mean for the rest of the economy? Are booming stock prices likely to bring extra growth or employment or do they merely reflect the psychology of investors?
- The standard 'efficient markets' model argues that stock prices represent the value of future returns from the companies discounted to their present value. If so, a buoyant stock market implies future growth and prosperity
- However work by behavioural economists and Robert Shiller at Yale shows that stock prices are too volatile to predict future returns – making this theoretical argument problematic

Does a buoyant stock market predict future prosperity in the economy?

- We can investigate this by examining the relationship between stock prices and other variables such as unemployment, inflation and interest rates using Vector Autoregressive Modelling (VAR)
- This involves predicting the value of the market at time t, using lagged values of stock prices (i.e. values at time t-1, t-2 and so on) plus the lagged values of the other variables in the system. For example:

- $S_t = a_1 + b_1 S_{t-1} + g_1 U_{t-1} + g_2 I_{t-1} + g_3 R_{t-1} + e_t$

- Where Stock Prices (S_t) are predicted by previous values of unemployment (U_{t-1}), inflation (I_{t-1}) and interest rates (R_{t-1}), while at the same time we control for previous values of stock prices (S_{t-1}). If the g coefficients are significant then these variables drive stock prices independently of the previous values of stocks

The VAR Model

- The VAR model can be defined as follows:
- $$\Delta Y_t = \mu + \sum_{i=1}^{p-1} \Gamma \Delta Y_{t-k} + \beta` S_t + \varepsilon_t$$
- Y_t = vector of stationary variables
- (Δ = differencing operator applied to any non-stationary variables)
- S_t = vector of exogenous shocks
- Γ= matrix of parameter estimates p for lagged effects of variables, 1 to k lags
- $\beta`$ = a row vector of parameter estimates for the exogenous shocks
- μ = constant
- ε_t = stochastic error term ~N(0,σ2)

Granger Causality Tests

- VAR modelling allows us to conduct Granger Causality tests
- To do these we estimate VAR equations for every variable in the system. As we showed earlier if the g coefficients in the stock price equation are statistically significant then we can say that inflation, unemployment etc 'Granger causes' stock prices.
- It is possible that in the equation which predicts inflation the g coefficient for lagged stock prices is statistically significant too. If so then stock prices also 'Granger cause' inflation
- These tests take advantage of the fact that changes in variable S_t cannot cause changes in variable I_{t-1} since current values of a variable cannot change past values of another – but the past can (and does) change the future

Granger Causality Tests of Relationship between Economic Variables (1974-2017)

Dependent Variable	***Predictor Excluded***	***Chi-Square Test of Exclusion***	***Probability > Chi-Square***
Consumer Confidence	Dollar / Pound Exchange Rate	3.30	0.51
Consumer Confidence	Inflation	3.35	0.50
Consumer Confidence	**Share Prices**	**10.17**	**0.04****
Consumer Confidence	Unemployment	6.81	0.15
Consumer Confidence	**Short term interest rates**	**10.65**	**0.03****
Consumer Confidence	**All**	**35.49**	**0.02****
Dollar / Pound Exchange Rate	**Consumer Confidence**	**8.26**	**0.08***
Dollar / Pound Exchange Rate	Inflation	2.26	0.69
Dollar / Pound Exchange Rate	**Share Prices**	**10.37**	**0.04****
Dollar / Pound Exchange Rate	Unemployment	1.43	0.84
Dollar / Pound Exchange Rate	**Short term interest rates**	**19.91**	**0.001*****
Dollar / Pound Exchange Rate	All	19.613	0.24
Inflation	**Consumer Confidence**	**18.37**	**0.001*****
Inflation	**Dollar / Pound Exchange Rate**	**10.12**	**0.04****
Inflation	**Share Prices**	**14.47**	**0.006*****
Inflation	Unemployment	2.23	0.69
Inflation	Short term interest rates	7.51	0.11
Inflation	**All**	**56.67**	**0.000*****
p<0.10=*; p<0.05=; p<0.01=*****			

Granger Causality Tests of Relationship between Economic Variables (continued)

Dependent Variable	*Predictor Excluded*	*Chi-Square Test of Exclusion*	*Probability > Chi-Square*
Share Prices	Consumer Confidence	4.93	0.29
Share Prices	Dollar / Pound Exchange Rate	3.29	0.51
Share Prices	Inflation	6.82	0.15
Share Prices	Unemployment	6.35	0.18
Share Prices	Short term interest rates		
Share Prices	All	20.38	0.43
Short term interest rates	**Consumer Confidence**	**12.16**	**0.01*** **
Short term interest rates	Dollar / Pound Exchange Rate	6.67	0.15
Short term interest rates	Inflation	2.02	0.73
Short term interest rates	Share Prices	4.77	0.31
Short term interest rates	Unemployment	2.34	0.67
Short term interest rates	**All**	**31.41**	**0.05** **
Unemployment	**Consumer Confidence**	**8.61**	**0.07***
Unemployment	**Dollar / Pound Exchange Rate**	**14.94**	**0.005*** **
Unemployment	**Inflation**	**7.74**	**0.10***
Unemployment	**Share Prices**	**11.16**	**0.03** **
Unemployment	**Short term interest rates**		
Unemployment	**All**	**52.60**	**0.00*** **
p<0.10=*; p<0.05=; p<0.01=*** **			

What Does this Mean?

- Share prices influence ‘Granger Cause’ unemployment, inflation, the exchange rate and consumer confidence
- Rising share prices make people more confident as consumers, they raise the value of the dollar relative to the pound and they reduce unemployment
- But they also tend to stimulate inflation.
- All these effects operate with varying lags and they operate with controls in place for shocks like the great recession and the Brexit referendum
- On the other hand share prices are quite volatile as the earlier figure shows, so the market could turn down in the immediate future and if this happens the effects will reverse themselves
- That said, up to the start of 2018 the effects of Brexit have been relatively benign because the benefits of rising stock prices outweigh the costs

BREXIT

WHY BRITAIN VOTED TO LEAVE THE EUROPEAN UNION

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