Do Labour Market Changes Explain the Slowdown in European Productivity Growth?

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Is There an Employment-Productivity Tradeoff?

- Two marked events in Europe after 1995
  - Slowdown in productivity growth to well below the U. S. rate
  - Increase in growth of employment per capita at well above the U. S. rate
- Are these connected causally or just a coincidence?
  - Which way does the causation go?
- Co-authored with Ian Dew-Becker
  - Look him up on google, at age 23, he has 4000+ entries

Ian in SF, you can't see "MV=PY"

The US Accelerates, Europe Decelerates

- From 1950 to 1995 EU productivity growth was faster than in the US

- But in the past decade since 1995 we have witnessed
  - An explosion in US productivity growth
  - A slowdown in EU productivity growth roughly equal in size
  - An explosion in research on the US takeoff and but much less research on Europe's slowdown

- The magnitude of the shift (average EKS&GK Groningen)
  - EU/US level of labor productivity (ALP)
  - 1979   1995   2004

    80%   97%   89%

Point of Departure: Post-95 Turnaround Plus New Heterogeneity

■ This paper begins with two simple observations:

1. While European productivity (Y/H) has fallen back since 1995 relative to the US, output per capita (Y/N) has not fared nearly as badly

    ►Y/H growth gap: 0.9%

    ►Y/N growth gap: 0.2%

2. After 1995, we see divergence across the EU-15 in Y/H growth

    ► St. Dev. 1970-1995: 0.62

    ► St. Dev. 1995-2005: 1.01

The Key Identity Suggests the Tradeoff

- An identity links Y/N and Y/H to H/N:

$$Y/N \ = \ Y/H \ * \ H/N$$

Thus the paradox of high European Y/H and low Y/N must be resolved by lower H/N

- Also, Y/H and H/N are jointly determined
- The task of this paper is going to be figure out which direction the causation runs
  - We will argue that a good deal of the decline in ALP growth is due to exogenous employment shocks
  - Also we will highlight the reversal of almost everything at 1995, comparing 1970-95 vs. 1995-2005

Bringing Together the Disparate Literatures

- Literature #1, why did Europe's hours per capita (hereafter H/N) decline before 1995? Prescott, Rogerson, Sargent-Lundqvist, Alesina, Blanchard
  - High taxes, regulations, unions, high minimum wages
  - Europe made labor expensive
  - Movement up Labor Demand curve => low employment + high ALP
- Literature #1 has missed the turnaround
  - Since 1995 there has been a decline in tax rates and employment protection measures; unionization earlier
  - Big increase in hours per capita, turnaround in both absolute terms and relative to the US Move back down L^D curve

The Employment-Productivity Tradeoff

- Take any CRS production F(K,L)
  - Intensive form, $L \cdot F(K/L,1) = L \cdot f(K/L)$
  - $Y/L = f(K/L)$
- As long as capital is fixed, an increase in employment lowers labor productivity
- We don't know how fast capital adjusts though; the tradeoff may be quantitatively small
- A major goal of this paper is to quantify the tradeoff

Textbook Labor Economics
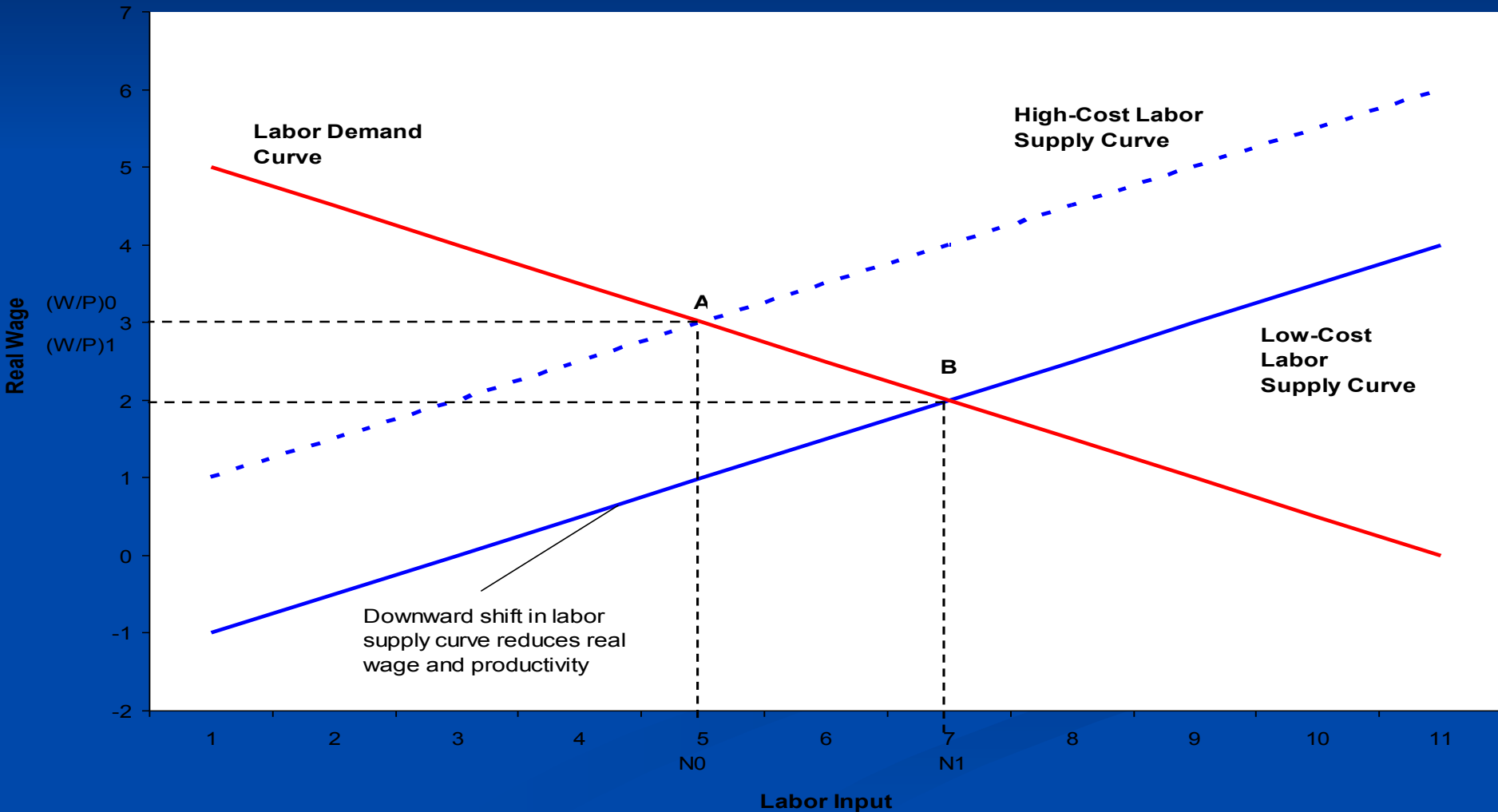
Pre-1995: Moving Northwest

- 1970-95 EU climbs to the northwest
  - Hours per capita decline, average labor productivity increases
  - In this sense much of Europe's 1970-95 productivity catchup was "artificial," propelled by policies making labor expensive
    - No busboys, grocery baggers, valet parkers
    - Product regulations kept stores shut tight many hours of the day/night
    - All this reduced Europe's employment share in retail/ services

Post-1995: Moving Southeast

- 1995-2004 EU slides southeast
  - Hours per capita start increasing while they decline in the US
  - Effects are magnified by slow reaction of capital, eventually capital should grow faster offsetting much or all of productivity slowdown
- Literature #1 misses the turnaround
  - Since 1995 decline in tax rates and employment protection measures
  - We are unaware of much macro-level research on the turnaround in hours
  - Allard and Lindert (2006) do not really mention it – data only goes to 2001

Literature #2: The EU-US ALP gap

- Central Focus of Lit #2 on post-1995 turnaround in US Productivity Growth
  - Jorgenson, Ho and Stiroh (2006): '95-'00 due to ICT, '00-'05 something else
  - Retail is often noted
    - Van Ark, Inklaar and McGuckin (2003)
    - Foster, Haltiwanger and Krizan (2002) on new establishments
  - Baily and Kirkegaard (2004) on regulations
    - Need to free land use restrictions

- Fully 85% of EU productivity slowdown has its counterpart in a speed-up of EU H/N
  - Europe paid for lower ALP mainly with higher hours rather than less consumption
  - Saltari and Travaglini have made a similar point with respect to Italy
- This runs counter to the Blanchard story about preferences for leisure
  - Now we hear that they're not lazy, just unproductive
 - Huge literature on different structural reasons for EU sclerosis

Literature #3: relationship between Y/H and H/N

- There is a long line of research examining the relationship between hours and productivity
- Even using an IV approach, increases in H/N drive down Y/H
  - This makes sense in a single factor model or with any slow adjustment of capital
  - Measuring the speed of adjustment of investment is difficult – future research for us
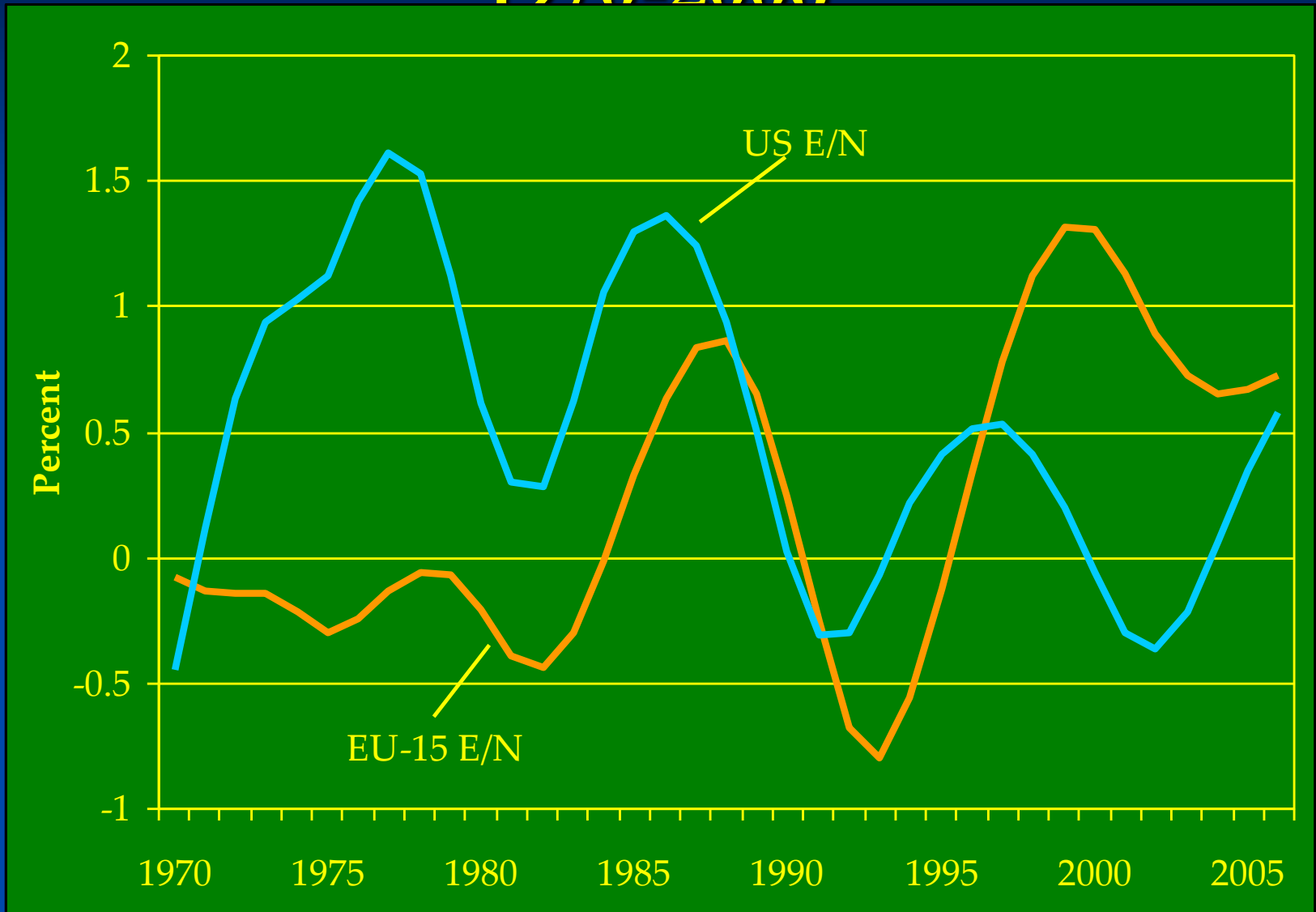- View today's talk as a report on research in progress, not the final polished word

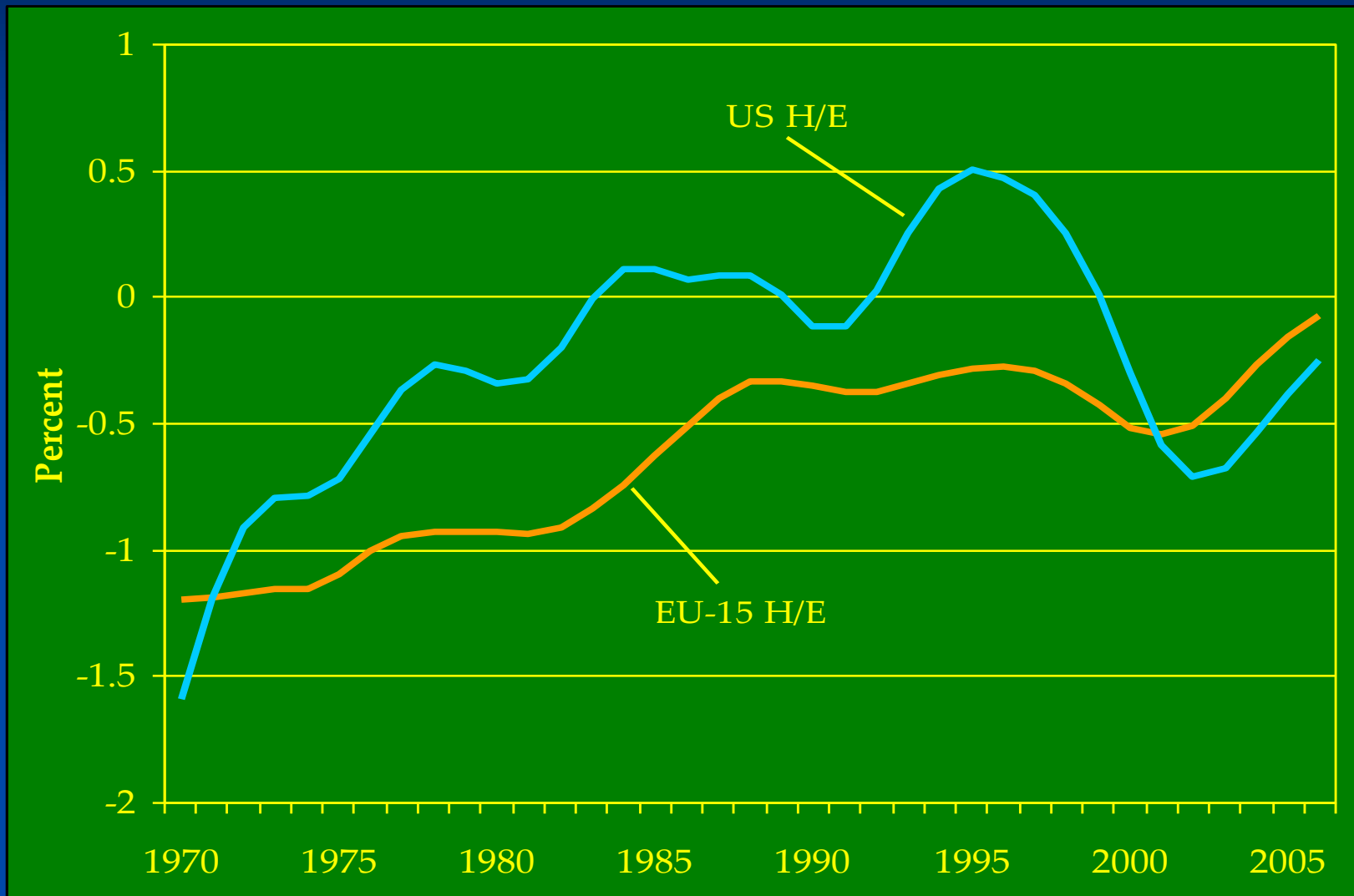# Trends in Labor Productivity Growth, 1970-2006
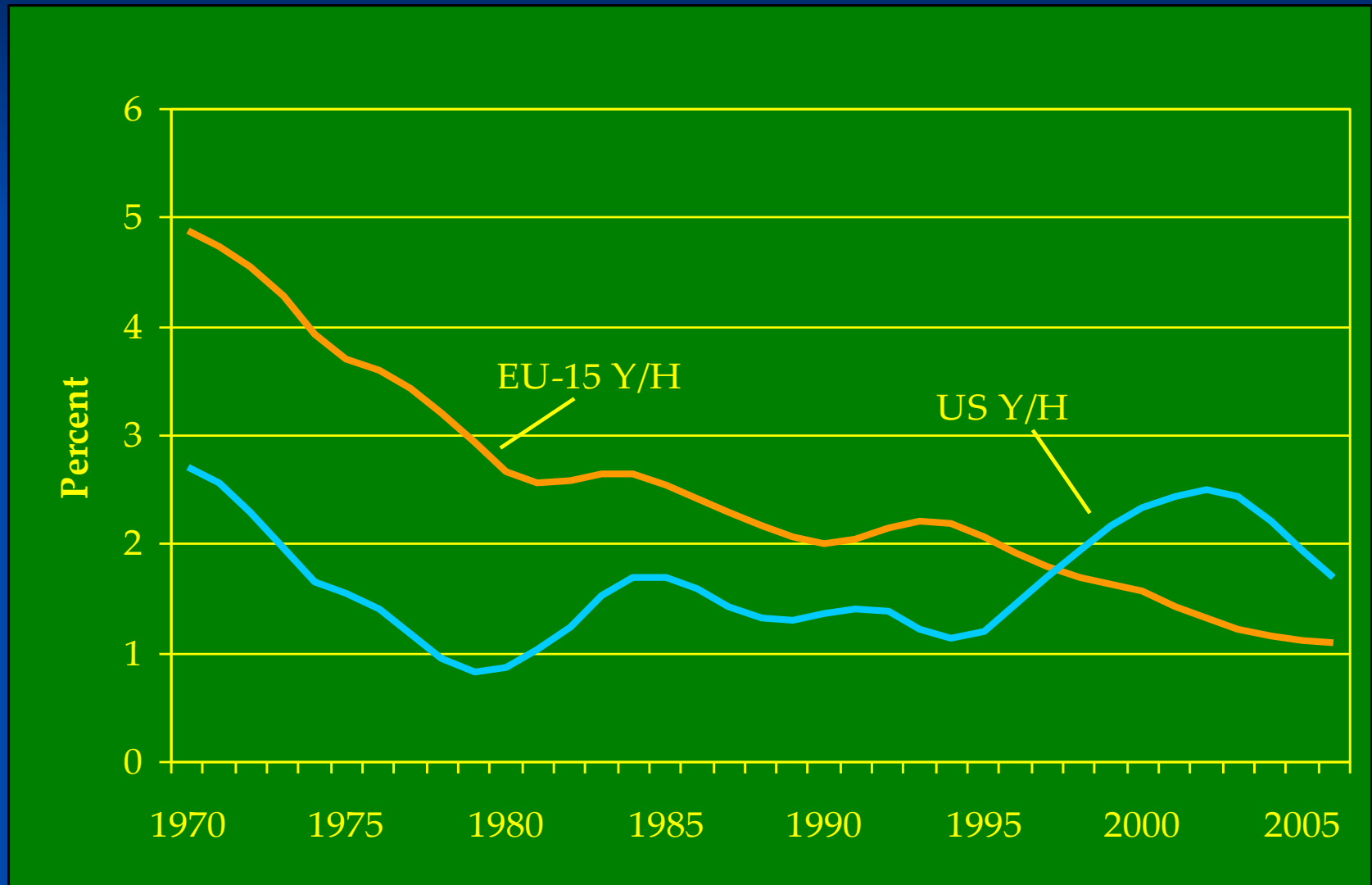
Growth Trends in Y/N and H/N, 1970-2006
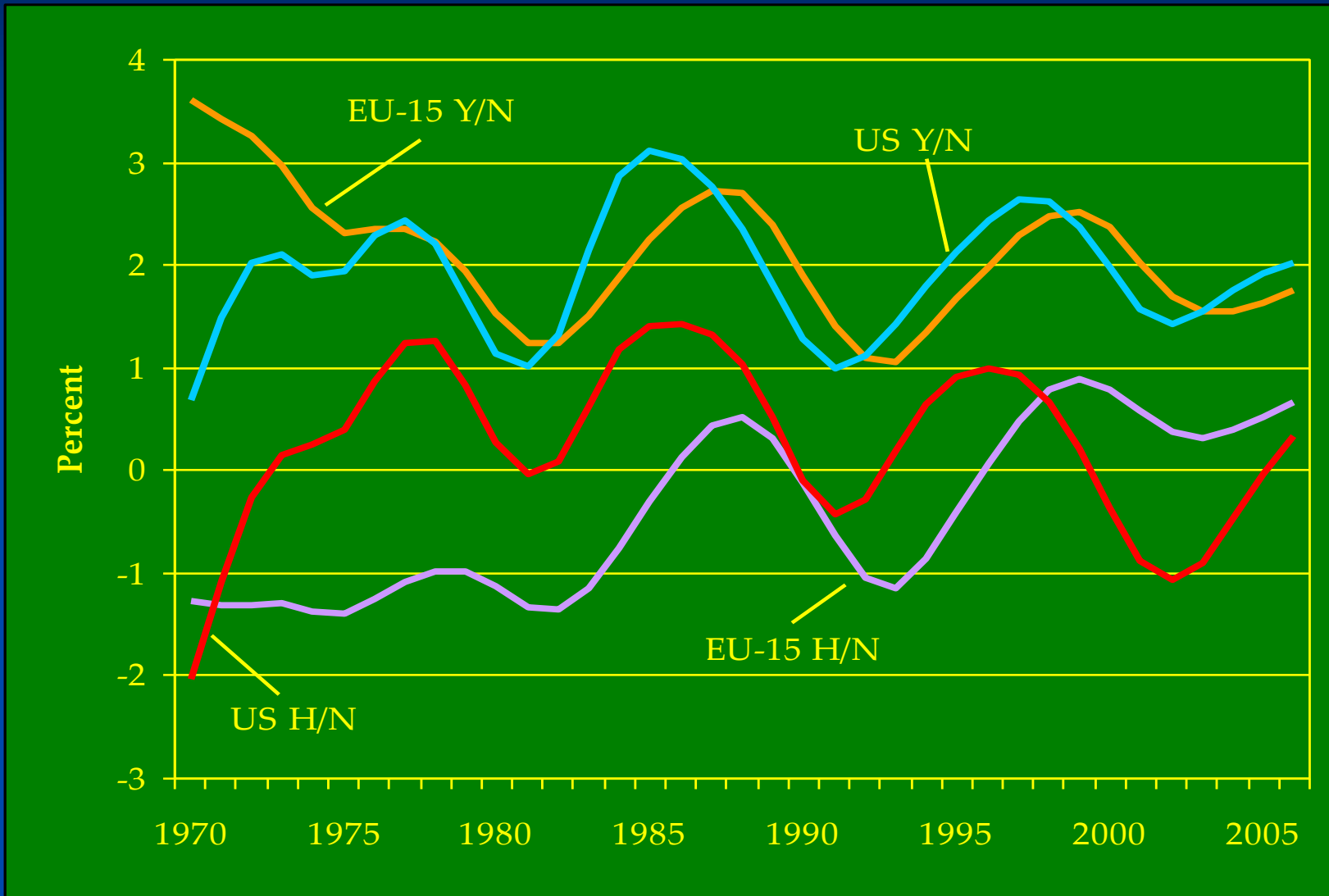
Growth Trends in E/N, 1970-2006

Growth Trend Turnaround in H/E is less Dramatic, 1970-2006

Interpreting the Post-1995 Turnaround

- Simple HP trends
- Europe is continuing its long slow decline
- Turnaround is generally pegged at 1995
    - The EU-15 stops catching up, and the US takes off
- We are mainly going to examine the determinants of the turnaround – i.e. changes in Y/H growth post-1995
- Qualification: US trend peaks in 2002-03 and is now declining

U. S. Productivity Growth Trends
Based on Data to 2007:Q4
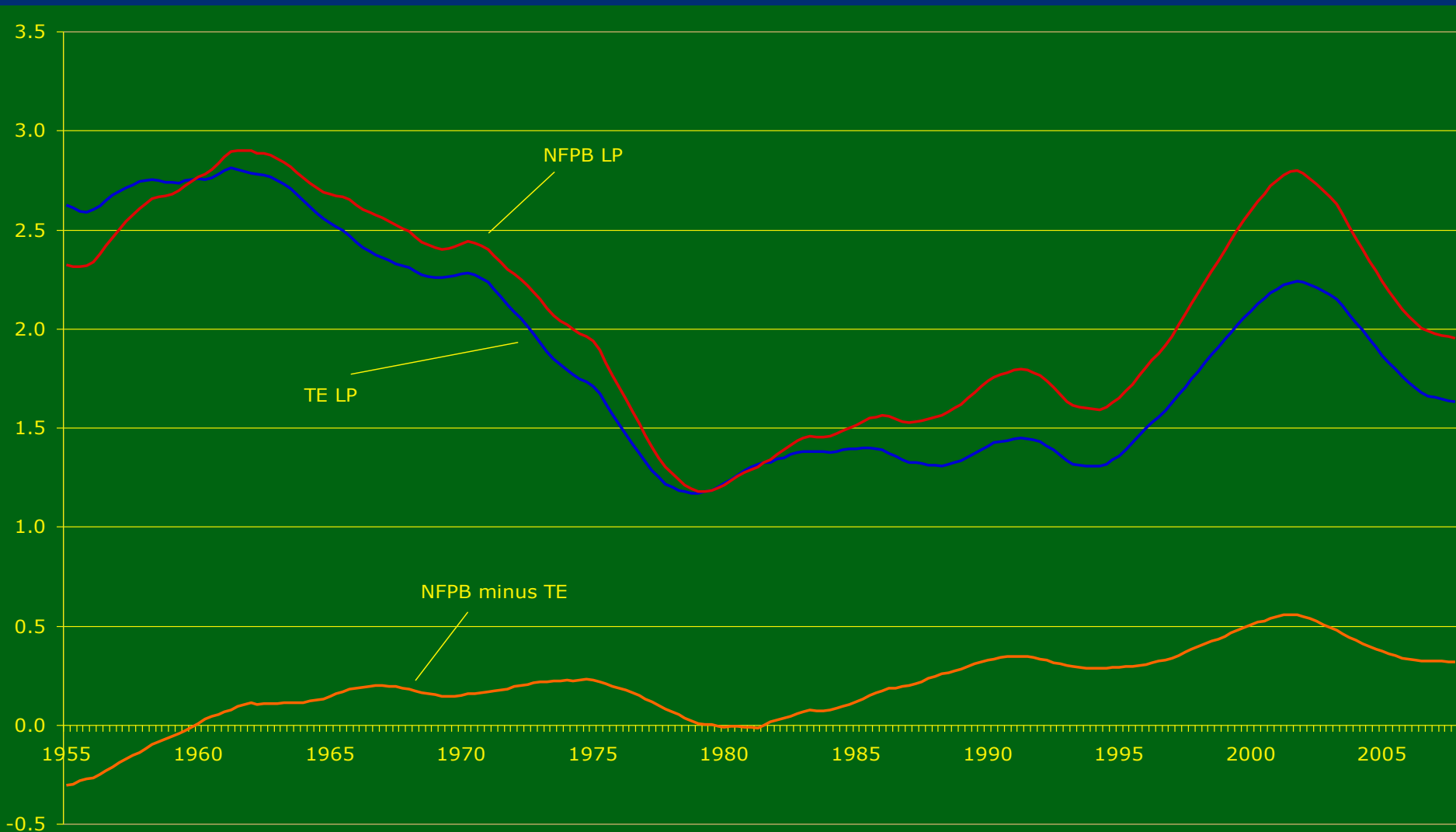
We Need to Look at Everything Per Capita

- Population growth in EU 0.7 percent per year slower than US over the past decade
- Output per capita in the EU doesn't look bad at all
- Post-1995 hours turnaround is a counterpart to the Y/H turnaround
- We will see that there is a similar pattern *within* the EU – strong negative correlation between the hours and ALP turnarounds
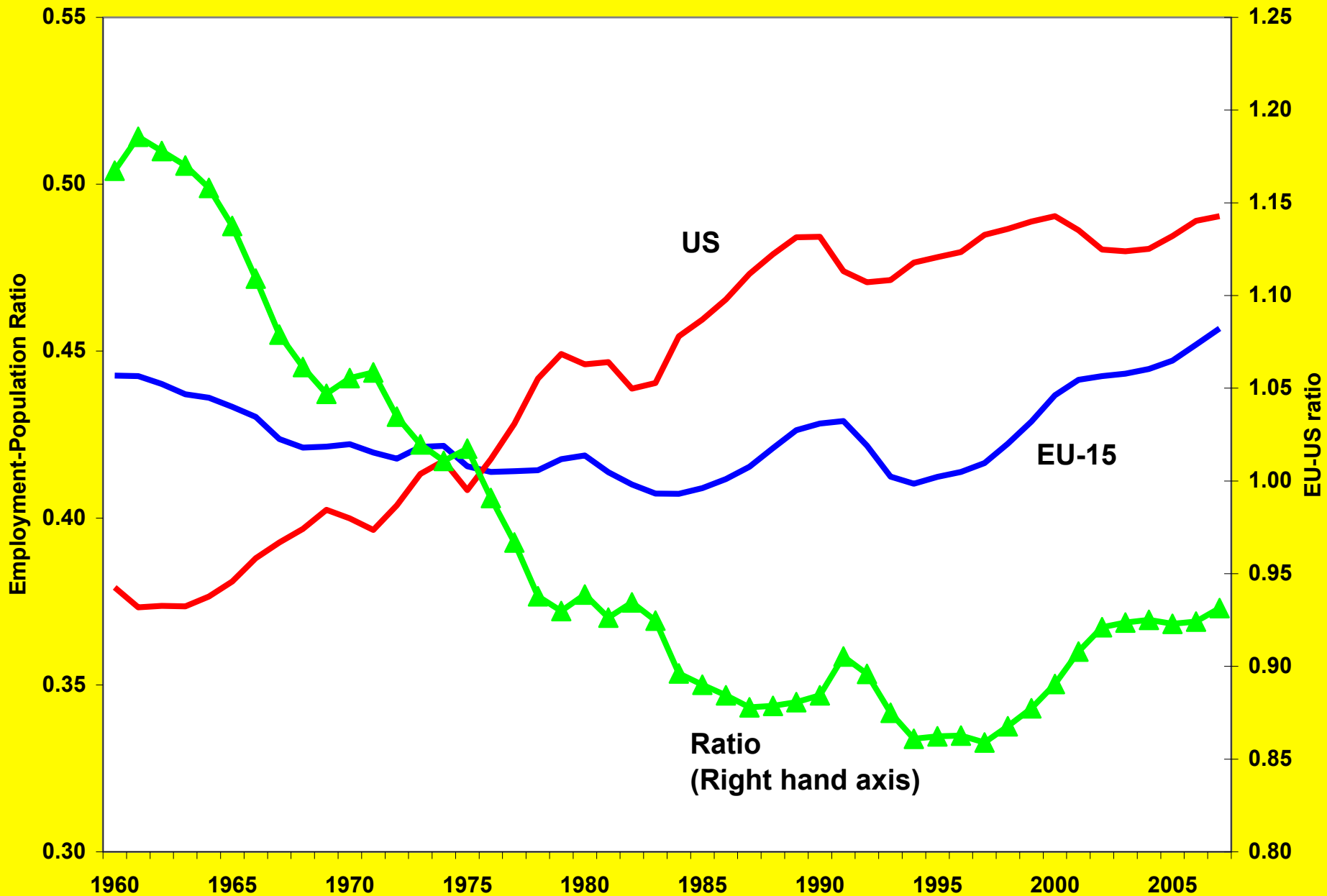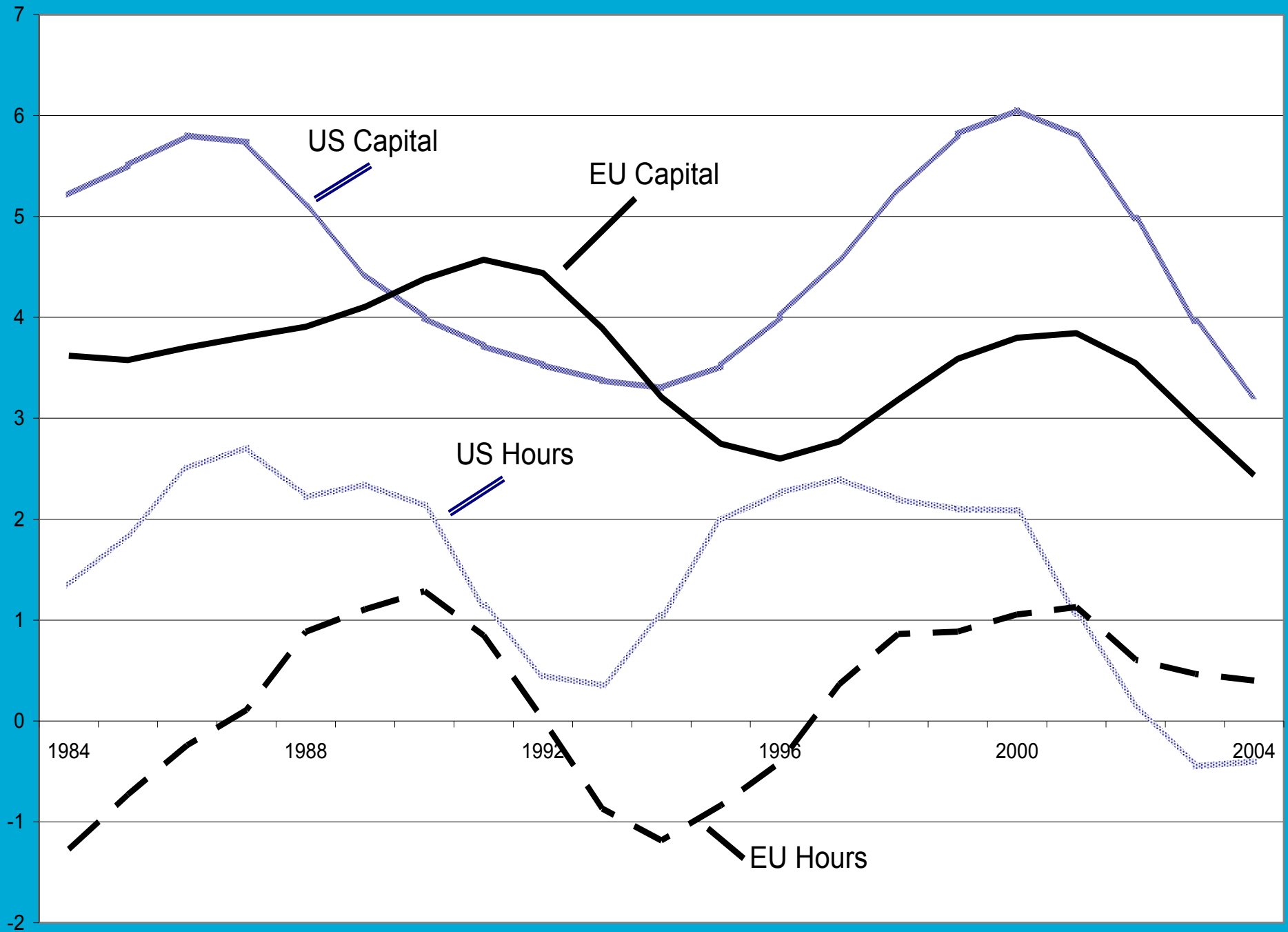
Turnarounds in Hours and Output

- Turnarounds are 1995-2006 minus 1980-1995 growth
- The relative turnarounds (EU minus US) cancel each other out

$$Y/H \ + \ H/N \ = \ Y/N$$

-2.20   1.99   -0.21

- 1980-2005 Y/N growth is identical
- But the EU is not catching up

US vs EU E/N

- The US has experienced an enormous decline in hours growth when capital growth fell
  - Thus "capital-deepening" numbers for US are misleading as they reflect as much movements in the denominator as in the numerator.
  - Cumulative hours growth zero 2000-06, growth in hours per capita negative
- The EU had strong hours growth while the US went through its recession and recovery

Defining the Four Country Groups, Pop Share and ALP Growth 1995-2006

- Nordic: Denmark, Finland, Sweden
  - Pop Share: 5   ALP: 2.09
- Anglo-Saxon: UK and Ireland
  - Pop Share: 17   ALP: 2.18
- Continental: Benelux, Austria, France, Germany, Portugal
  - Pop Share: 49   ALP: 1.75
- Mediterranean: Greece, Italy, Spain
  - Pop Share: 29   ALP: 0.24

A closer look at the Mediterranean Countries

- Mainly driven by Spain and Italy

Spain:

- ▶ -4.43 turnaround in Y/H
- ▶ *+5.04* turnaround in H/N

Italy:

- ▶ -2.28 turnaround in Y/H
- ▶ +1.16 turnaround in H/N

- Had we ranked the countries according to output per capita, Spain would be a Tiger, behind only Greece and Ireland

Making Sense of Cross-EU Heterogeneity in Table 1

- Notice the homogeneity pre-1995 and heterogeneity post-'95. Stdev LP 0.63 to 1.0. Stdev H/N 0.46 to 1.02

- The only two countries with a noticeable acceleration in LP are Sweden, Greece and Ireland

- Declines < 1% for Finland, UK, Austria, Lux, NL

- Sharp declines for Belgium, Denmark, France, Germany, Portugal, and especially Italy and Spain

- We emphasize the experience of the Mediterranean countries and their contrast with Nordic & Anglo-Saxon

Research Strategy

- Divergence across the EU has increased

- The Y/H slowdown in the Med countries is balanced by healthy H/N growth, which mainly consists of E/N growth

- We will estimate regressions that allow us to determine how much of the turnaround in E/N growth can be attributed to policy/institutional variables

- Then how much of the productivity slowdown can be explained by the E/N growth and by policy variables, separately and together?
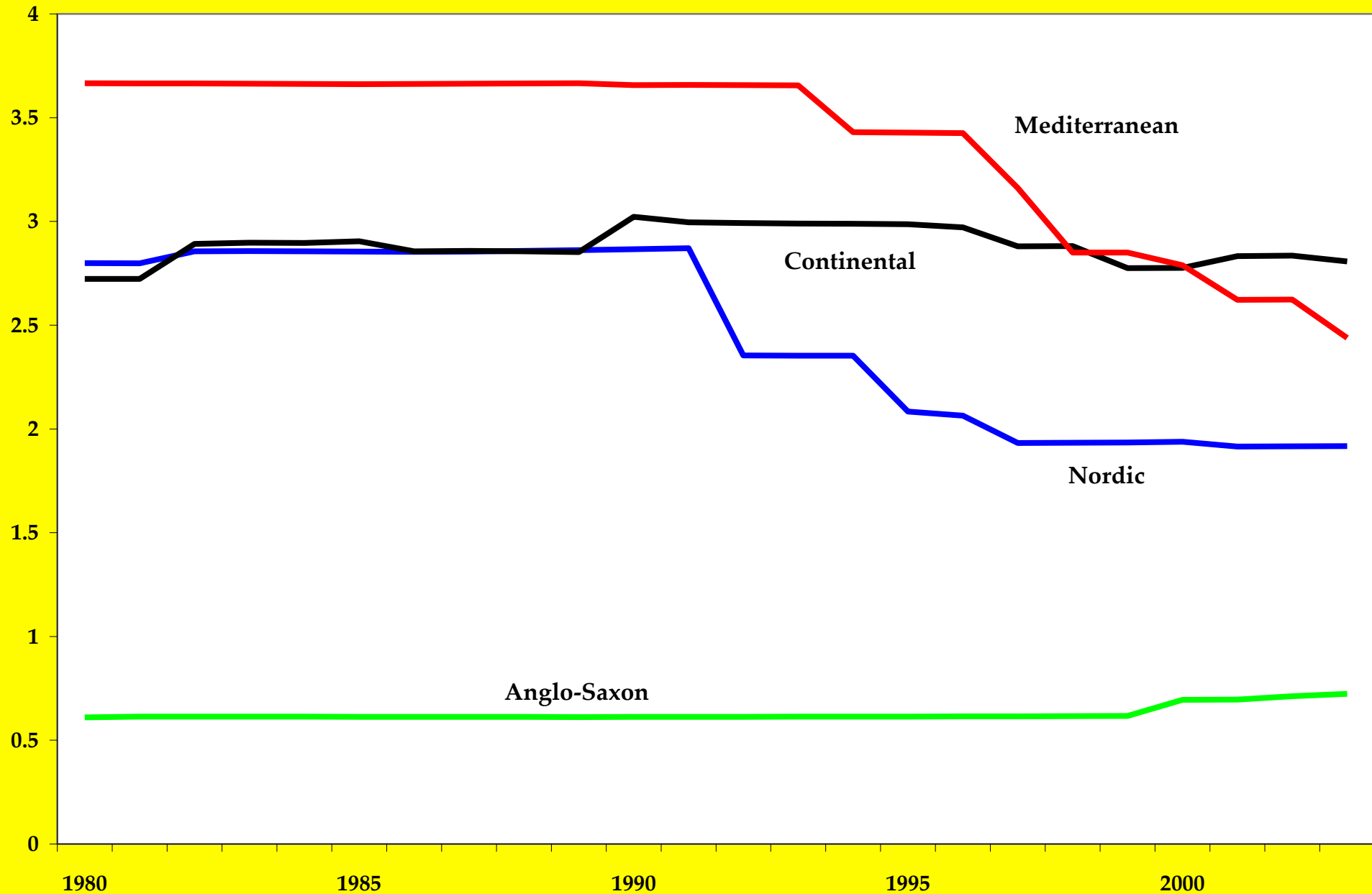
Employment Regressions

- Cover 1980-2003 EU-15, N=320, population weighted

- **Explanatory Variables:**
  - Output Gap
  - Average Replacement Rate (ARR)
  - Employment Protection Legislation (EPL)
  - Product Market Regulation (PMR)
  - Union Density
  - Tax wedge
  - Various dummies
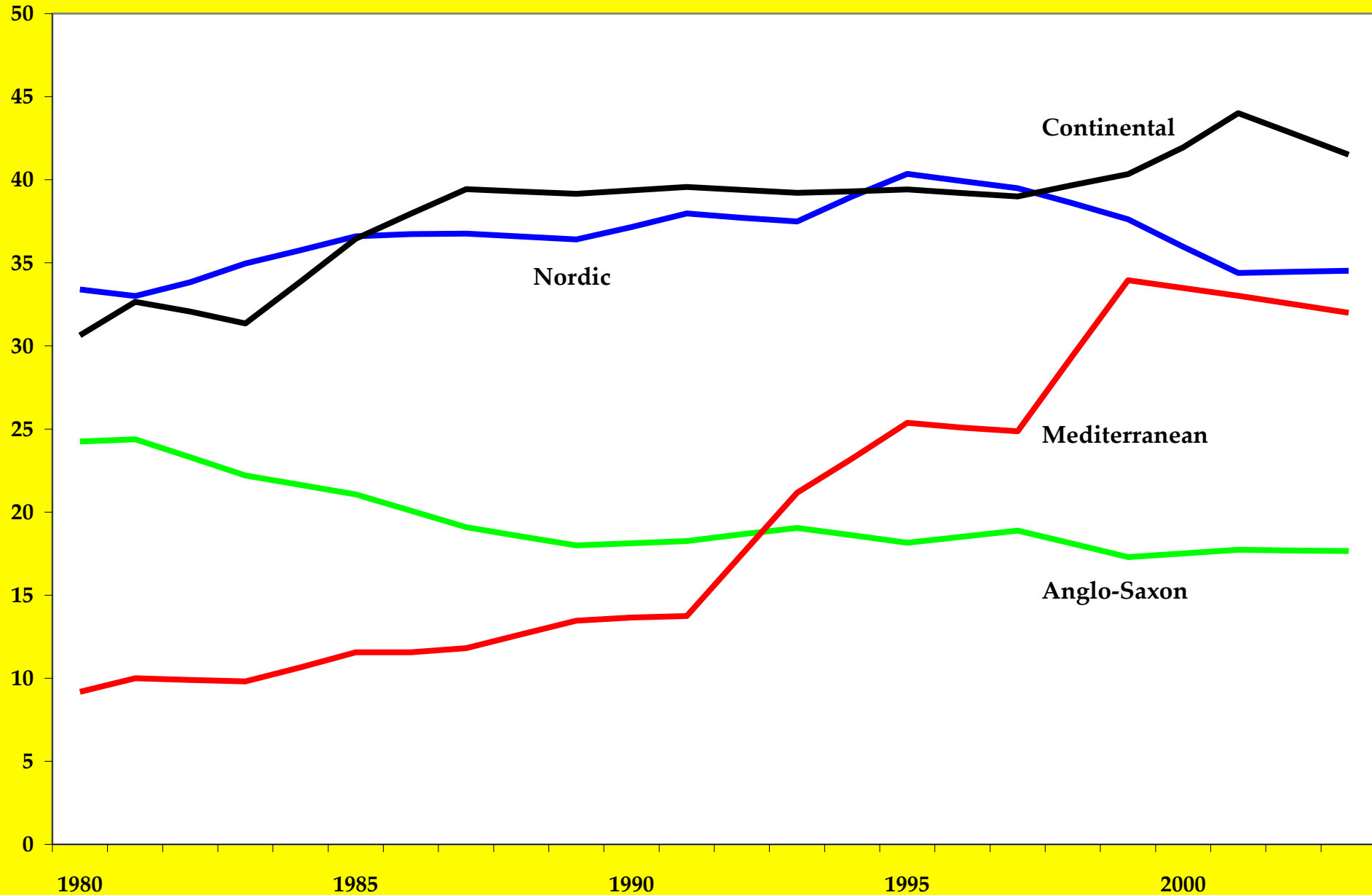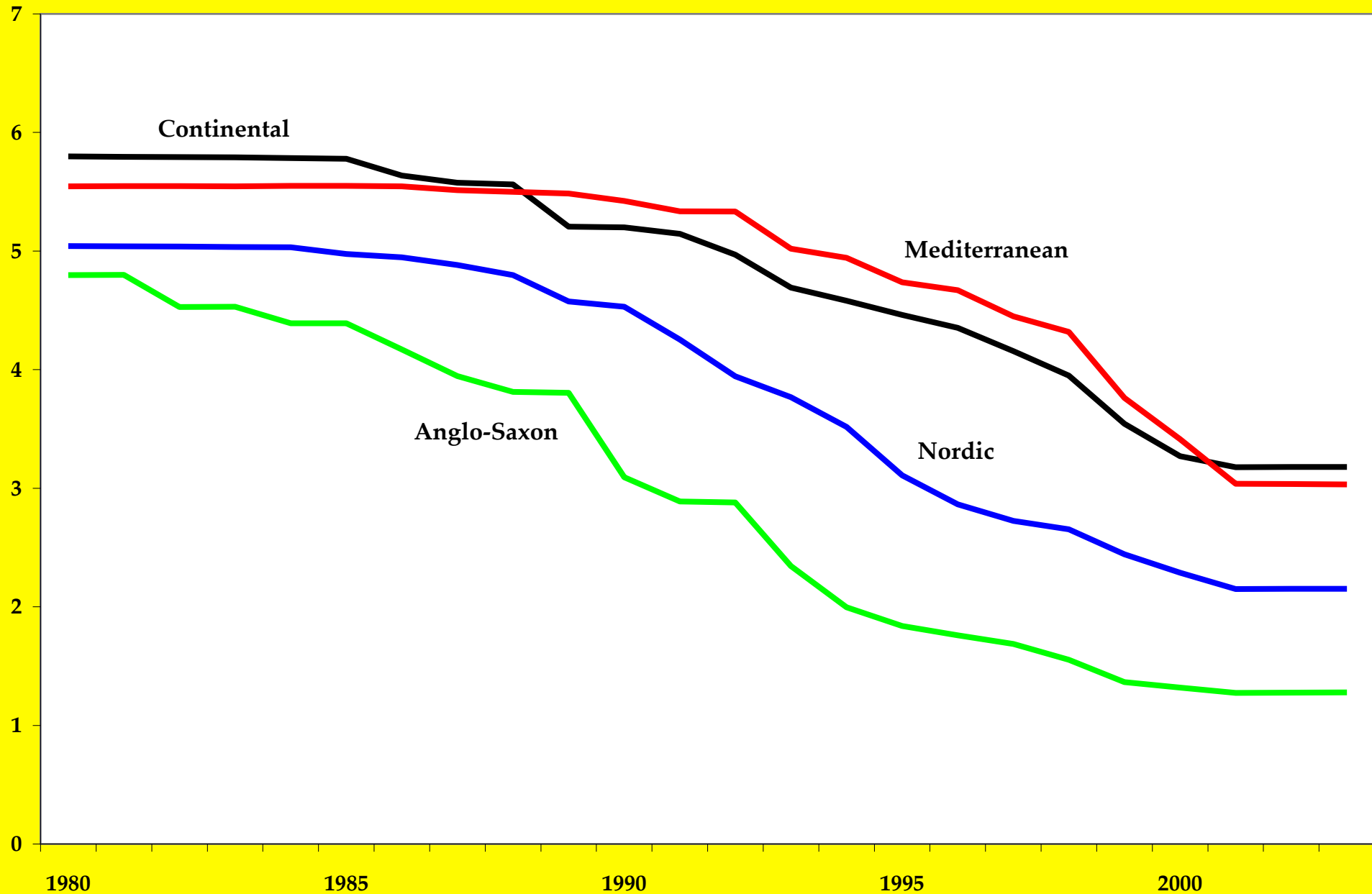- These are common across this literature

Taxes in Europe
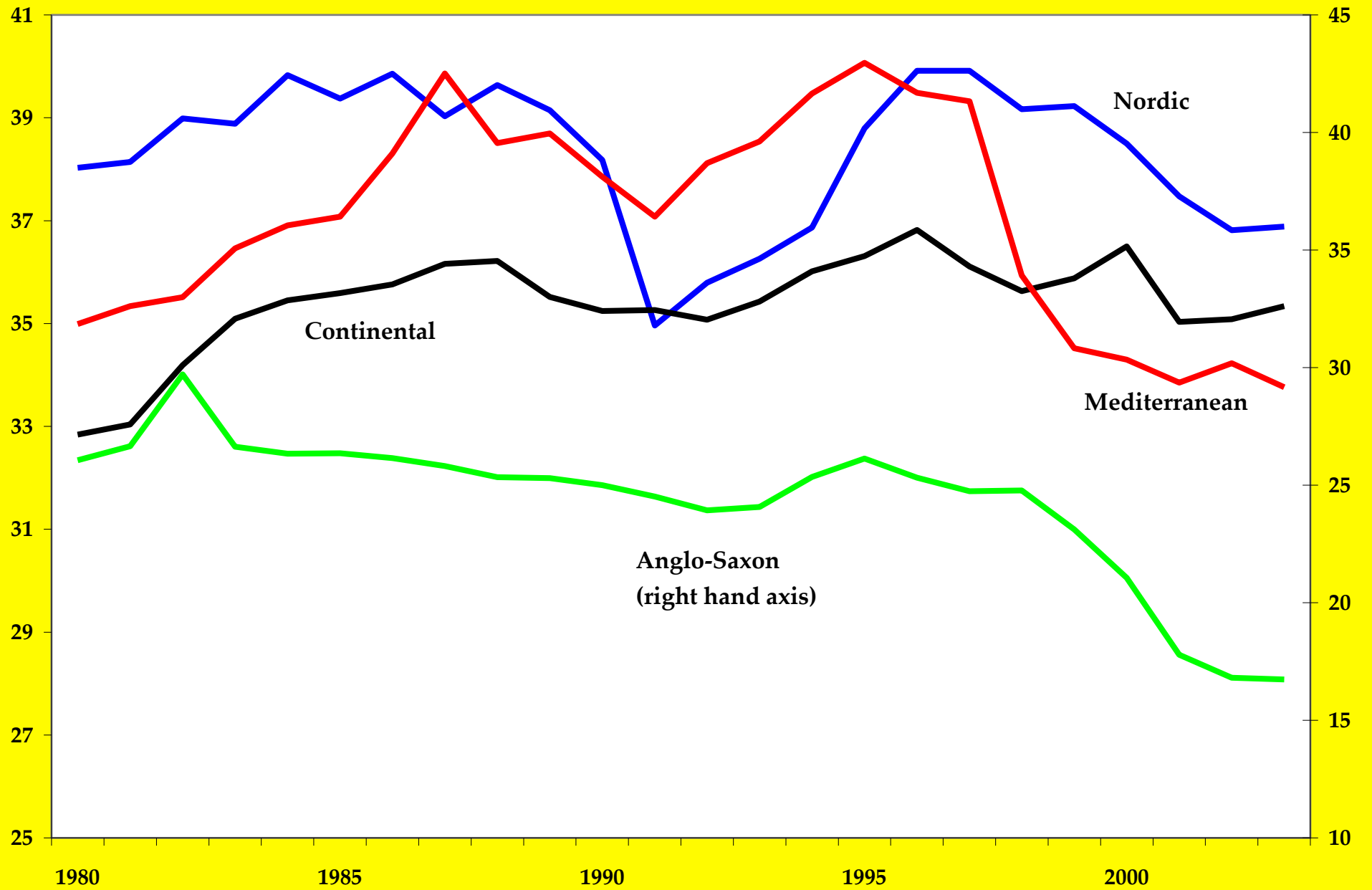
Employment Protection Legislation

Unemployment Benefits

OCED Product Market Regulation Index

Employment Regression Results

Tax Wedge	**-0.28**	*******
	(0.07)	
Employment Protection Legislation	**0.86**	
	(0.79)	
Product Market Regulation	**-0.44**	
	(0.55)	
Unemployment Benefits (ARR)	**-0.18**	*******
	(0.05)	
Union Density	**-0.46**	*******
	(0.10)	
High Corporatism Dummy	**-2.04**	******
	(0.98)	
Output Gap	**0.52**	*******
	(0.05)	
Post-1995 Dummy	**0.94**	
	(0.15)	
R2	**0.52**	
N	**320**	
RMSE	**1.18**	

- Our tax wedge coefficient is consistent with what others have found

- EPL and PMR seem to have no effects

- Everything else has the correct sign – regulations and taxes reduce employment

- The post-1995 dummy is substantial
  - Growth in the employment *rate* rose by 1% after '95
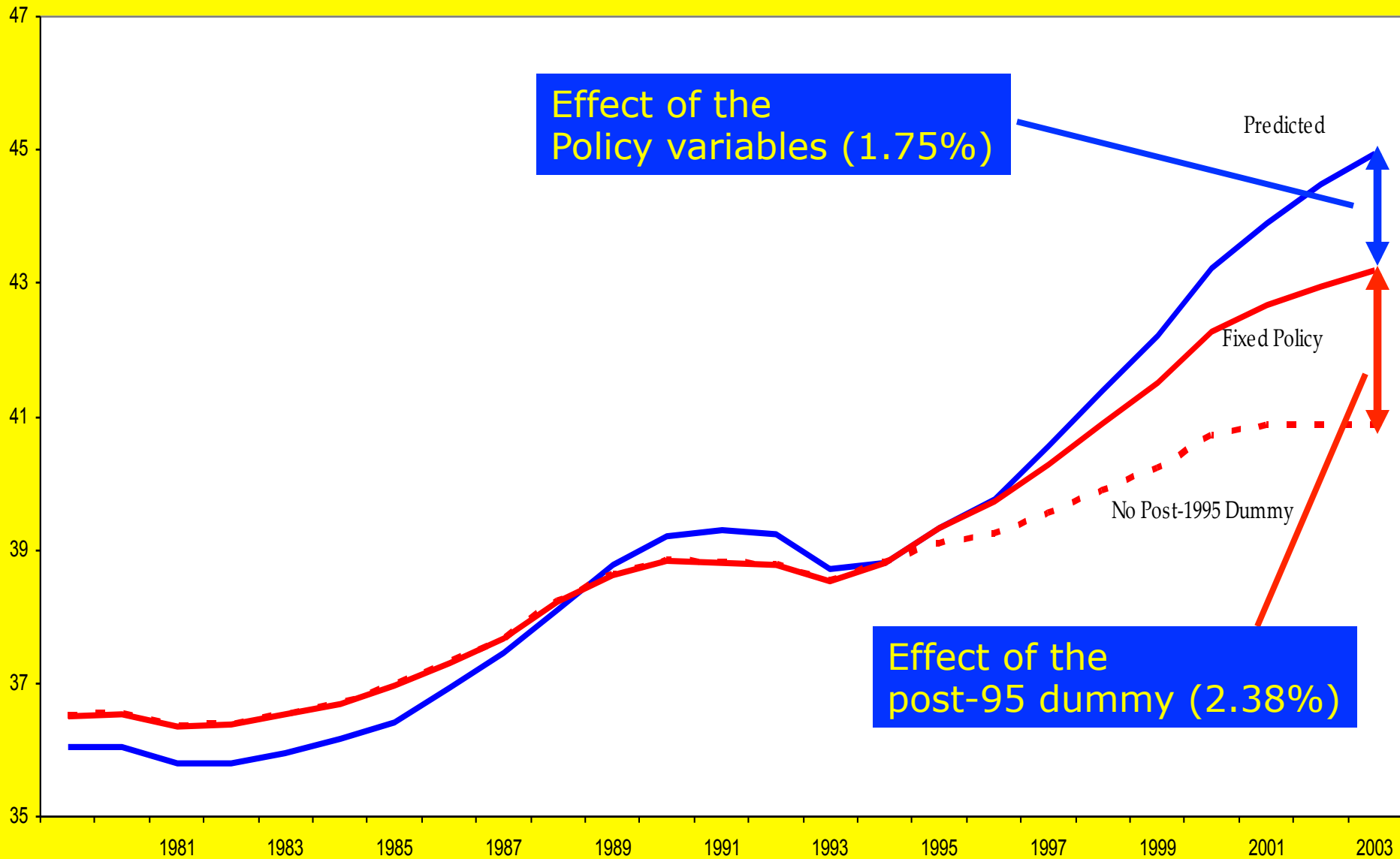
Employment Regression Results

Robustness

- Results are the same if population weights are dropped or year dummies are added

- Dropping the Mediterranean countries or Spain does not affect the size of the post-1995 dummy

Employment Regression Results

- With all of our dummies, we need to determine the effects of the policy/institutional variables holding constant the country and time dummies.

- We plot predicted values with policy fixed at its 1995 level

- The output gap and dummies are still allowed to vary

Female Employment

Male Employment

Effect of the
Policy variables (1.47%)

Predicted

Fixed Policy

Effect of the
post-95 dummy (6.32%)

No Post-1995 Dummy
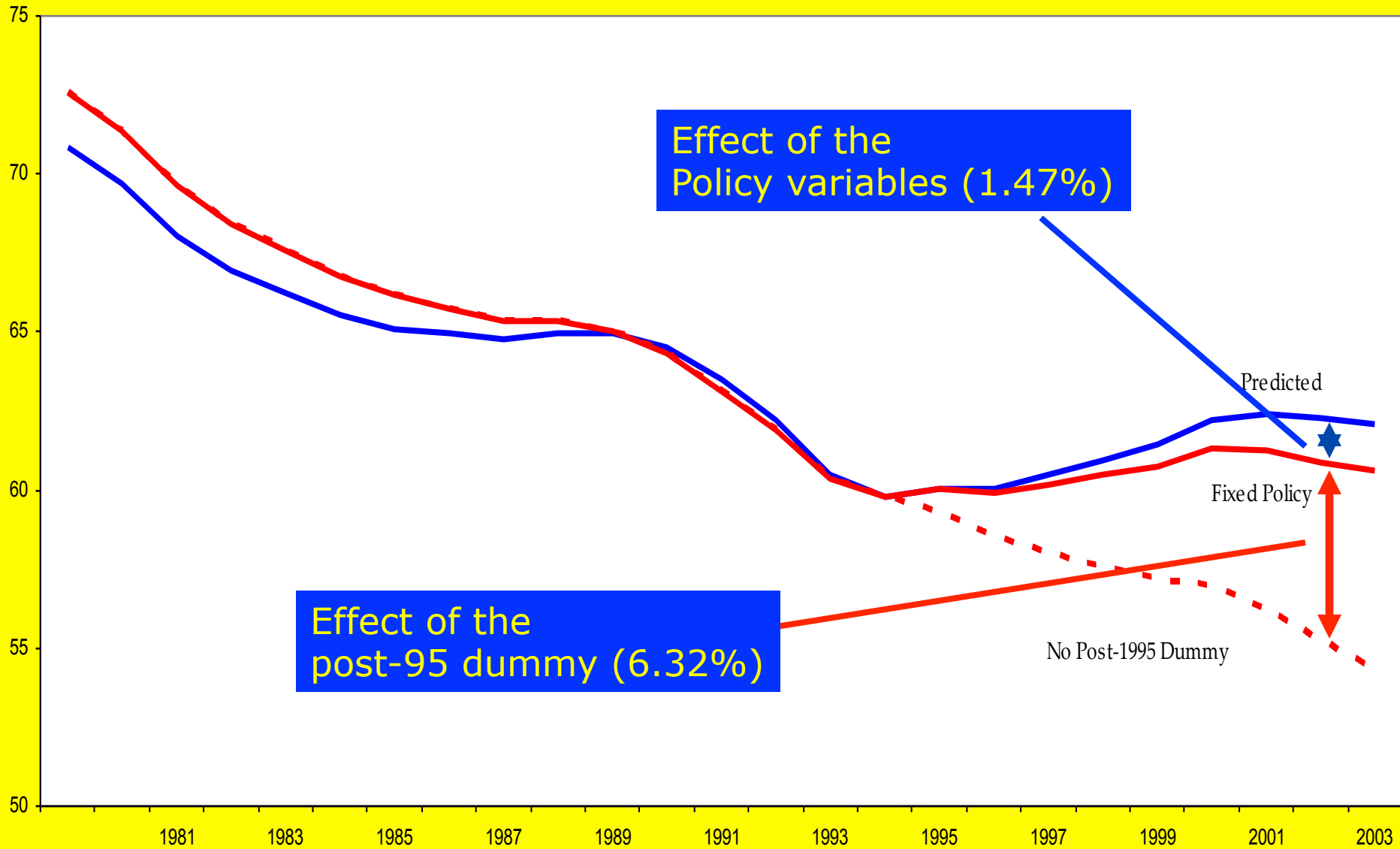
Productivity Regressions

- Suppose we are in a Cobb-Douglas world. What coefficient would we expect on employment?

    $$y = 0.33*k + 0.67*l$$

    $$(y-l) = 0.33*(k/l)$$

- If capital is fixed, the coefficient will be -0.33
- If capital adjusts it will be smaller
- If labor is not homogenous it could be larger
    - The last people to enter the labor force are likely the least skilled and experienced

Productivity Regressions

- We can't simply regress productivity on employment

- A shock to productivity affects wages and hence employment
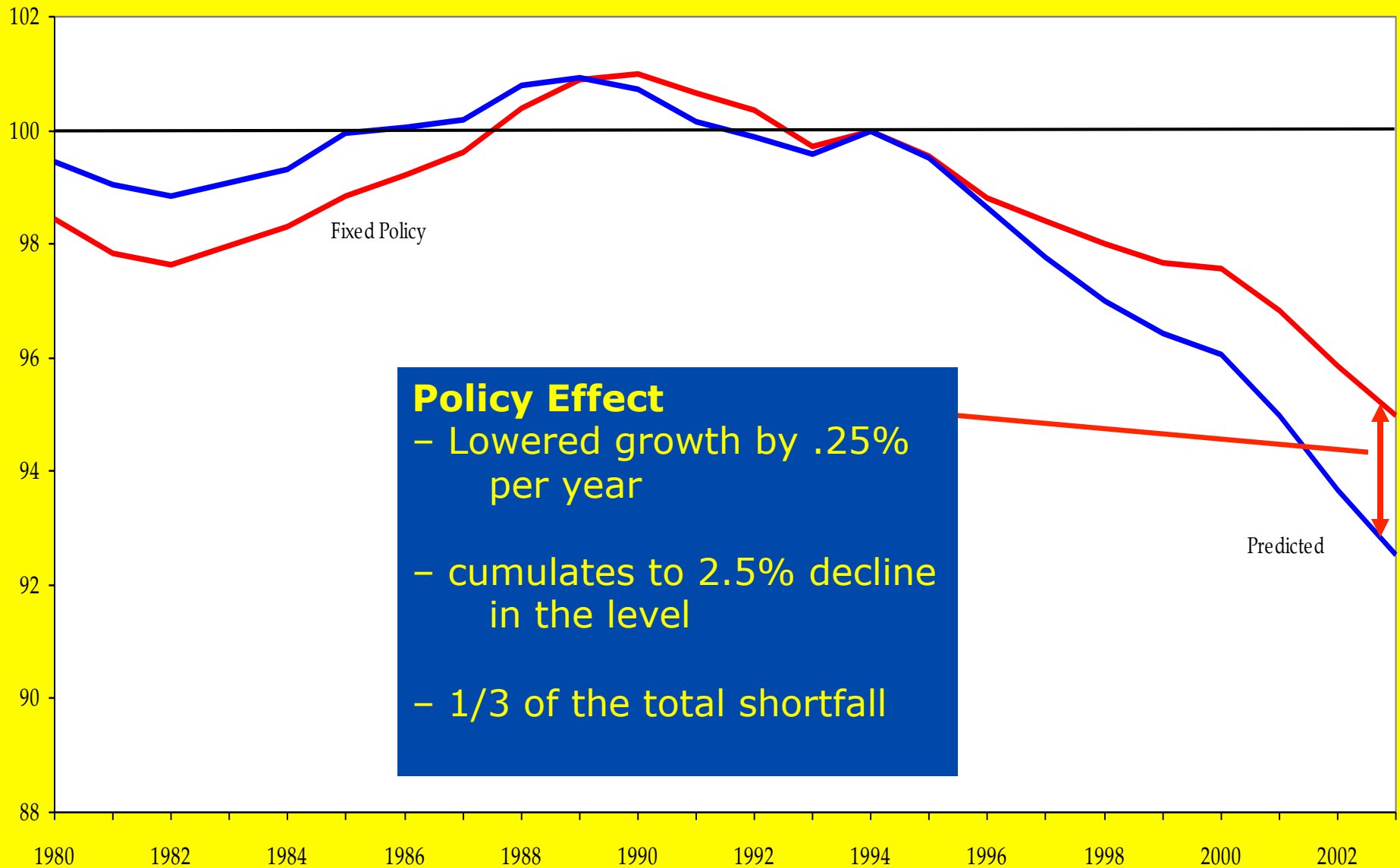
Productivity Regressions

Identification

- We want variables that affect employment but not productivity

- The tax wedge is our best candidate

- We also consider using the post-1995 dummy and union density

  - Pragmatism

  - This gives more power and passes identification tests, but raises the question as to what caused the post-1995 change as quantified by the dummy

Productivity Regressions

Employment Rate	-0.64	***
	(0.20)	
Employment Protection Legislation	1.66	***
	(0.65)	
Product Market Regulation	0.56	
	(0.45)	
Unemployment Benefits (ARR)	0.14	***
	(0.05)	
Union Density	0.03	
	(0.12)	
High Corporatism Dummy	-0.49	
	(0.94)	
Output Gap	0.68	***
	(0.11)	
Post-1995 Dummy	-0.14	
	(0.24)	
R2	0.63	
N	320	
RMSE	0.95	

- Tax wedge is the only instrument in this version
- Coefficient on employment is twice what we would expect
- EPL and ARR have independent positive effects on productivity
- We can drive the SE on employment down to 0.10, but the result remains the same
- Not dependent on Med.

Level of Labor Productivity

Fixed Policy

Policy Effect
– Lowered growth by .25% per year

– cumulates to 2.5% decline in the level

– 1/3 of the total shortfall

Predicted

Effects of the Policy and Institutional Variables

- Assuming hours per employee is stable, E/N + Y/H = Y/N

- Policy has effects on both employment and productivity

- We just add these effects up

Effects of Policy & Institutions

	Shock Size	Employment	Productivity	Output Per Capita
Tax Wedge	9.21	-2.67 ***	1.71 ***	-0.96 **
		(0.64)	(0.53)	(0.4)
Employment Protection Legislation	0.87	0.74 **	0.23	0.97 ***
		(0.36)	(0.37)	(0.31)
Product Market Regulation	0.9	-0.14	0.35	0.21
		(0.24)	(0.25)	(0.22)
Unemployment Benefits (ARR)	11.31	-0.90 ***	1.37 ***	0.47 *
		(0.34)	(0.31)	(0.25)
Union Density	23.32	-7.93 ***	5.07 ***	-2.85 ***
		(1.17)	(1.23)	(1.07)
High Corpratism Dummy	1	-1.02 **	0.65 **	-0.37 *
		(0.48)	(0.33)	(0.21)

- Tax wedge and union density lower Y/N
- ARR and EPL have *positive* effects
  - Driven by their direct effects on productivity

# Effects of Government Policy

- Why would ARR and EPL *raise* productivity and output?
  - Acemoglu and Shimer on reservation wages and matching
  - Match quality may improve
  - More incentive to create job-specific human capital

The New Results in this Paper at the Industry Level

- We aggregate productivity growth by industry in a way that allows us to determine the relative role of productivity and shares

- The "productivity" effect is just the difference in productivity growth in a given industry

- The "share" effect is the addition or subtraction from growth as shares shift within industries.

  - Example: Ireland shifts to high tech manufacturing, this comes out as a "share" effect within manufacturing

Contributions, Productivity vs. Share Effects, in EU-US, 1995-2003
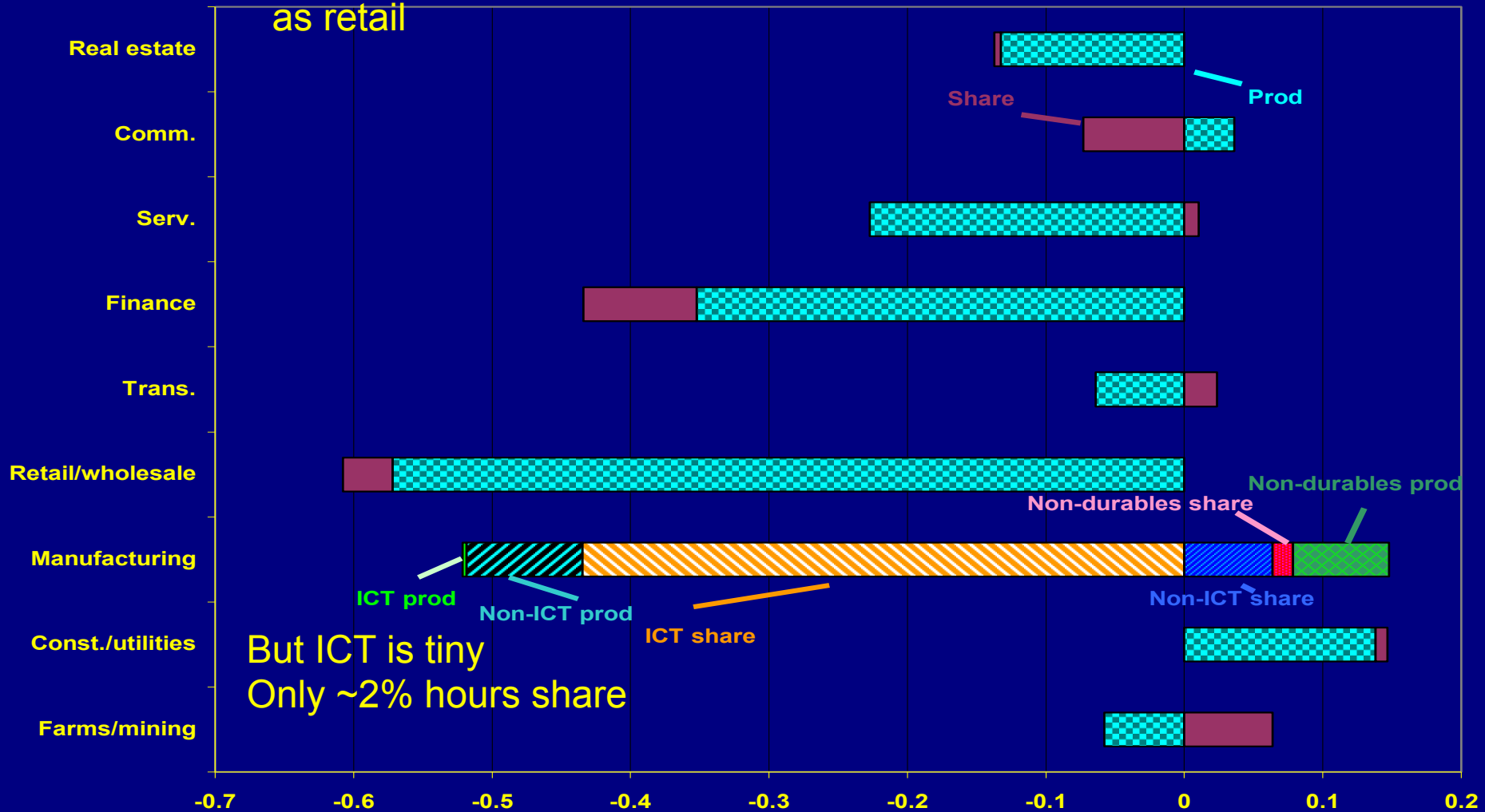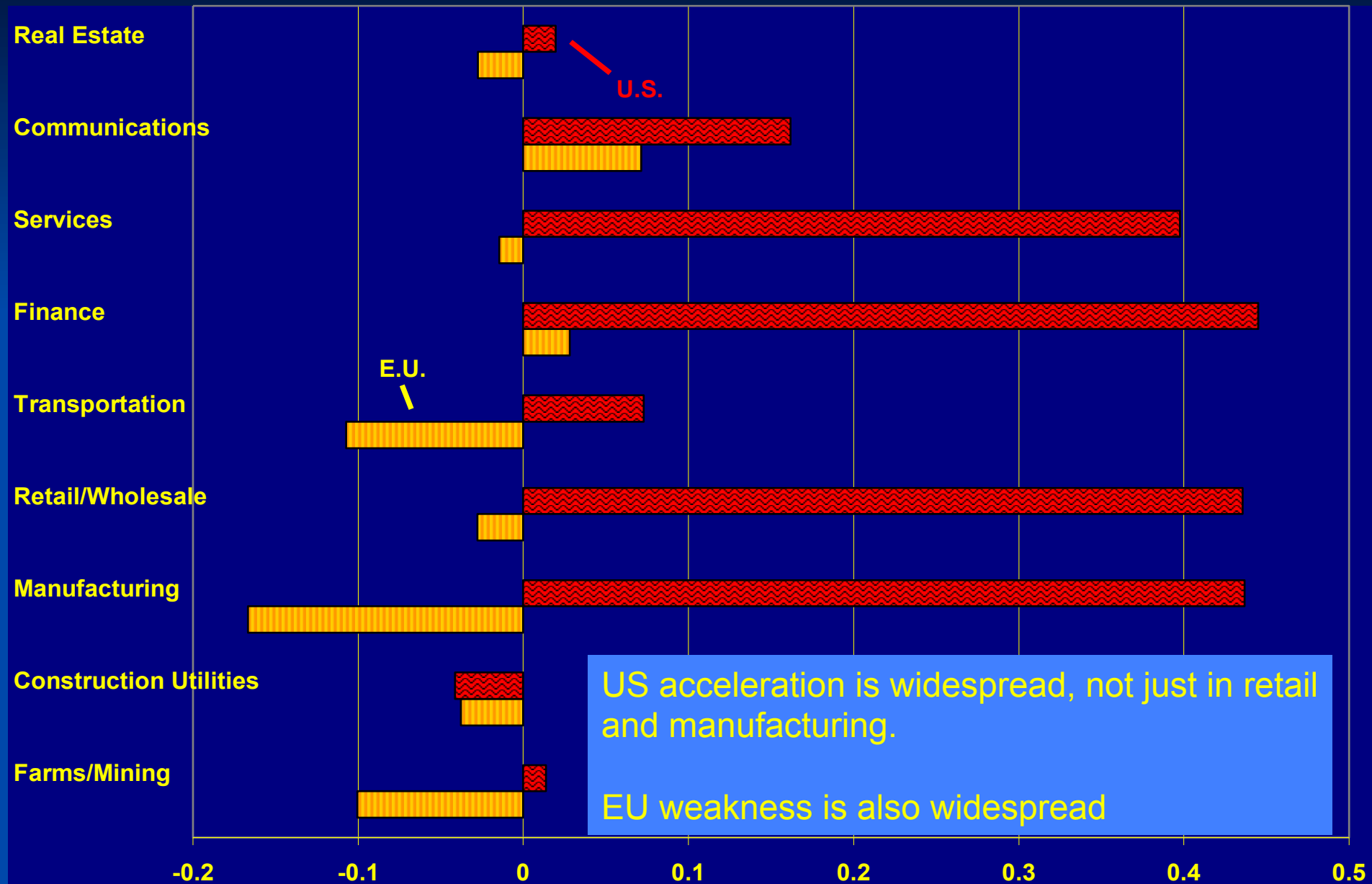
Cross-Industry Correlation of Y/H and E/N Turnarounds

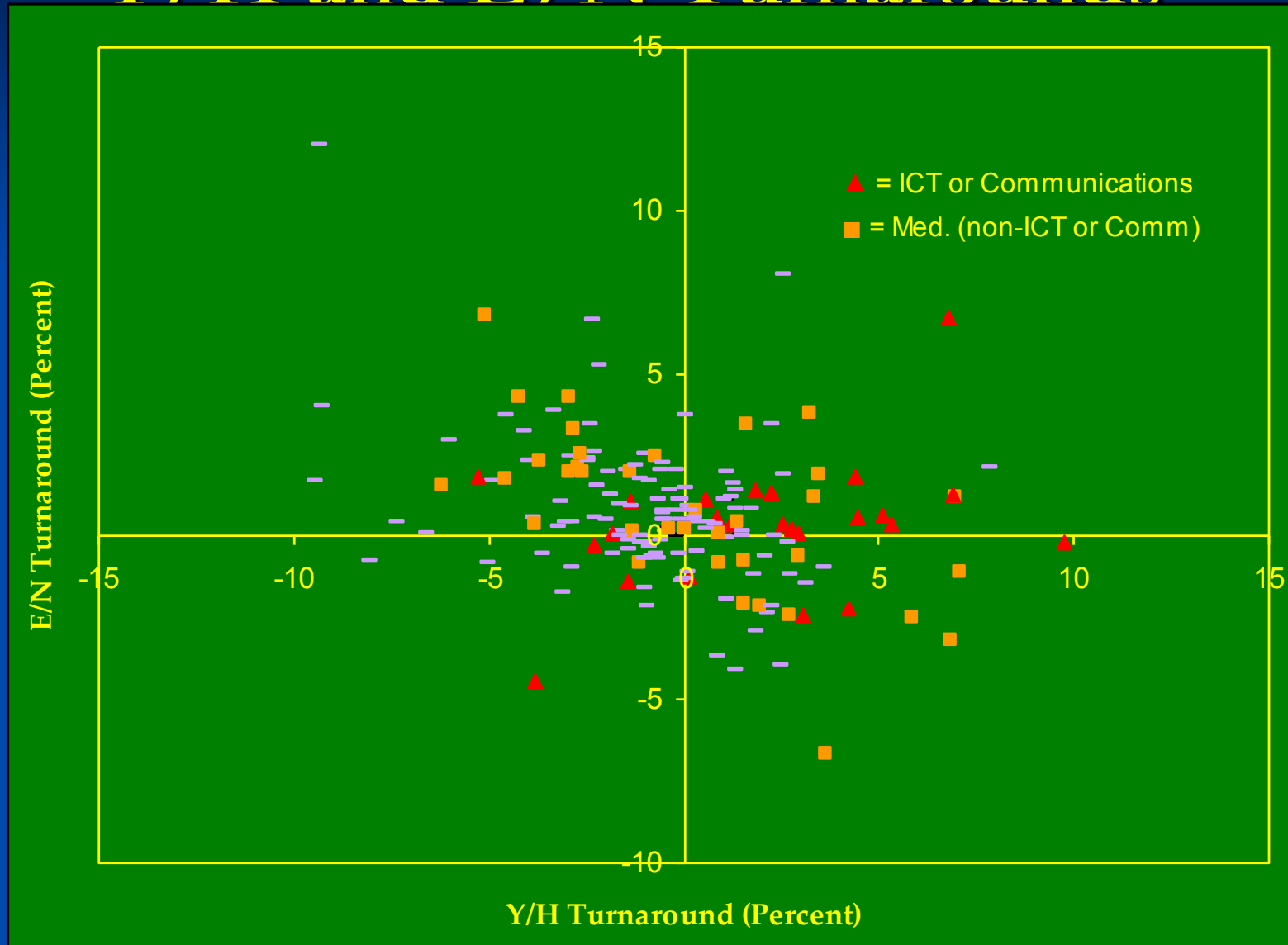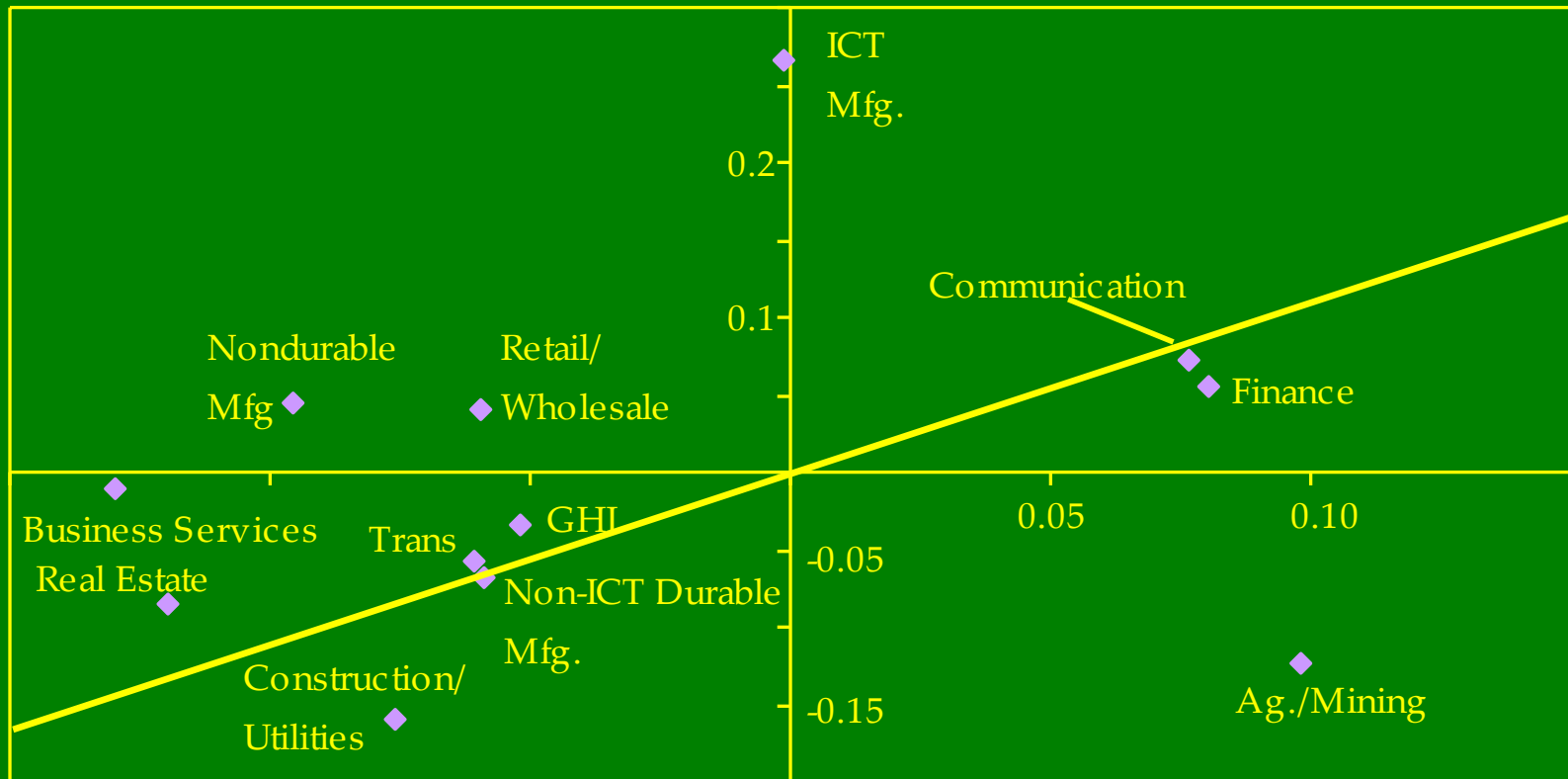# Table 12: Regressions of LP Turnaround* on E/N Turnaround*

Countries	Exclude ICT and Comm.	Coefficient	T-Statistic	N	R2	RMSE
All	No	-0.45	-4.35	179	0.10	3.000
All	Yes	-0.54	-5.94	149	0.19	2.495
Mediterranean Only	No	-0.82	-4.19	36	0.34	2.920
Mediterranean Only	Yes	-0.83	-5.60	30	0.53	2.140

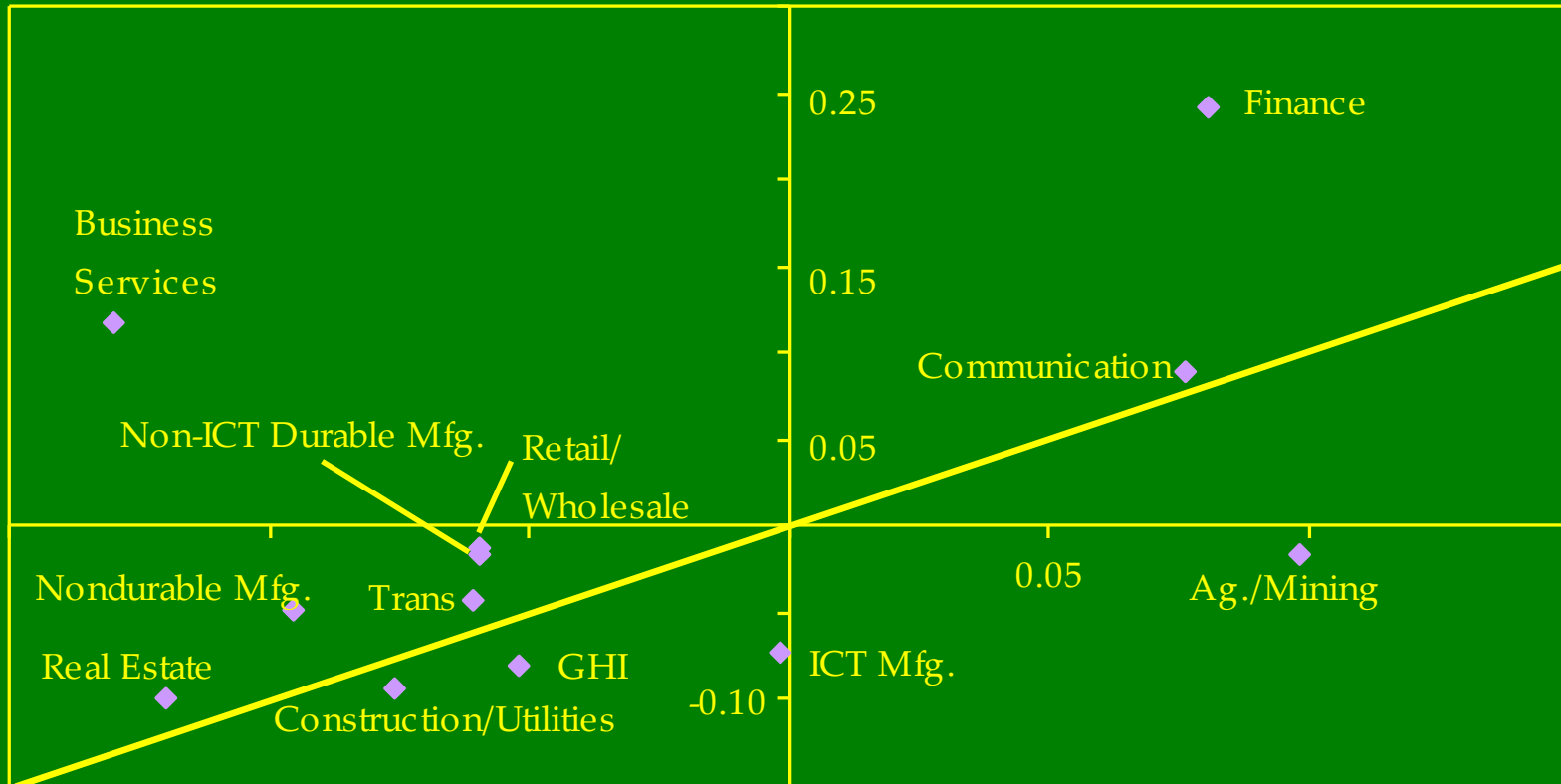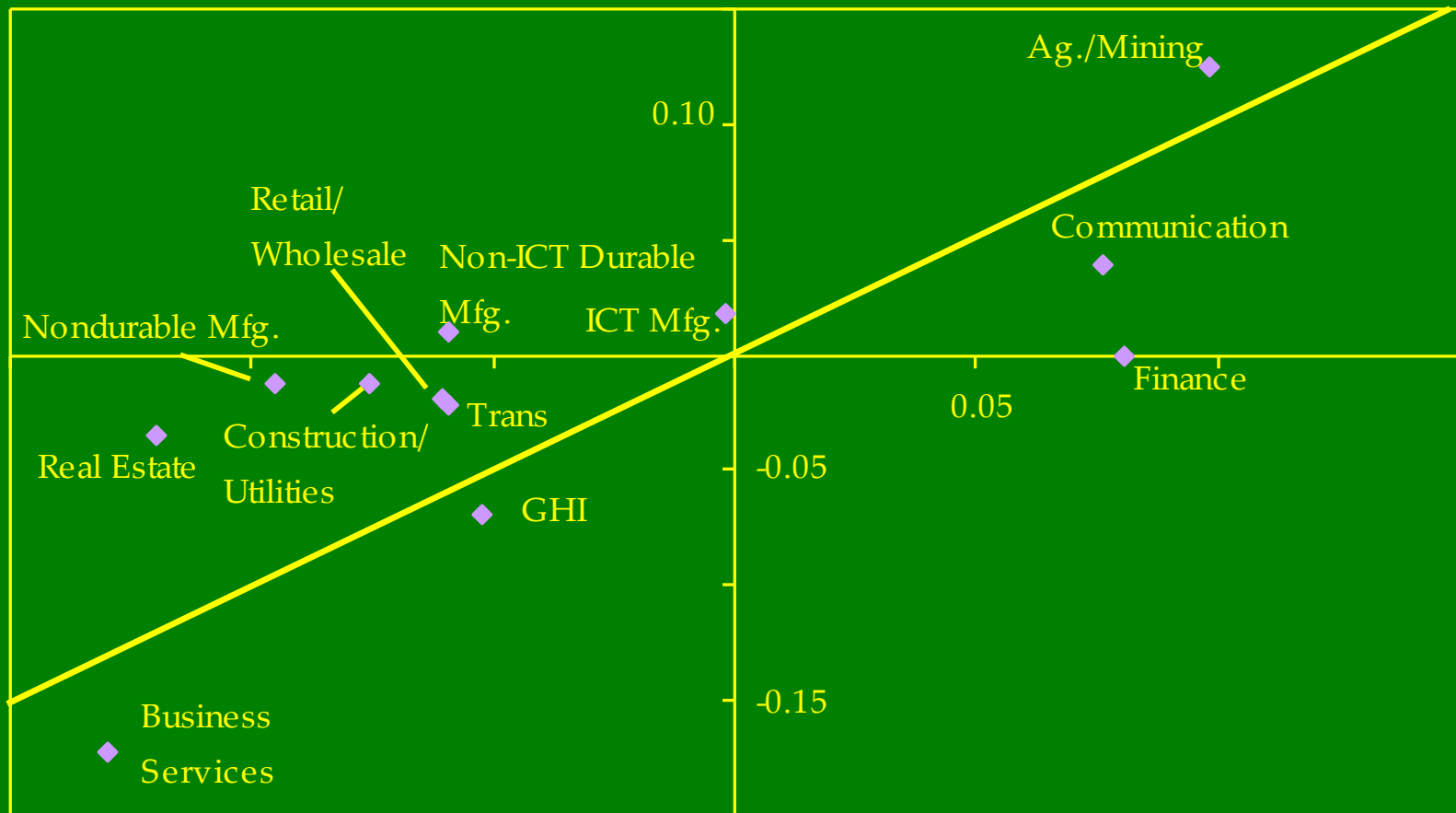* Turnaround equals 1995-2004 average growth minus 1980-1995 average growth

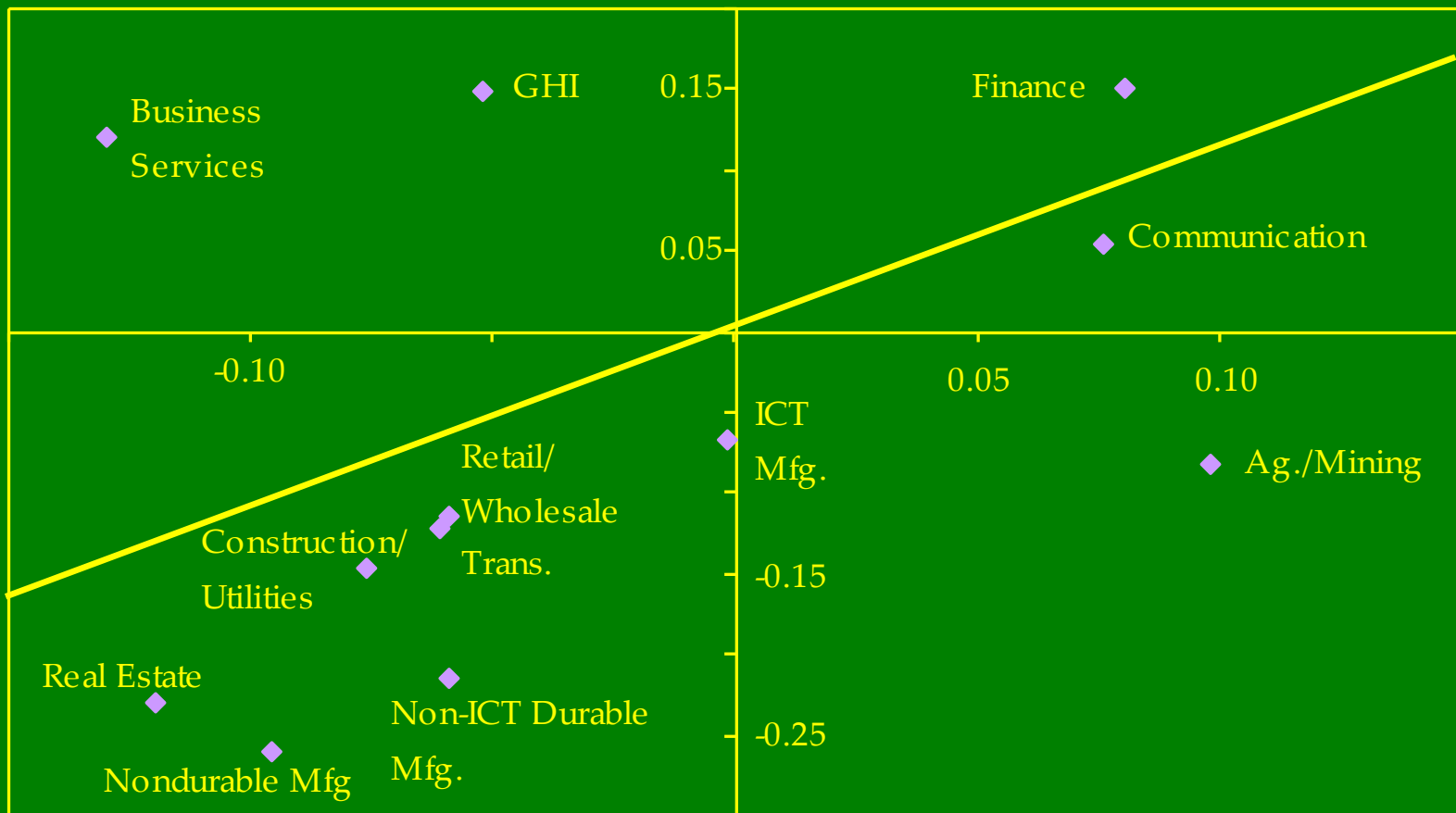# Comparing Nordic with EU-15

Comparing Anglo-Saxon with EU-15
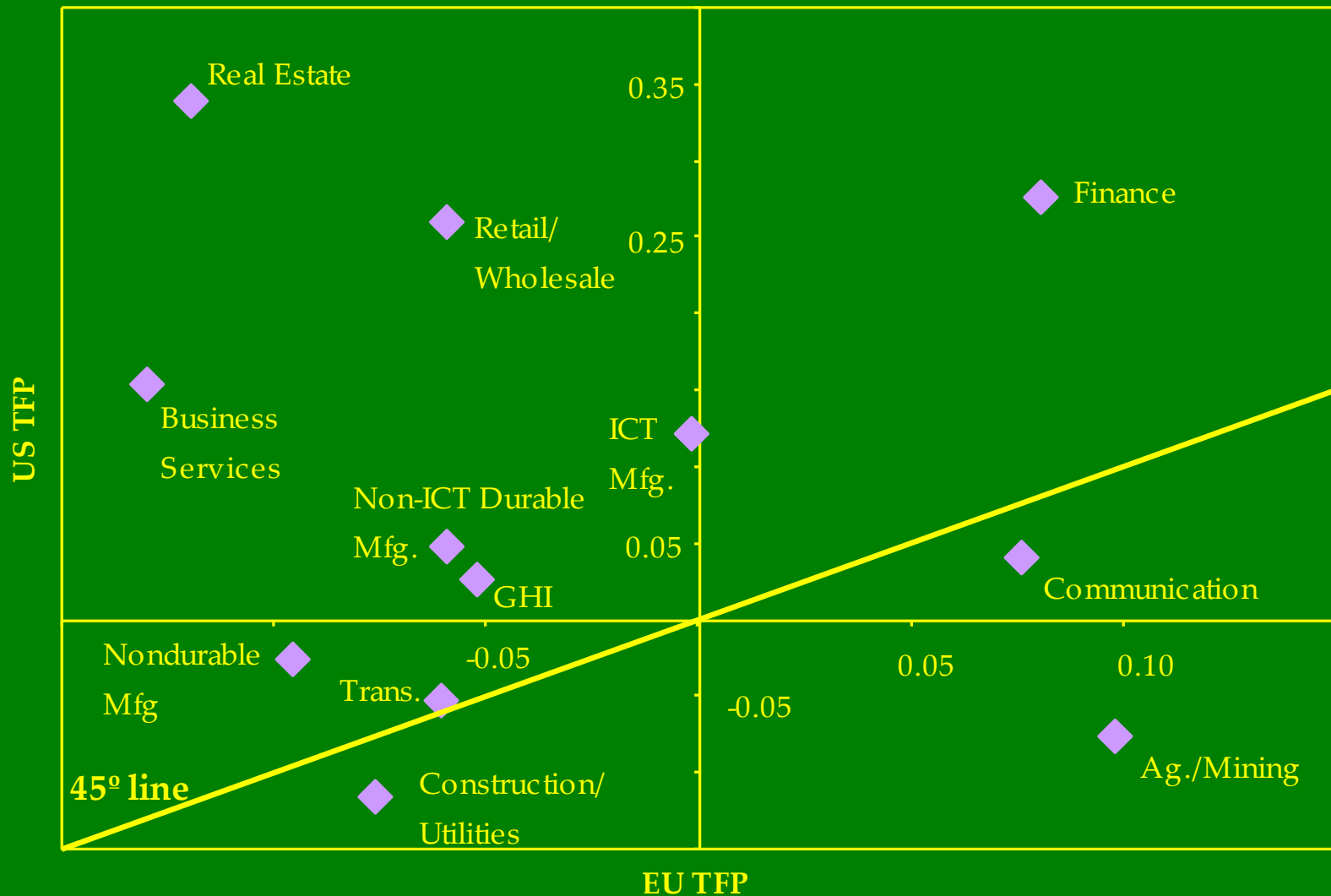
Comparing Continental with EU-15

Continental

Comparing Med with EU-15

Comparing US with EU-15

Conclusions from Employment and Productivity Growth Regressions

- Growing heterogeneity with EU-15 in employment and productivity growth after 1995.
- There is a strong negative correlation between growth in Y/H and E/N evident in the data, emerging from our regressions, and also in the cross-industry data displayed at the end
- At least in short run, lower taxes and looser regulations raise employment growth and reduce productivity growth
- The novelty in our framework is to show that policy changes widely endorsed in Europe as desirable (Lisbon agenda) may boost E/N at the cost of reducing Y/H, thus leaving ambiguous effects on growth in output per capita (Y/N)
- A 1% increase in employment only raises output by 0.36% in the short-run
- Summary of effects
  - Unions reduce output per capita
  - EPL and unemployment benefits raise output per capita
  - PMR and the tax wedge have roughly no effects

Further Conclusions from Cross-Industry Results

- Differences across Europe are in part reflected in industries that are "national champions". Compared to EU average, LP turnaround reveals
  - Nordic strong in ICT manufacturing
  - Anglo-Saxon strong in finance and business services
  - Continental average as would be expected
  - Mediterranean weak across the board, consistent with a broad-based macro explanation rather than an industry-specific explanation

Final Qualification

- The E/N and Y/H regression analysis is static and does not trace further dynamic adjustment
  - Negative effect of policy reforms on K/H should in many models be followed by faster growth in K
  - This has not happened (yet) in much of Europe
- There are fundamental differences in industry performance between the US and EU that have widely accepted structural explanations
  - Wholesale and retail trade, big boxes vs. inner-city pedestrian walking districts (role of land-use planning as another policy reform)