Deep Integration and Economic Growth

A Counterfactual Analysis for Europe

Nauro Campos
Brunel Univ London

Fabrizio Coricelli
Paris 1-Sorbonne

Luigi Moretti
Univ of Bologna

Motivation

- "Never waste a good crisis"

- Brexit raises a number of fundamental questions

- About value of EU membership, dynamics of net benefits, whither integration ("ever closer union")

- These questions will remain with us and the world (eg US and LDCs) is watching

Where are we at (10 days to go)?

1. Leave/remain referendum: Thurs June 23rd

2. Polls remain tight: 45% "in", 45% "out", 10% "?"

3.   Citigroup (Research Dept.)   30%-40%
      Betting markets now offering 1/2   33%

4. Important and unpredictable event
            Vote & after
            Role of media & govt party split

Objectives (also Outline…)

1. What has the EU ever done for the UK?

2. Is the UK the/a "leading beneficiary"?

3. Conclude with some thoughts on possible mechanisms: FDI, BCS, SC

   (IOW I will not talk about trade, migration and sovereignty)

UK economic performance

Figure 1: GDP per capita 1870-2007 (UK=100)
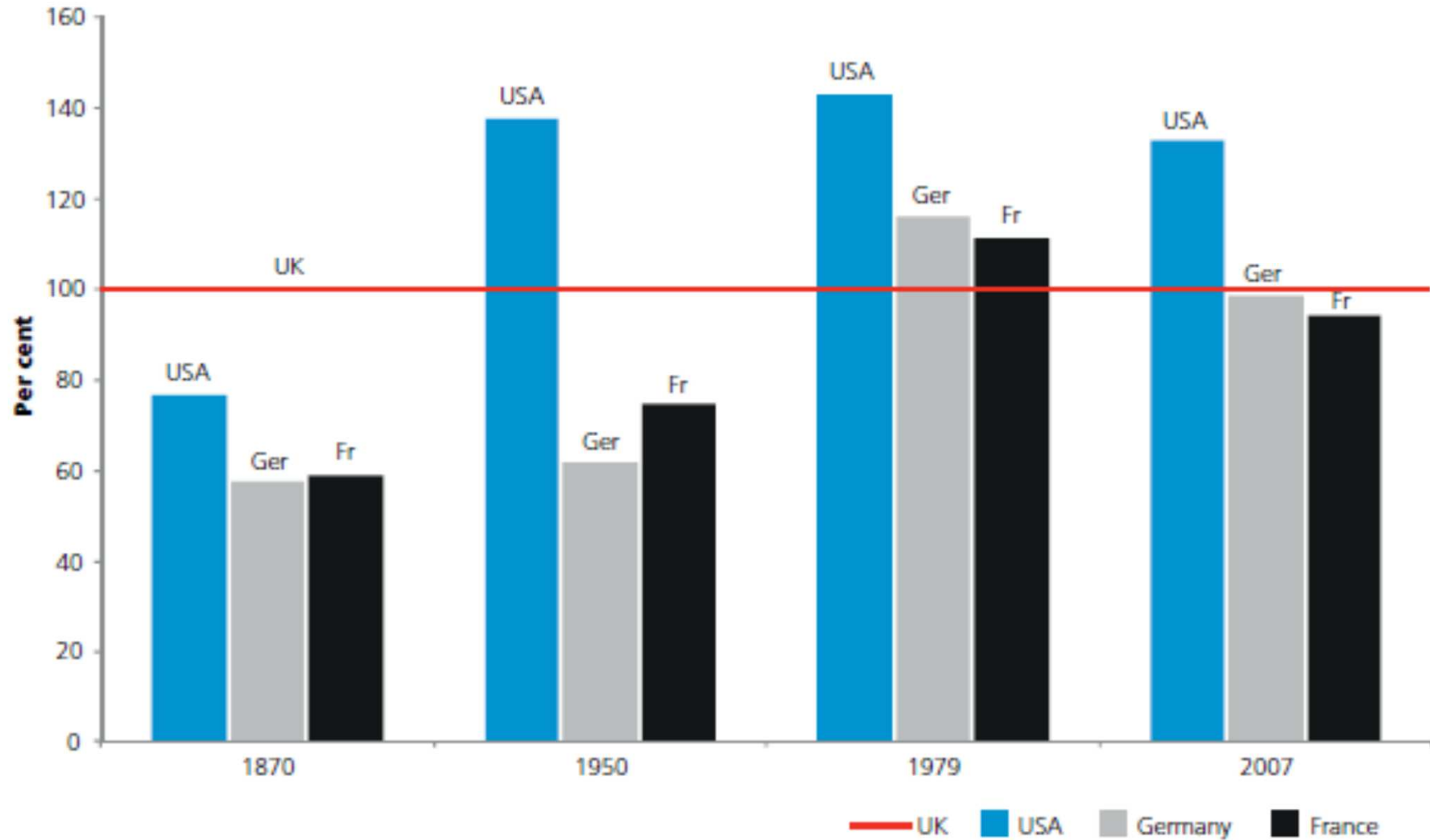
Notes: In each year the base is UK=100 and each country's GDP per capita is relative to this. So a value of US=120, for example, implies the US has a 20% higher GDP per capita than the UK.

Source: Crafts (2012)

UK economic performance

1. "British relative economic decline"

2. New puzzle on the block:

   Why and how does UK rebound?

Mrs Thatcher to the rescue?

- After all, après 1979 (actually 1983)...

- Privatisation
- Labour markets (dereg/flex/unions?)
- Skills (university expansion)
- Greater openness to FDI & migration
- Big bang (financial dereg, 1983-1986)

# Consensus is 1983, but…

how "evidence-based" is this view?

(a) dynamics of UK/EU6 ratios
(b) carry out structural break tests

Figure 1. Percentage Difference between the UK's GPD per capita and EU Founding Members' (EU-6) and EU-5 (excludes Luxembourg) between 1950 and 2011 (Data source: Penn World Tables 8.0)

1973: UK membership

UK and EU6   UK and EU5
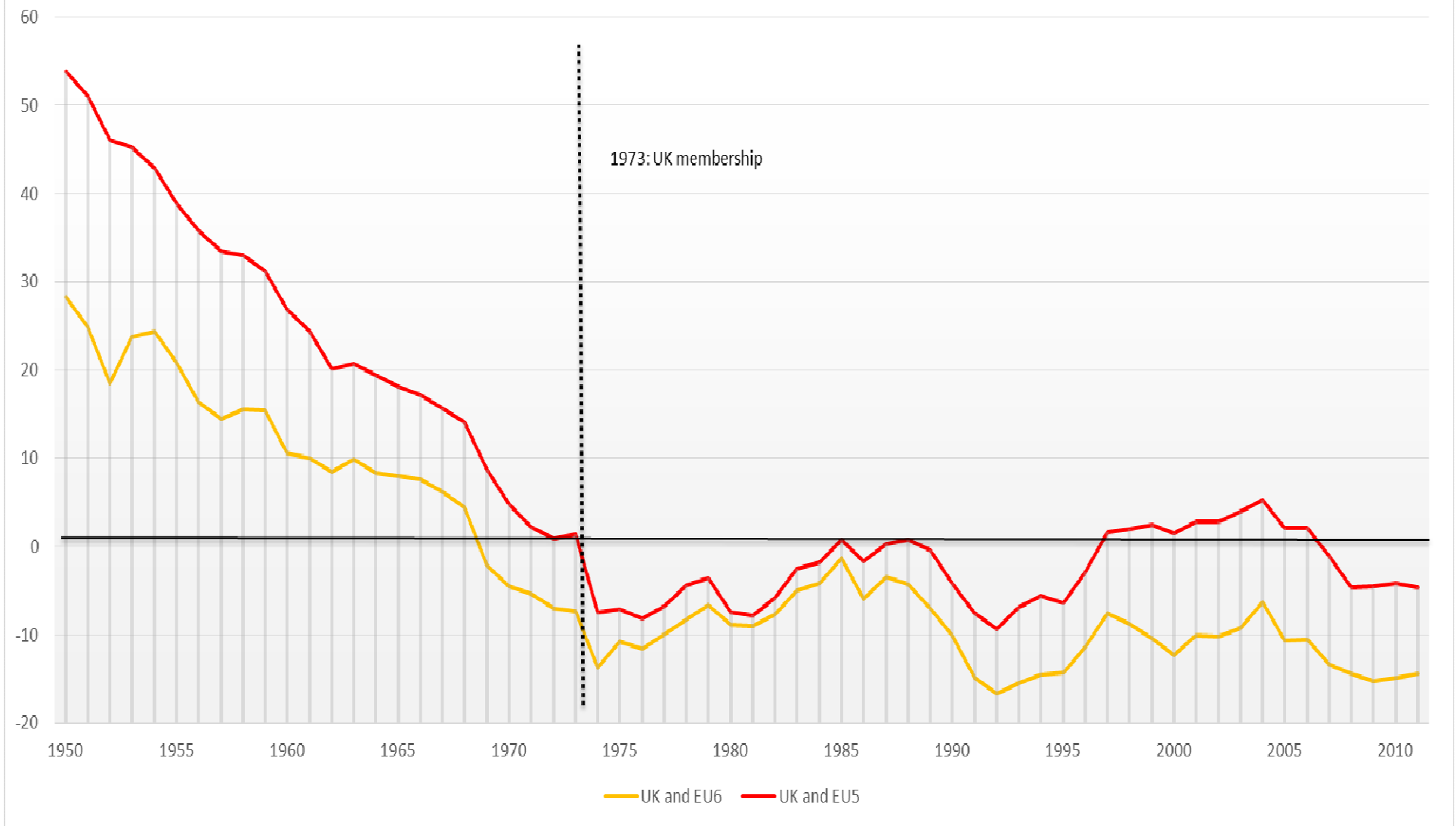
Source: Campos, N. and F. Coricelli (2015), "Why Did Britain join the EU? A New Insight from Economic History," *VoxEu*, February.

Total Factor Productivity
(1973 EU Enlargement; ratios to EU6)

tfpEU6UK_ratio   tfpEU6DK_ratio   tfpEU6IRL_ratio
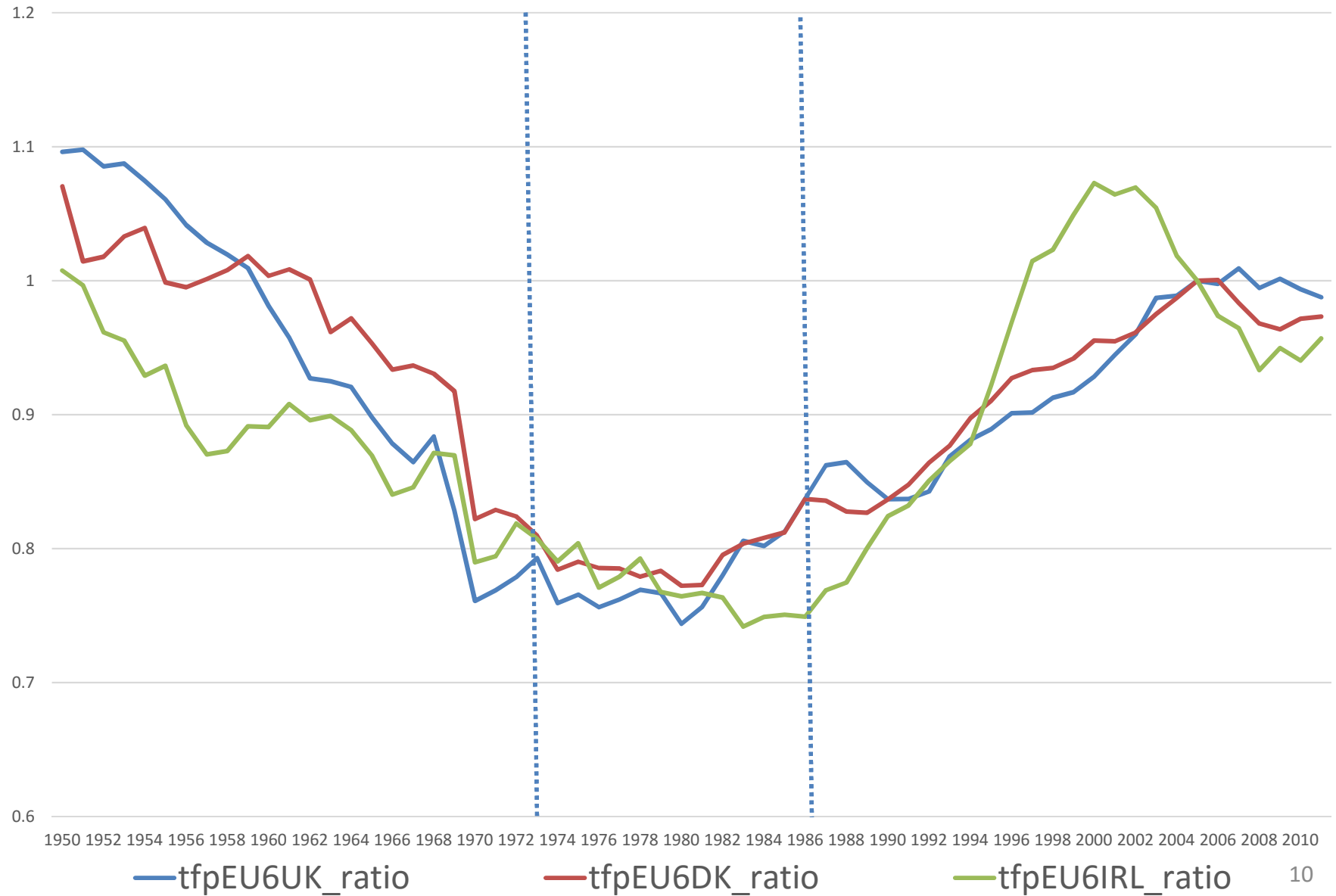
Point #1: What has the EU ever done for UK?

- Evidence of structural break circa 1970

- not 1979, 1983, 1986 (Chow, ZivotA, Bai-Perron)

- Q: What has Europe ever done for UK?

- A: EU membership helped "**reverse**" (B. r. e. d.)

- European Integration has been so far dismissed as an explanatory factor re UK post-WW2 economic performance rebound.

Maybe it shouldn't.

The 3 take-aways

UK joined at the end of expansion 1973   Break
UK ref at the start of the recovery 2016   Break?

1) Forecast at your own peril

2) 1973 break join :: Brexit reignite relative decline

3) NY, NY (there everywhere): if Europ Intgr works
     this well in UK, imagine what it does elsewhere?

Point #2:

Is the UK the "leading beneficiary" from the European integration project?

Further details on material in this section

Campos, N., Coricelli, F. and L. Moretti (2014), "Economic Growth and Political Integration: Estimating the Benefits from Membership in the European Union Using the Synthetic Counterfactuals Method," CEPR DP 9968 (also ungated IZA DP).

FINANCIAL TIMES

Napoleon in 1812
The big retreat from investment banking — JOHN GAPPER, PAGE 11

Steely determination
Gina Rinehart embarks on the biggest gamble of her career — BIG READ, PAGE 9

The 'woo-woos'
Donna Karan's irresistibly silly autobiography — PAGE 12

Bruegel work alleged to be Nazi loot

"The Fight Between Carnival and Lent", a 1559 painting by Pieter Bruegel the Elder, has become the latest art masterpiece that is alleged to have been looted during the second world war.

A document buried in the archives of the National Museum of Krakow shows that the painting was taken from its galleries by the wife of a Nazi administrator during Germany's wartime occupation of Poland. Estimated to be worth tens of millions of dollars, it currently hangs in Vienna's Kunsthistorisches Museum.

Polish authorities are expected to ask the Austrian government to carry out a full investigation into the painting and its provenance, to determine whether it should be returned to Krakow.
Analysis page 6

Carney backs EU membership, saying UK is 'leading beneficiary'

● BoE chief hails rise in prosperity since 1973 ● Reforms urged to safeguard future benefits

CHRIS GILES AND GEORGE PARKER

Bank of England governor Mark Carney supported Britain's EU membership yesterday, highlighting its economic benefits while calling for reforms to ensure the union still works in Britain's interests in future.

Delivering the Cairncross Lecture at Oxford university, Mr Carney said that Britain's economy had become more open in trade and more dynamic and prosperous since the country joined the EU in 1973. He said "the UK is the leading beneficiary" of the free movement of goods, services, capital and labour enshrined in European treaties.

"Taken together, these measures promote competition and spur innovation which ultimately benefit us all," Mr

Carney said. He added that EU membership had also created "some monetary and financial stability challenges for the BoE to manage". The governor added: "Thus far, we have been able to meet these challenges."

Mr Carney's intervention will be welcomed by David Cameron as he seeks to renegotiate the terms of Britain's membership of the EU. The prime minister has also praised the benefits of Britain's remaining in a reformed union.

Mr Cameron is understood to have encouraged Mr Carney to set out the issues that a Brexit might raise for the BoE, even though the prime minister has yet to officially commit to leading the campaign for Britain to stay in the EU. Mr Cameron may be in awaiting the outcome of his renegotiation, but senior

Conservatives are discreetly letting it be known they are happy for business leaders to start making the case for Britain to stay in "a reformed Europe".

Mr Carney hopes his speech and an accompanying BoE report will frame the national debate and that the bank will be seen as an honest broker in the fierce arguments raging over Britain's referendum. Due to be held by the end of 2017, the vote will decide whether the country remains in or leaves the EU.

He said: "Broadly speaking, the evidence suggests that the UK has successfully harnessed the benefits of openness afforded by its EU membership while avoiding some of the drawbacks of reduced flexibility from which some continental European economies suffer." Mr Carney stressed that the central

bank had not conducted a "comprehensive assessment" of the pros and cons of the UK being in the EU, but had limited its analysis to the effect of membership on the BoE's ability to do its job.

Although the governor had few criticisms of existing EU financial regulations and said the union still had the "highest standards" of regulation, he saw challenges to the UK's position as the eurozone seeks to deepen its financial integration and regulation in the years ahead. "It is important that any future EU legislative measures, designed to meet the needs of deeper integration in the eurozone, do not adversely affect the Bank of England's ability to ensure the stability of the UK financial sector," he said.
Carney's Oxford speech page 3

> 'The UK has harnessed the benefits of openness'
> Mark Carney, BoE governor

Research Question and Method

- What would have been the levels of per capita income (and productivity) if a given country had <u>not</u> become a full-fledged member of the EU?

- *Synthetic control methods for causal inference in comparative case studies*   or   "synthetic counterfactuals"   or   SCM

- Abadie et al: AER 2003, JASA 2009, AJPS 2015

Method: Synthetic counterfactuals

- Recent addition to econometrics of program evaluation (Imbens and Wooldridge JEL 2009)

- "artificial control group" (JEL 2009, p. 79)

- It estimates the effect of a given intervention by comparing the evolution of an aggregate outcome variable for a country "treated" to its evolution for a *synthetic* control group

Synthetic counterfactuals (con't)

- SCM minimizes the pre-treatment distance (mean squared error of pre-treatment outcomes) between the vector of <u>treated</u> country's characteristics and the vector of potential <u>synthetic</u> control characteristics

- Specify: (1) treatment, (2) set of matching covariates, and (3) "donor pool"

Original Example: Basque GDP & ETA
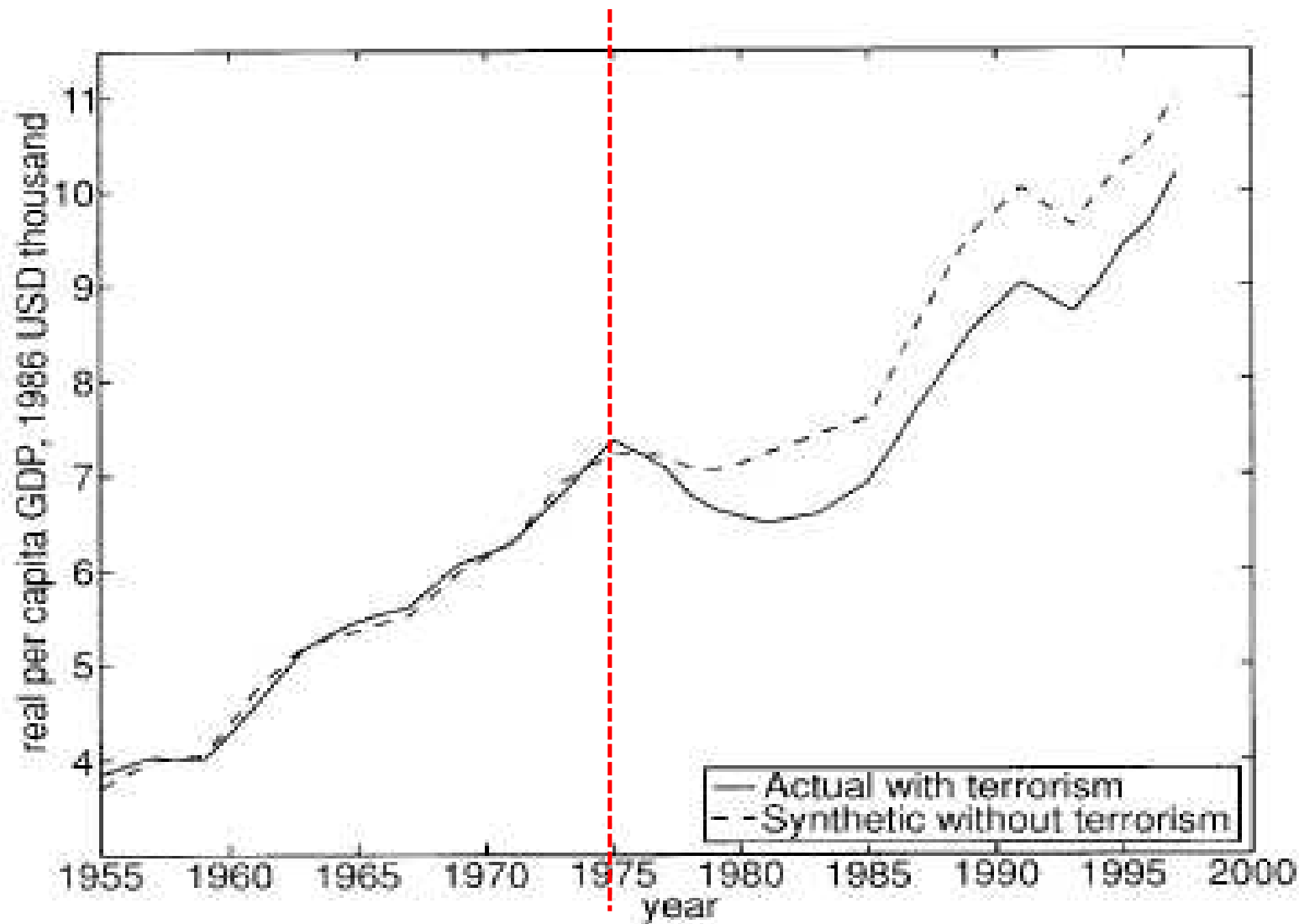
SCM: Other applications

- FDI and financial liberalisation (Campos and Kinoshita 2010 IMFSP)

- Anti-smoking legislation (Abadie et al. 2012 JASA)

- Trade liberalisation (Billmeier and Nannicini 2013 REStat)

- German reunification (Abadie et al. AJPS 2015)

- Political connections (Acemoglu et al. 2015 NBER)

This paper

- Synthetic counterfactuals method

- Estimate growth and productivity payoffs

- EU membership

- All enlargements: 1973, 1980s, 1995, 2004

Specification

1. Year treatment starts (EU membership)
   - 1973: IRL, DK, UK; 1980s: Greece, SP, Port; 1995: Austria, Fin, Sweden; 2004: Poland CZ etc

2. Matching over which covariates?
   - Follow Abadie et al 2003: investment, labour, agriculture in GDP, level of secondary and tertiary education, etc
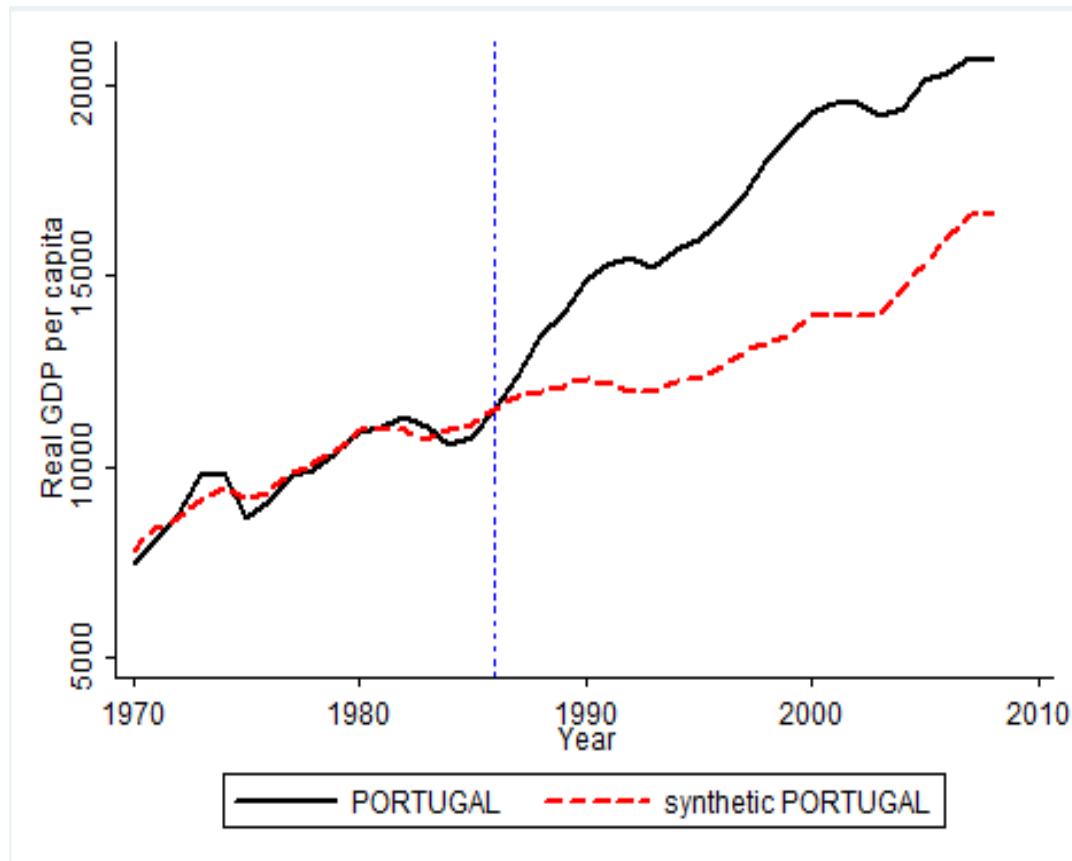
3. Donor pool
   - Used various pools ranging from *whole world* to *neighbours,* report upper middle income (from Bover and Turrini, 2010)

Main Results

A synthetic counterfactual

Portugal

Donor c.	W	Donor c.	W.
ALB	0	ISL	.142
ARG	0	JPN	0
AUS	0	KOR	0
BRA	.195	MAR	0
CAN	0	MEX	.025
CHE	.151	MYS	.105
CHL	0	NZL	0
CHN	0	PHL	.384
COL	0	THA	0
EGY	0	TUN	0
IDN	0	TUR	0
		URY	0

Note: sample of control countries from Bover and Turrini (2010)

Predictors	PRT	Synth-PRT
Real GDP pc [1]	9851.037	9883.258
Investment share [1]	23.66904	25.28905
Pop. growth [2]	.0176952	.1320407
Share of agriculture [2]	21.99968	17.97246
Share of industry [2]	30.77487	36.70358
Tertiary education [2]	10.54996	15.64759
Secondary education [2]	49.49542	62.94135

[1] Source: Penn World Tables
[2] source: World Development Indicators
Note: results are robust to different donor samples and model specifications

1973 Northern Enlargement (GDP pc and Labor productivity)
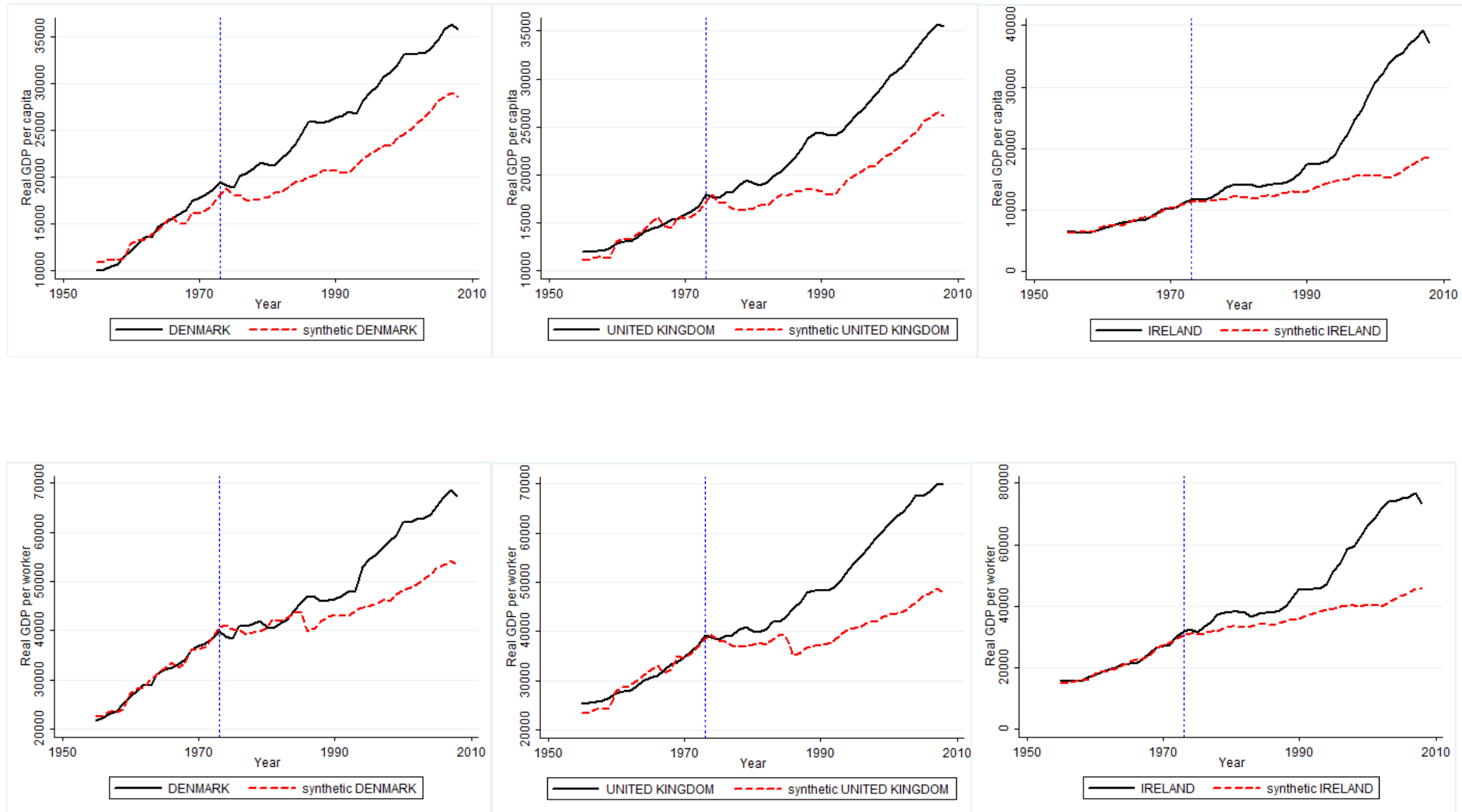
1980s Southern Enlargement (GDP pc and labor productivity)
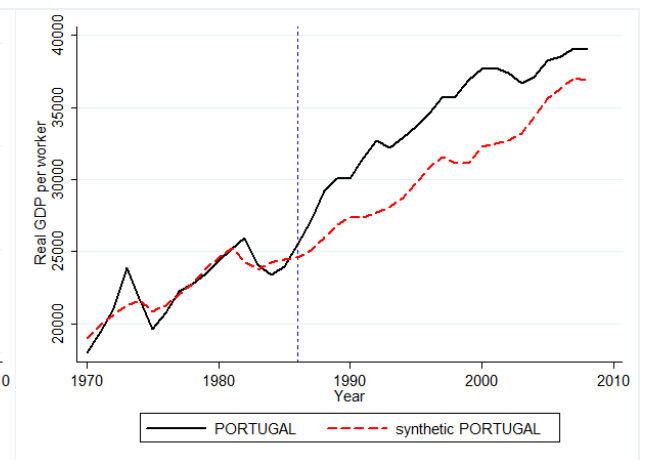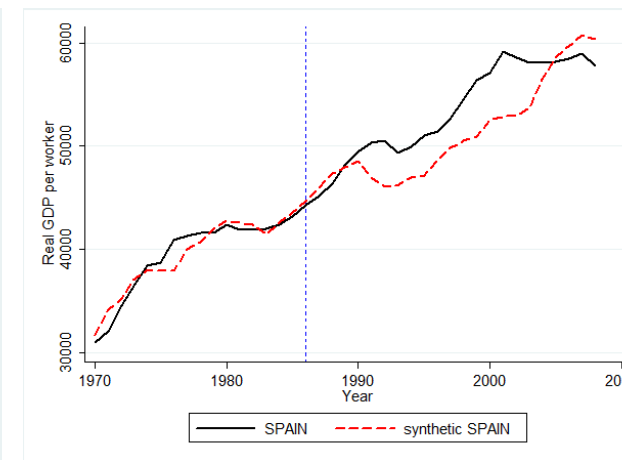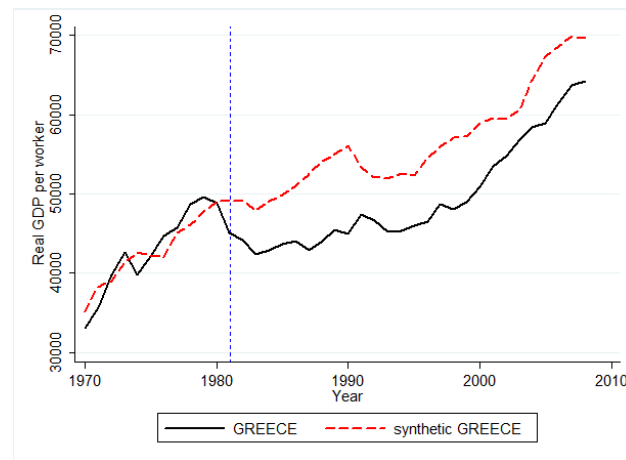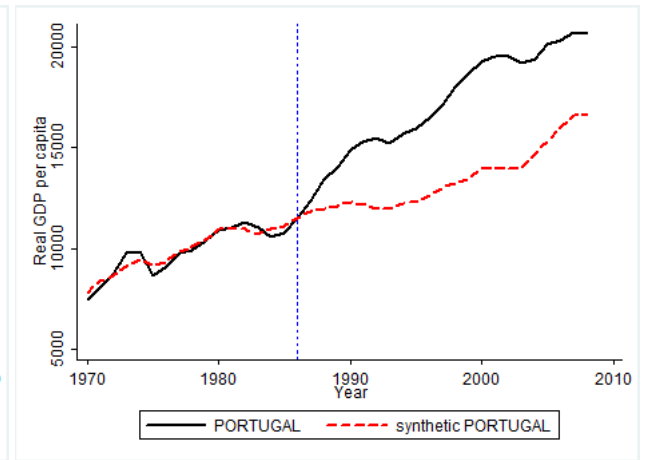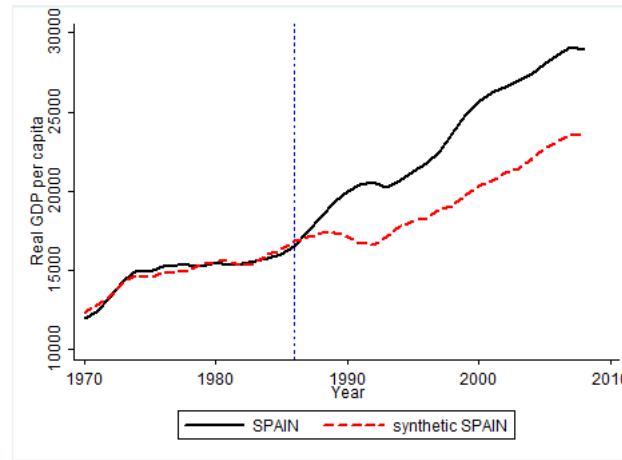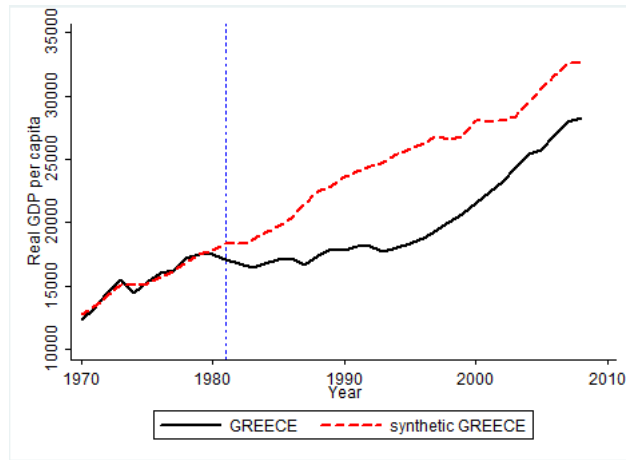
1995 Scandinavian enlargement(GDP pc and labor productivity
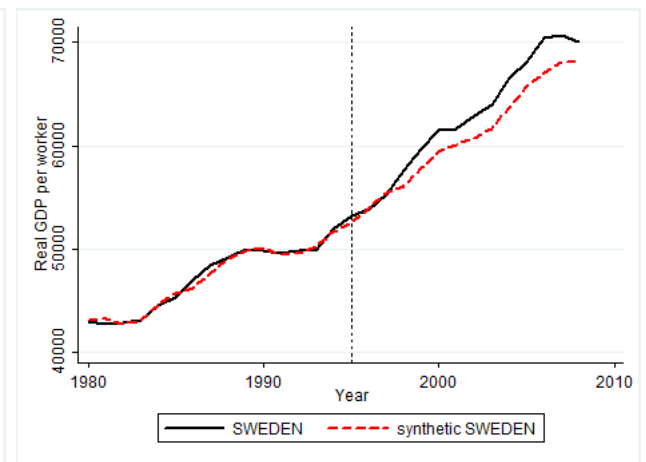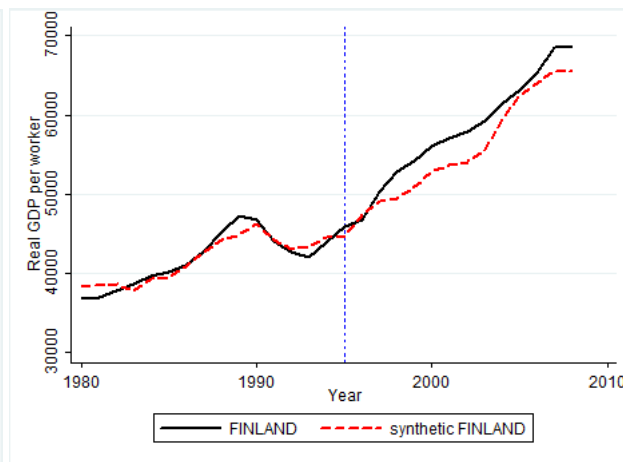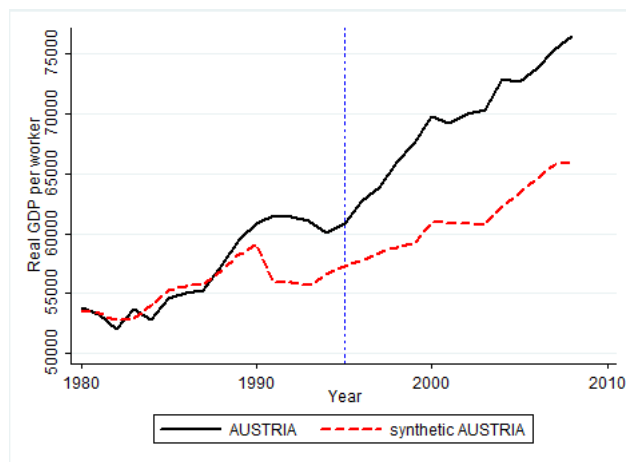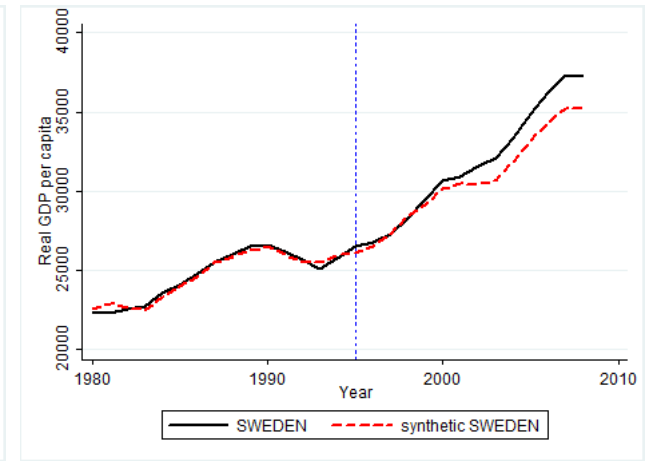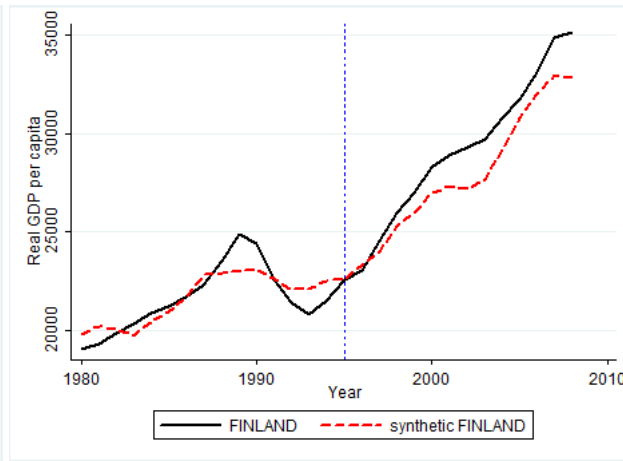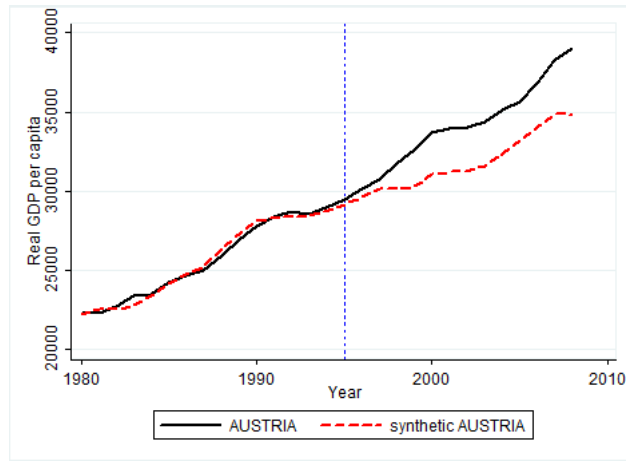
2004 Eastern enlargement: GDP per capita PPP
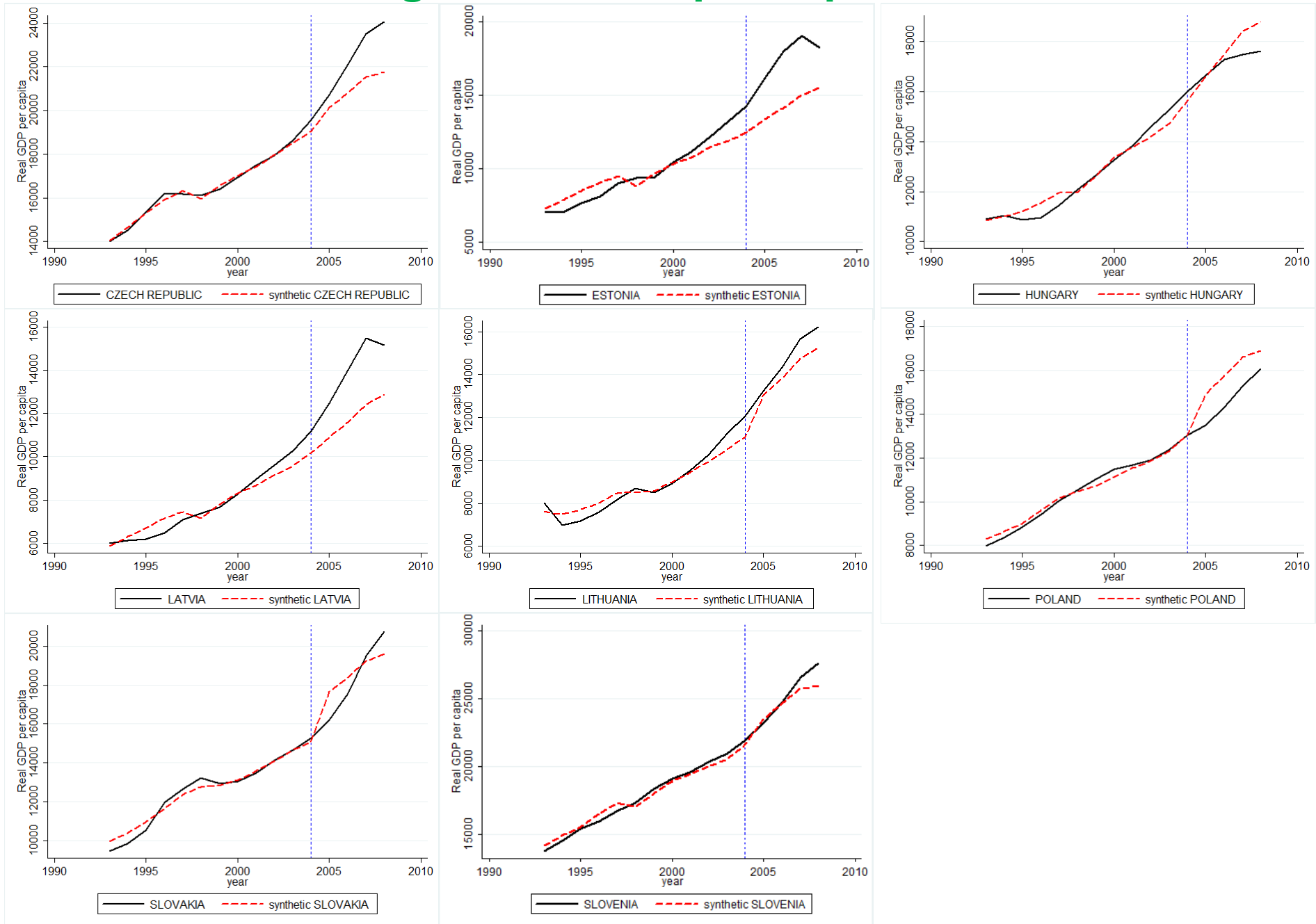
Anticipation: Eastern enlargement, 1998 (GDP per cap. PPP)
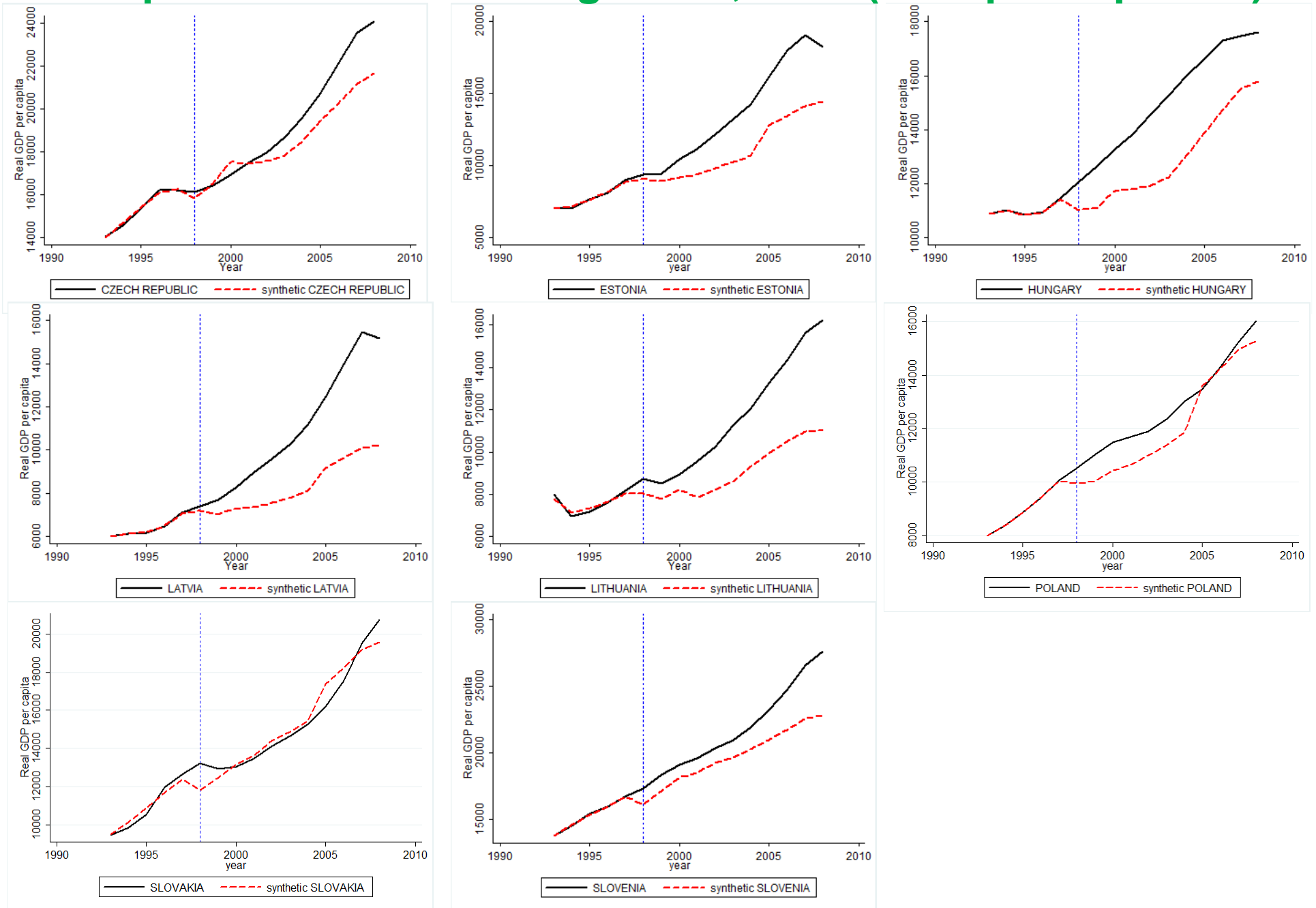
Summary and main findings

- <u>Positive</u> effects from EU membership on growth and productivity, <u>heterogeneity</u> across countries

- Large effects for 1973 and 2004, modest for 1995 and mixed for 1980s

- Mixed 1980s: negative for Greece

Statistical significance?

DID estimates show most results are statistically significant

	Real GDP per capita		Labor productivity	
	DID estimate (std error)	R-square Number of obs	DID estimate (std error)	R-square Number of obs
Denmark	5077.194 (1386.343)***	0.644 108	6216.016 (2513.27)**	0.624 108
UK	4955.629 (1237.554)***	0.579 108	10718.85 (2350.346)***	0.613 108
Ireland	7259.517 (1674.366)***	0.484 108	12861.94 (3092.105)***	0.609 108
Greece	-4973.71 (1294.363)***	0.523 78	-7109.32 (2697.609)**	0.385 78
Portugal	3721.436 (771.392)***	0.73 78	3565.105 (1356.720)**	0.723 78
Spain	3825.029 (1052.929)***	0.656 78	2076.349 (1961.888)	0.677 78
Austria	2271.567 (1296.521)*	0.709 58	6780.129 (1806.187)***	0.731 58
Sweden	962.307 (1409.562)	0.625 58	1720.407 (2438.039)	0.733 58
Finland	1224.518 (1515.423)	0.61 58	2411.818 (2922.211)	0.667 58
Czech Republic	909.501 (1196.608)	0.443 32	2881.739 (2190.197)	0.442 32
Hungary	2154.955) (828.794)**	0.558 32	6006.61 (1754.429)***	0.636 32
Poland	695.562 (967.726)	0.533 32	2523.66 (2105.043)	0.537 32
Estonia	2667.475 (1378.954)*	0.509 32	4712.617 (2620.998)*	0.546 32
Latvia	2626.301 (1014.959)**	0.518 32	3597.256 (1989.464)*	0.535 32
Lithuania	2559.155 (987.010)**	0.485 32	4765.042 (2237.021)**	0.469 32
Slovakia	61.484 (1407.638)	0.474 32	-552.678 (2706.944)	0.472 32
Slovenia	2047.926 (1418.284)	0.574 32	5578.613 (2301.06)**	0.564 32
Northern enlargement 1973	5764.113 (1053.615)***	0.474 324	9932.264 (1760.411)***	0.571 324
Southern enlargement 1981&1986	463.535 (1037.843)	0.363 234	-917.892 (2757.304)	0.248 234
Southern enlargement 1986	3773.233 (1104.118)***	156 0.452	2820.727 (3202.338)	0.245 156
Northern enlargement 1995	1486.131 (966.654)	0.552 174	3637.452 (2056.951)*	0.49 174
Eastern enlargement (1998-anticipation effect)	1715.295 (994.159)*	0.185 256	3689.107 (2027.719)*	0.192 256

DID estimates show results are statistically significant for all enlargements
(also not shown for 5 and 10 years and whole period)

	Real GDP per capita		Labor productivity	
	DID estimate	R-square	DID estimate	R-square
	(std error)	Number of obs	(std error)	Number of obs
Northern enlargement 1973	5764.113 (1053.615)***	0.474 324	9932.264 (1760.411)***	0.571 324
Southern enlargement 1981&1986	463.535 (1037.843)	0.363 234	-917.892 (2757.304)	0.248 234
Southern enlargement 1986	3773.233 (1104.118)***	156 0.452	2820.727 (3202.338)	0.245 156
Northern enlargement 1995	1486.131 (966.654)	0.552 174	3637.452 (2056.951)*	0.49 174
Eastern enlargement (1998-anticipation effect)	1715.295 (994.159)*	0.185 256	3689.107 (2027.719)*	0.192 256

Magnitude?

	Difference in post treatment average GDP pc level between ACTUAL and SYNTHETIC		
COUNTRY	ALL YEARS	10 YEAR	5 YEARS
Denmark	24.596	14.498	10.256
UK	25.962	10.387	6.564
Ireland	51.984	10.906	6.435
Spain	19.806	13.662	9.348
Portugal	27.551	20.495	13.324
Greece	-19.758	-17.336	-11.591
Austria	7.208	6.364	4.467
Sweden	3.174	2.353	0.823
Finland	4.365	4.017	2.185
Czech Republic	4.876	4.876	0.844
Estonia	24.018	24.018	16.218
Hungary	16.754	16.754	16.928
Latvia	31.692	31.692	18.016
Lithuania	28.082	28.082	17.352
Poland	5.763	5.763	8.754
Slovakia	0.302	0.302	1.315
Slovenia	10.409	10.409	6.383
Nothern Enlargment 1973	34.181	11.930	7.752
Southern Enlargement	9.200	5.607	3.694
Southern Enlargement (without Greece)	23.679	17.079	11.336
Northern Enlargment 1995	4.915	4.244	2.491
Eastern Enlargement (1998 Anticipation)	15.237	15.237	10.726

Summary and main findings

- <u>Positive</u> effects from EU membership on growth and productivity, <u>heterogeneity</u> across countries

- Large effects for 1973 and 2004, modest for 1995 and mixed for 1980s

- Mixed 1980s: negative for Greece

- Magnitude of average effect: **about 12 percent**

Two extensions

Figure 4. Random donor samples (1,000 replications) – Real GDP per capita in the Northern and Southern enlargements
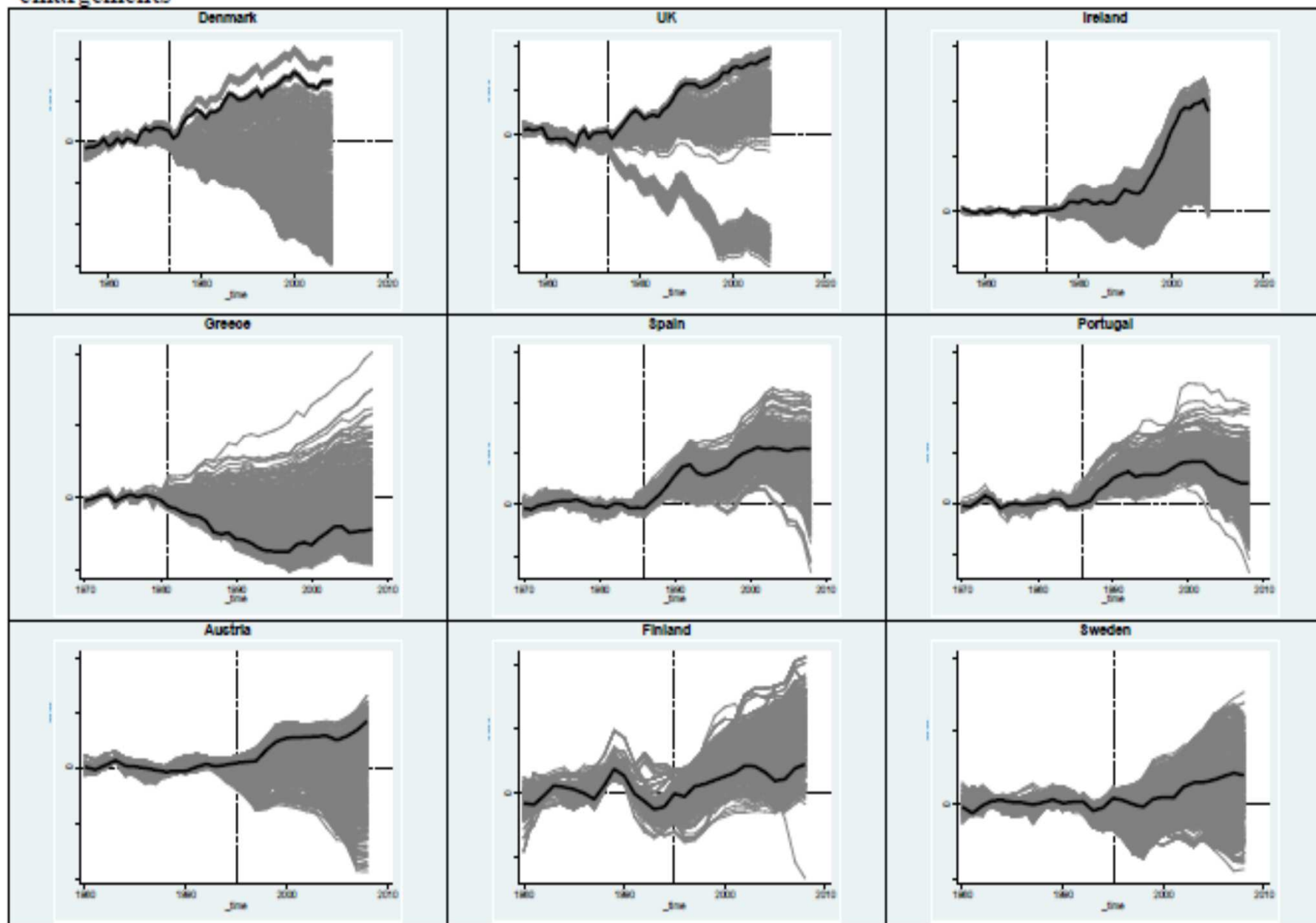
Figure 5. Random donor samples (1,000 replications) - Real GDP per capita in the Eastern enlargement (anticipation effects)
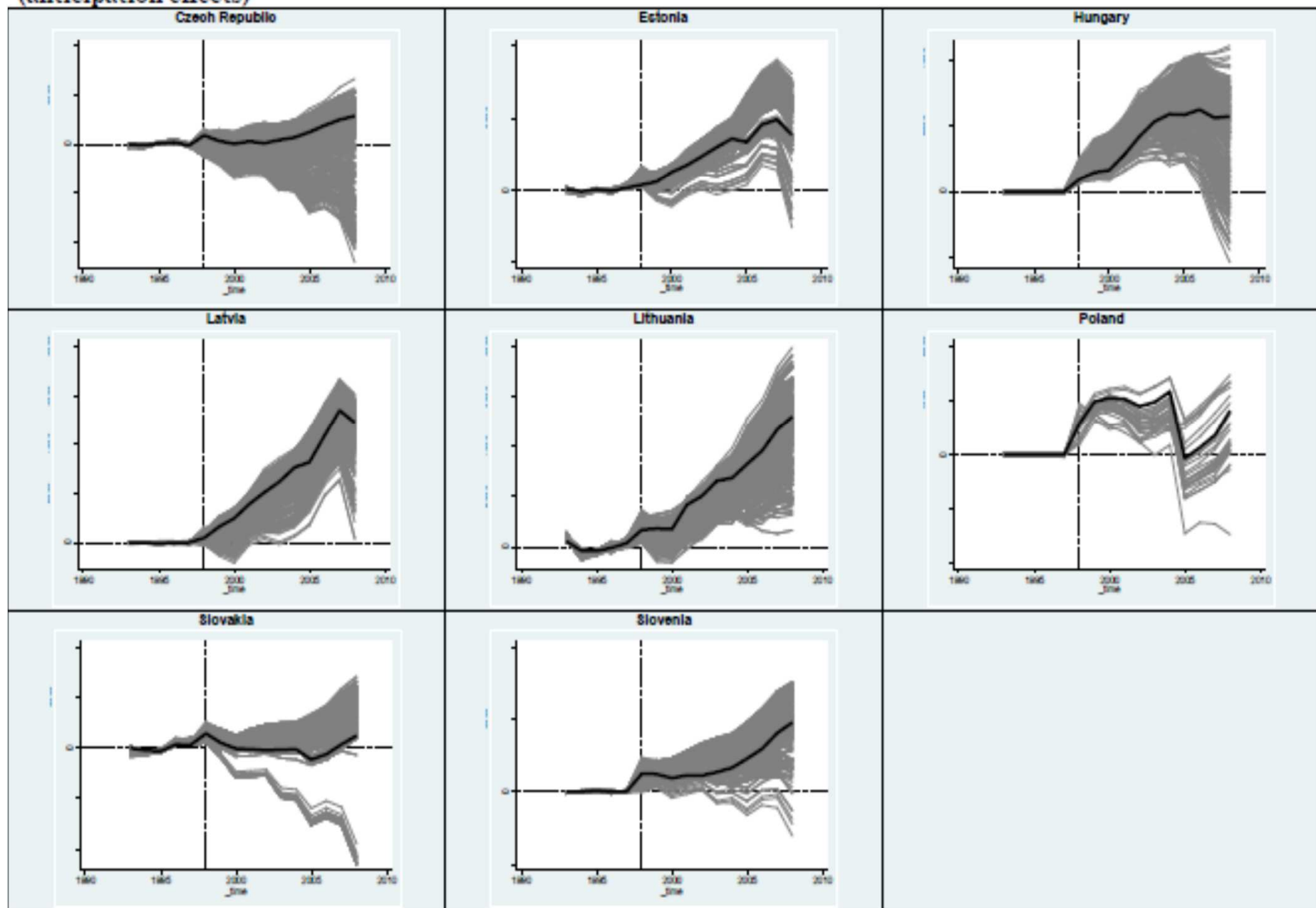
Table 2.B Summary statistics of the per capita GDP effects after 10 years from the treatment using 1,000 alternative and randomly selected donor samples

Country	(1) % effect (our main estimation)	(2) Median % effect across 1,000 random samples	(3) Average % effect across 1,000 random samples	(4) % of estimations with negative effects (out of 1,000 random samples)	(5) % of estimations with positive effects (out of 1,000 random samples)	(6) % effect using the best pre-treatment fit
Denmark	19.05	-4.54	-9.77	74.70	25.30	-2.62
United Kingdom	12.64	3.09	3.55	18.40	81.60	7.29
Ireland	11.51	-0.24	-2.14	58.10	41.90	2.65
Greece	-24.46	-15.45	-18.54	91.30	8.70	-25.90
Spain	18.57	17.29	15.86	0.70	99.30	17.48
Portugal	20.74	26.03	24.28	0.00	100.00	24.43
Austria	7.42	0.83	-1.10	58.10	41.90	4.93
Finland	3.13	11.46	10.07	8.10	91.90	19.99
Sweden	4.98	5.76	2.43	31.90	68.10	6.11
Czech Republic	13.51	0.87	6.18	36.00	64.00	5.50
Estonia	26.75	39.22	43.90	1.60	98.40	23.86
Hungary	14.89	12.30	13.61	12.10	87.90	15.78
Latvia	47.88	48.02	47.78	0.00	100.00	42.14
Lithuania	47.13	42.74	44.29	0.00	100.00	47.13
Poland	5.36	9.99	11.71	15.60	84.40	0.21
Slovak Republic	5.98	18.86	18.72	2.70	97.30	5.98
Slovenia	20.76	21.07	22.37	6.50	93.50	26.09

Note: For each treated country i the cumulative *Effect* after 10 years from the treatment year $(t=0)$ is: $\left(\frac{Actual_{i,t=10}-Synthetic_{i,t=10}}{Synthetic_{i,t=10}}\right)*100$.

What are the factors that may explain the dynamics of these net benefits?

Common currency, fin integr or structural reforms (EPL & regulatory reform)?

$$GAP_{c,t} = \beta_1 GAP_{i,t-1} + \beta_2 Euro_{i,t} + \beta_2 Fin\_Intgr_{i,t} + \beta_3 Str\_reforms_{i,t} + C_c + T_t + \varepsilon_{i,t}$$

where:

-*GAP* is the % difference between actual and synthetic GDP series;

-*Euro* is a dummy variable for countries which joined the common currency;

-*Financial Integration* is: (int.assets)/(int.liabilities + int.assets);

-*Structural reforms* are EPL (labour market) and ETCR (non-manufacturing).

Dependent variable	(1) Percentage gap	(2) Percentage gap	(3) Percentage gap	(4) Percentage gap	(5) Percentage gap	(6) Percentage gap
L.Percentage gap	0.928*** (0.030)	0.910*** (0.030)	0.970*** (0.028)	0.928*** (0.030)	0.911*** (0.031)	0.955*** (0.035)
Euro	0.024*** (0.009)	0.022** (0.009)	0.020** (0.010)	0.024*** (0.009)	0.022** (0.009)	0.020* (0.010)
Fin. Integr.	0.054 (0.049)	-1.454*** (0.455)	-1.157** (0.579)			
Fin. Integr. (sq.)		1.915*** (0.578)	1.443* (0.735)			
L. Fin. Integr.				0.067 (0.051)	-1.377*** (0.525)	-1.242** (0.591)
L. Fin. Integr. (sq.)					1.828*** (0.662)	1.581** (0.750)
EPL (labour mrkt)	Yes	Yes	Yes	Yes	Yes	Yes
ETCR (non-manuf).	Yes	Yes	Yes	Yes	Yes	Yes
Years of membership	Yes	Yes	Yes	Yes	Yes	Yes
Country dummy	Yes	Yes	Yes	Yes	Yes	Yes
Five-year dummy	Yes	Yes	Yes	Yes	Yes	Yes
Observations	295	295	203	295	295	209
Sample	17 EU25 countries	17 EU25 countries	9 EU15 countries	17 EU25 countries	17 EU25 countries	9 EU15 countries

Bottom-line: Two-Speed Europe may not pay

Conclusions

Summary and main findings

- <u>Positive</u> effects from EU membership on growth and productivity, <u>heterogeneity</u> across countries

- Large effects for 1973 and 2004, modest for 1995 and mixed for 1980s (negative for Greece)

- Magnitude of average effect: about 12 percent

- Mechanisms: ever closer FDI + deep integration

Hvala vam puno

The synthetic counterfactual

Be Y an outcome variable (eg. GDP per capita).

$$\tau_{it} = Y_{it}^{I} - Y_{it}^{C}$$

where Y_{it}^{C} is unknow for $t > T_0$.

Given $N+1$ the observed countries, with $i=1$ the treated country and $i=2,..., N+1$ the control/donor countries, Abadie et al. (AER 2003, JASA 2010) show that:

$$\hat{\tau}_{it} = Y_{it}^{I} - \sum_{i=2}^{N+1} w_i * Y_{it} \qquad \text{for} \quad t \geq T_0$$

The algorithm chooses $W* = (w_2,..., w_{N+1})$, thus that the following conditions hold :

$$Z_1 - \sum_{i=2}^{N+1} w_i * Z_i = 0 \qquad\qquad Y_{1t} - \sum_{i=2}^{N+1} w_i * Y_{it} = 0 \qquad \begin{array}{c} \text{for} \\ t < T_0 \end{array}$$

with $\sum_{i=2}^{N+1} w_i = 1$ and $w_i \geq 0$, where Z are predictors of Y.

Synthetic Counterfactuals Method

Assumptions:

1. *Z* should contain variables that help the approximation of Y_{1t} pre-treatment, but should not include variables which anticipate the effect.

2. Donor countries ($i=2,...,N+1$) should not be affected by the treatment.

Advantages:

- It allows the study of the dynamic effects.
- It is designed for case-study, so it can allow the evaluation of treatment independently from: *i*) the number of treated units; *ii*) the number of control units; *iii*) the timing of the treatment.

Main disadvantage:

- *Difficult to assess statistical significance using standard (large-sample) inference: instead permutation tests on donor sample (placebo experiments)*

Some other approaches

- Pesaran, Smith and Smith, "What if the UK or Sweden had joined the euro in 1999? An empirical evaluation using a Global VAR" *International Journal of Finance & Economics* 2007

- Hsiao, Ching and Wan, "A Panel Data Approach for Program Evaluation: Measuring the Benefits of Political and Economic Integration of Hong Kong with Mainland China," *Journal of Applied Econometrics* 2012

Point #3: Mechanisms

- *How* did UK Benefit from EU Membership?

- Mechanisms: FDI

       No time today: BCS (biz cycles synch)
                         SC   (state capacity)

Whither FDI?

- FDI: diffusion of frontier management practices, increases competition and shores up technological innovation

- FDI is resilient (in ways portfolio invt isn't)

- UK is a major FDI destination in the EU

- Why have we not yet seen any estimate of the causal effect of EU membership on UK FDI inflows?

Figure 3. *What would UK FDI net inflows look like had the UK opted-out of the Single Market in 1986?*

Campos, N and F Coricelli (2015) "Some Unpleasant Brexit Econometrics," VoxEU, December.
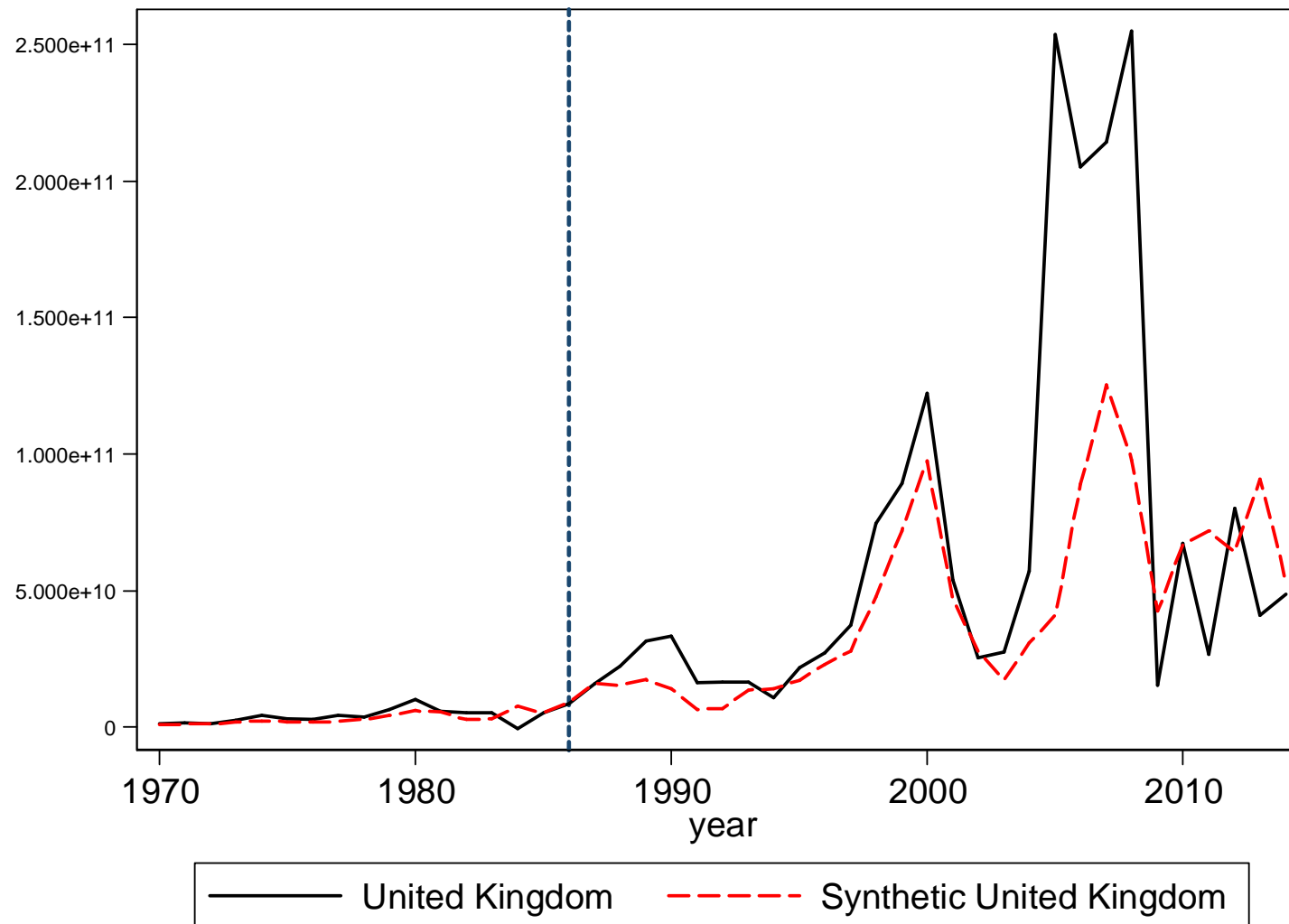
The gravity of the trade channel

Baier et al(JIE 2006): EU **127-146%** after 10-15 ys

EFTA by **35%**

Glick & Rose (2016):

vanishes thanks to "doing the econometrics right"

What about **FDI**?

Dependent Variable:	(1) Ln(1 + FDI)	(2) FDI	(3) Ln(FDI)
	OLS FE	Poisson	Heckman
EU member (target)	0.285***	0.320*	0.132***
	(0.077)	(0.163)	(0.050)
EU member (sender)	-0.010	0.828***	0.199***
	(0.079)	(0.191)	(0.050)
Ln(GDP, sender)	0.500***	3.903***	0.766***
	(0.154)	(1.462)	(0.226)
Ln(GDP, target)	0.473***	3.799***	0.686***
	(0.056)	(1.432)	(0.226)
Ln(GDP per capita, sender)	1.450***	-1.125	1.655***
	(0.154)	(1.623)	(0.254)
Ln(GDP per capita, target)	0.180	-1.489	-0.010
	(0.158)	(1.513)	(0.255)
Observations	33,524	33,147	33,524

FDI lessons

Synthetic counterfactual suggests more than 20% increase in FDI inflows in UK due to Single Market

Gravity evidence ranges from about 15% increase of FDI inflows due to EU membership (Heckman) to about 30% (using "better econometrics")

If you need one number: 28% FDI increase