Productivity Growth in the U. S. and Europe: Past, Present, and Future

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What is Europe?

- Throughout "Europe" refers to the EU-15, not the EU-27
- Most of the first session compares EU-15 as a whole to the U. S. Initially we look at a long time period going back to 1870, but most of the analysis refers to post-1960
- The second session begins by additional aspects of the EU vs. U. S. comparison, but then digs deeper to find systematic differences within Europe among country groups. Focus is on post-1985.

Today's Two Sessions

- Session #1 Compares Europe and the U. S.
  - Income per Capita vs. Productivity, 1870-2010 and a closer look 1960-2010
    - Hours per Capita
      - Unemployment, LFPR, Hours per Employee
  - Sources of changes in the U. S. productivity frontier since 1870, by eras
  - Europe since 1870: falling behind, catching up, falling behind again. Why?
  - Short-run responses 2007-2010. Where do we stand now compared to 2007?
  - Future: good and bad omens for both U. S. and Europe

After Break, Session #2

- Welfare Analysis of Europe vs. U. S. as of 2007
  - How much is European welfare understated due to extra leisure that is not included in GDP?
  - How much is American welfare overstated by GDP, which ignores negative aspects of American life.
  - Role of welfare state, security, inequality
- Post-1995 EU Turnaround
  - Productivity growth has slowed down
  - Employment per capita growth has speeded up
- Is there a Tradeoff between Employment and Productivity?
- In which Industries has EU Productivity Faltered?

Definitions Used Throughout the Outline and this Presentation

Y (Real GDP), N (Population), H (Aggregate Hours of Work)

Thus

Y/N is real GDP per capita

Y/H is labor productivity

H/N is hours per capita

Further subdivisions

$$H/N = H/E * E/L * L/N$$

(hours per employee, employment rate, labor force participation rate)

The Initial Data Display for Long-Run Comparisons

Starts with linked data 1820-2010

Europe vs. U. S., income per capita (Y/N)

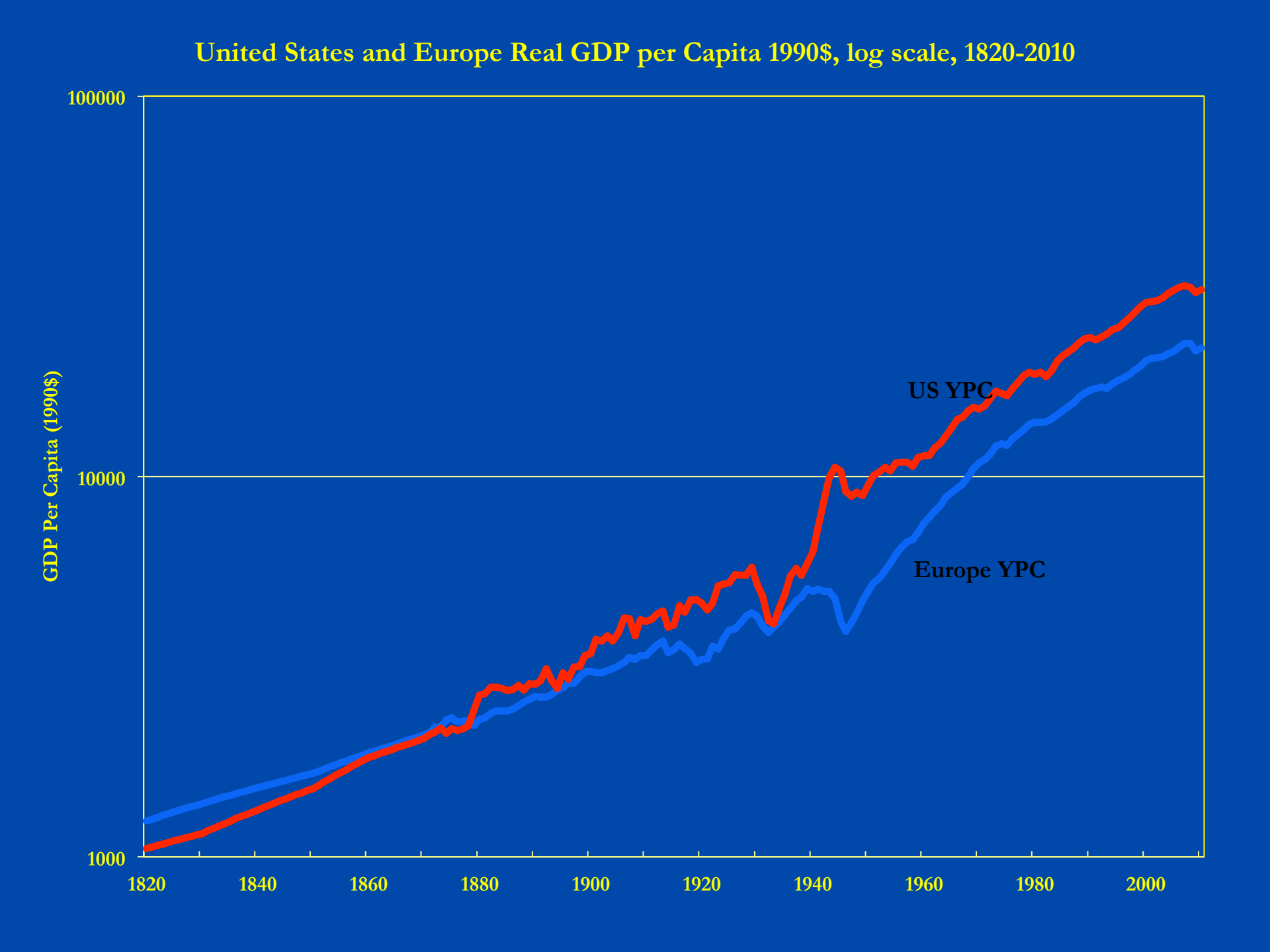
Continues with data 1960-2010

Income per capita (Y/N)

Output per hour (Y/H)

Hours per capita

Note: Real GDP is compared with two different set of PPP weights, 1990 base and 2005 base, from Groningen data source


United States and Europe Real GDP per Capita 1990$, log scale, 1820-2010
GDP Per Capita (1990$)
100000
10000
1000
1820
1840
1860
1880
1900
1920
1940
1960
1980
2000
US YPC
Europe YPC

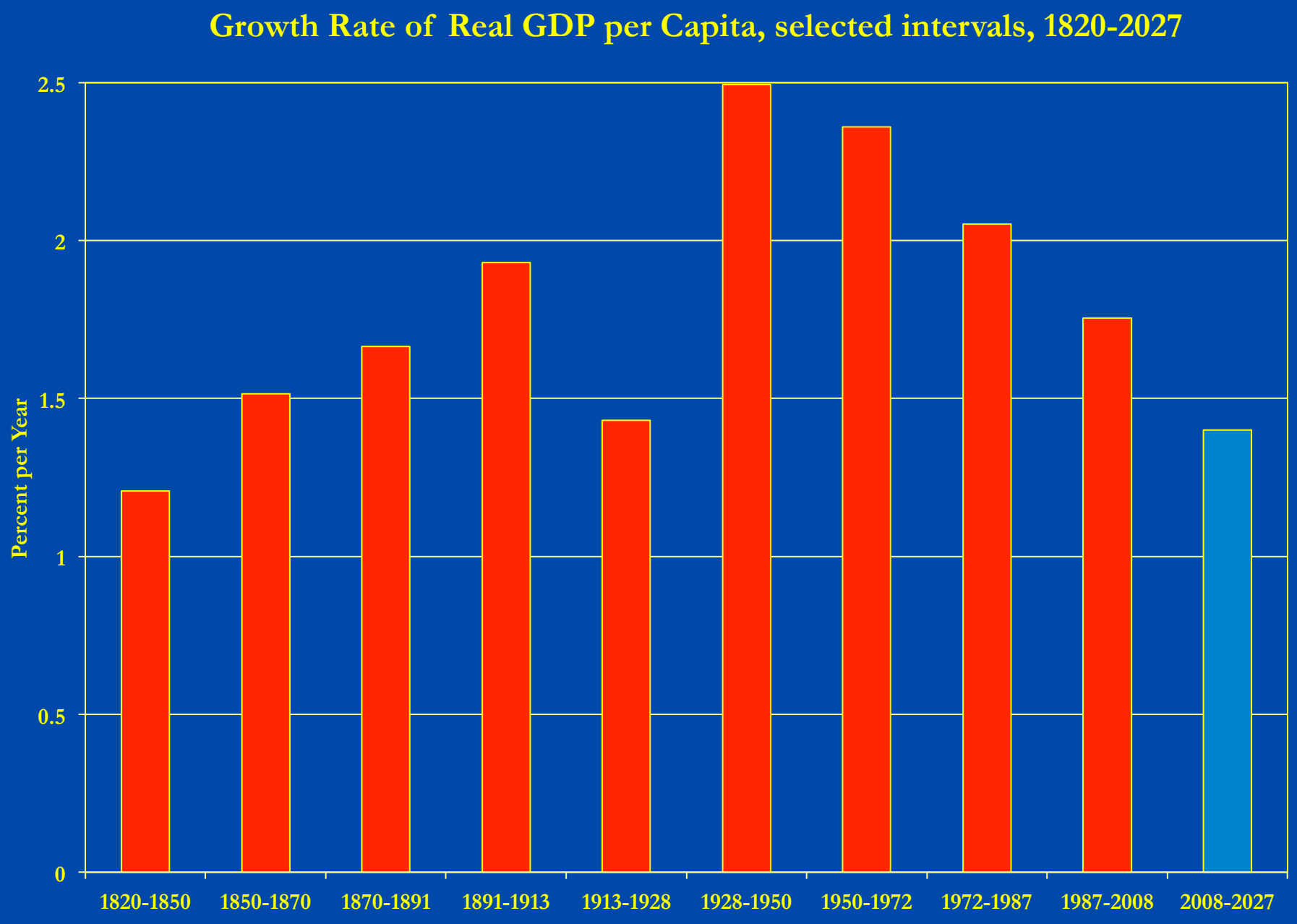
Much to Notice on this Graph, But Especially 1920-1950

- In levels, Y/N showed a great "leap" during WWII to a level much higher than would have been predicted by extrapolating the 1920s
- In growth rates, I've called this the "one big wave"
- Very little recognition of this phenomenon; possible causes
  - Alex Field's "Most Productive Decade" (the 1930s)
  - The enormous investment in industrial capacity in WWII (Gordon's 1969 "GOPO")

Europe to US Ratio of GDP per Capita, 1820-2010

Comments on These Charts

- The stagnation of Europe/US Y/N at 70 percent since 1970
- That 70 percent number also characterizes the 1920s
- Thus, leaving aside the dislocations of 1929-70, one could argue
  - The U. S. caught up to Europe 1820-1870, moved ahead 1870-1929
  - Europe has made no progress since 1920; damage of WWI was permanent


Growth Rate of Real GDP per Capita, selected intervals, 1820-2027
Percent per Year
2.5
2
1.5
1
0.5
0
1820-1850
1850-1870
1870-1891
1891-1913
1913-1928
1928-1950
1950-1972
1972-1987
1987-2008
2008-2027

Puzzles in the U. S. History of Growth in Real GDP per Capita

- One can almost detect a monotonic rise in Y/N growth from 1820-50 to 1928-50 and then an inexorable slowdown.
  - Pessimistic extrapolations of growth 2007-2027 will be discussed below
- The one exception to this story is 1913-28.
  - Highly suspicious; could be a problem with data and price index bias
  - This was the period when there was a great leap forward involving electrification, motor vehicles, indoor plumbing, and central heating
- My central argument: the Great Inventions of 1880-1900 were the most powerful in human history, before or since, and the U. S. chronology of Y/N growth makes sense from this perspective

The Evolution of the American Productivity Frontier, 1870-2010

- Great inventions of 1880-1890 (mainly American except for ICE by Daimler)
  - Why did these great inventions occur in the U. S.?
  - Lessons for policy? Individual entrepreneurs (Edison, Bell)
- The delayed payoff in the 1920s
  - Role of construction boom in 1920s changing the standard of living
  - New construction hastened the conversion of housing units to electricity, indoor plumbing, central heating

Issues Involving the Great Leap 1930-1950

- Delayed benefits of modern industrial plants and commercial office buildings built in the 1920s
  - Analogy to the delayed benefit of the internet revolution of the late 1990s
- The continuing evolution of the Great Inventions in the 1930s
  - Autos, motion pictures, radio, foundations of TV
- Requires more research on the industrial composition of economic activity in the 1920s vs. the 1950s

U. S. Frontier: Contrasts between 1950-70 and 1970-95

- Conversion of factories to greenfield sites, hiring suburban workers
- Interstate highway system with its great increase in the productivity of truck drivers
- Air conditioning and the south, 1950-70
  - Movement to non-union manufacturing started with textiles in the 1920s and 1950s and continued after 1980 with the automobile transplant foreign-owned factories
- The productivity growth slowdown after 1972
  - Energy prices, turnaround of infrastructure
  - Demographics: inexperienced women and teenagers
    - (yet the females performed well in WWII)
  - Sufficient real wage rigidity to raise labor's income share

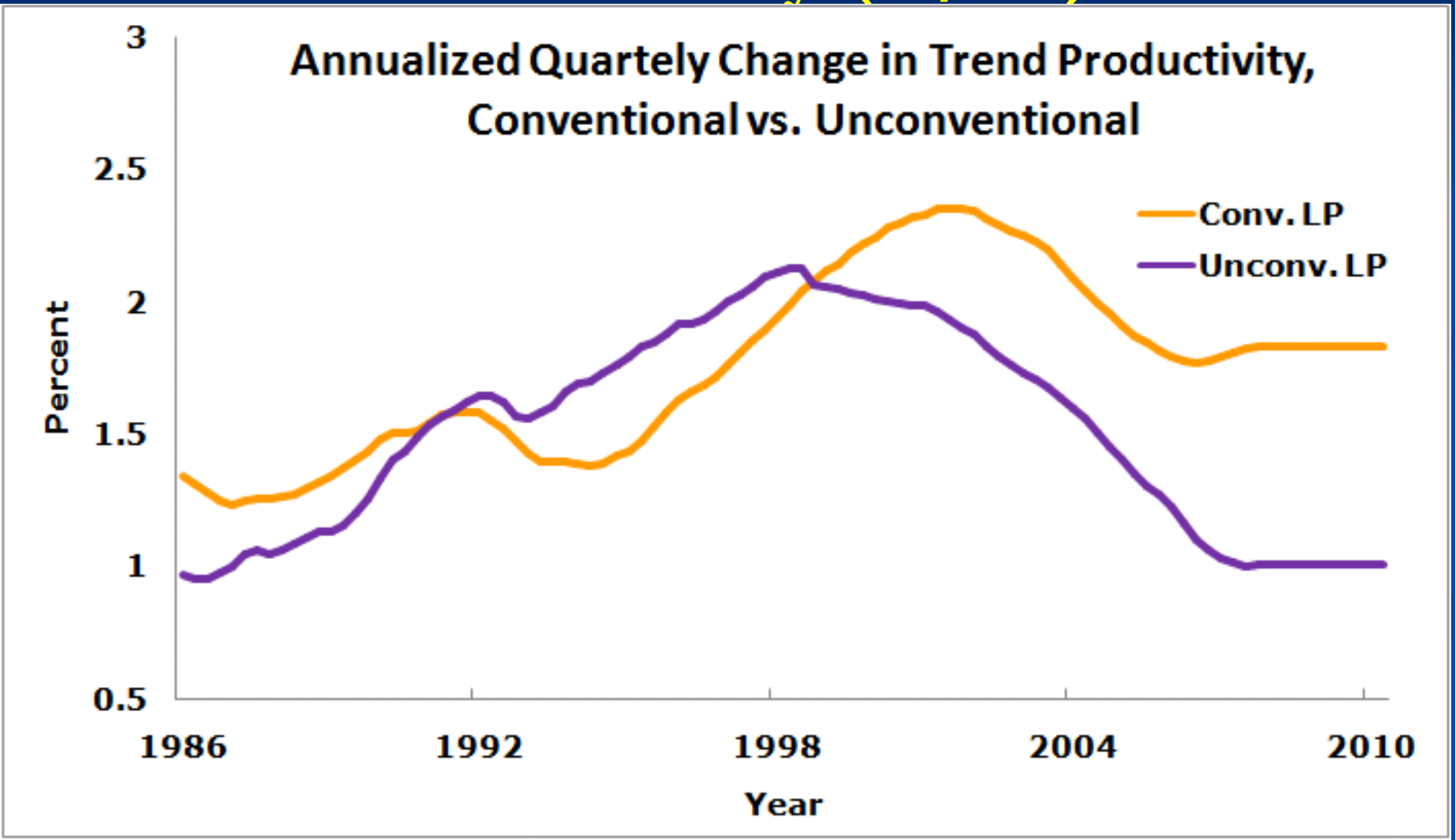
The Great Productivity Revival after 1995

- Put in context of the Solow (1987) paradox:
  - "We can see the computer everywhere but in the productivity statistics."
- The IT revival after 1995
  - Internet = marriage of computer and communication
  - Distinction between productivity in computer-producing and computer-using industries
  - US advantage in production but also in the use of computers
    - Advantage most evident in retail, wholesale, finance, and business services

The Puzzles About US Productivity Growth After 2000

- The official data show a further upsurge 2000-04
- This was taken seriously by economists, leading to explanations
  - Savage cost cutting after crash, 2000-02
  - Delayed learning about internet
- But now this appears to be a data measurement question
- Conventional productivity GDP/HP
- Unconventional productivity GDI/HE

Total Economy Labor Productivity (Y/H)



Growth Accounting

- This is a standard part of all reports on productivity
- At which point should LIGEP provide the standard algebra?
- How much emphasis should we place on growth accounting?
  - Most growth accounting exercises wind up displaying unexplained variations of MFP growth
  - Little seems to be explained, and there is usually no model of why capital deepening is high in one period and low in another.

Standard Growth Accounting Decomposition

- U. S. by Jorgenson and associates, also by Oliner-Sichel; for Europe by Inklaar-Timmer- van Ark.
- Production function $Y = A\, K^{b}\, H^{1-b}$
- "A" is the growth rate of TFP, sometimes called the " Solow residual" or the "autonomous growth factor" or "the measure of our ignorance"
- Growth rates (as lower case)
- Standard relationships:

$$y = a + bk + (1-b)h$$

Implies

$$y - h = a + b(k - h)$$

Method of estimating growth rate of TFP

$$a = y - h - b(k - h)$$

Features of Modern Growth Accounting

- Growth of *k* includes
  - Growth rate of quantity of capital (the capital stock)
  - Growth rate of capital quality (effect of the ongoing shift from structures to faster depreciating computers)
- Growth of *h* includes
  - Growth rate of quantity of labor input (unadjusted aggregate hours of work)
  - An adjustment for labor quality, usually related to change in educational attainment

Consensus Results for U. S. as of 2008

- Production and Use of ICT explained about 75% of Y/H growth revival 1995-2001
- ICT provided negative explanation 2001-04, very little explanation 2004-08
  - ICT investment share of GDP fell sharply after 2000 but conventional measure of productivity growth continued strong until 2004
  - Unconventional measure of productivity growth fell rapidly after 2000
- The need for special explanations of 2001-04 is reduced if we place substantial weight on the unconventional measure
- Leaves open interpretation of post-2001. Also leaves open forecasts for post-2010
  - Projections for TFP are sheer speculation, but history has to provide some guidance as to the plausible range of outcomes.

The Pessimistic Long-run Conclusion

Comparing 2007-2027 forecasts with 1987-2007 actual:

Output growth will slow from 2.9 to 2.4

Output per capita growth will slow from 1.74 to 1.4

That is the slowest growth of income per capita "since George Washington"

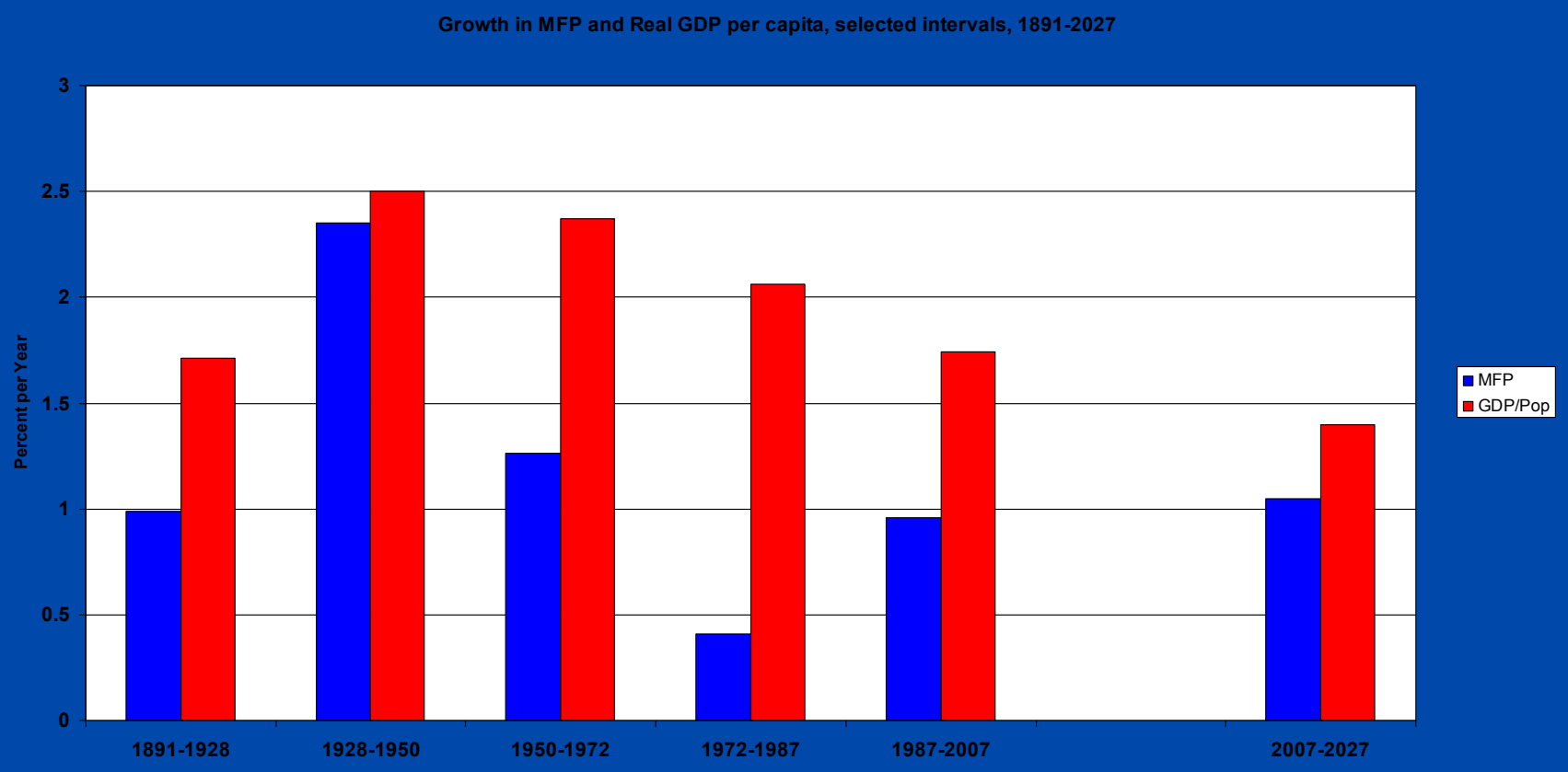
Compare to 2.16 1929-2007 or 2.02 1891-2007

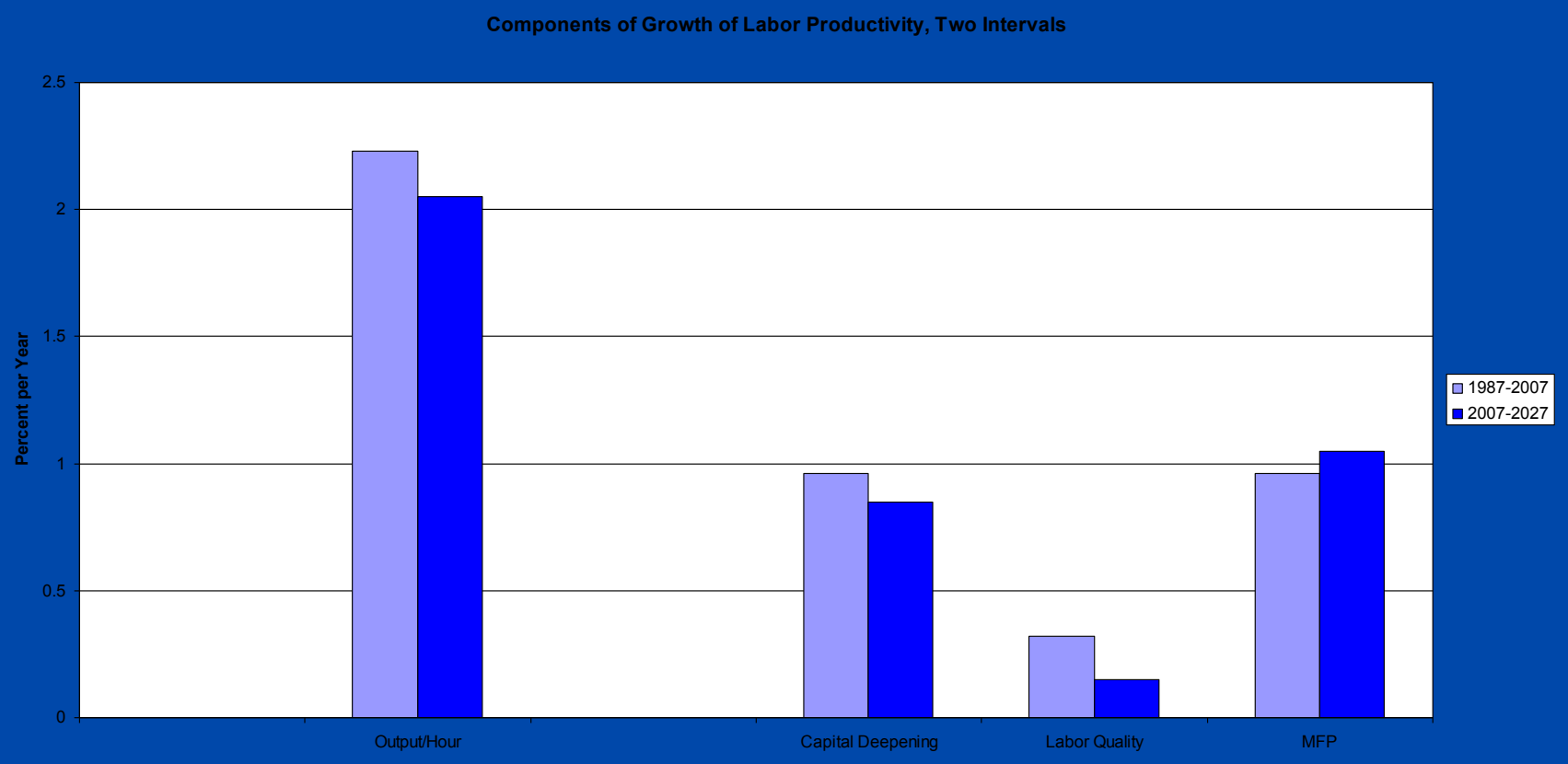
What growth in labor productivity and TFP are implied by this pessimistic forecast

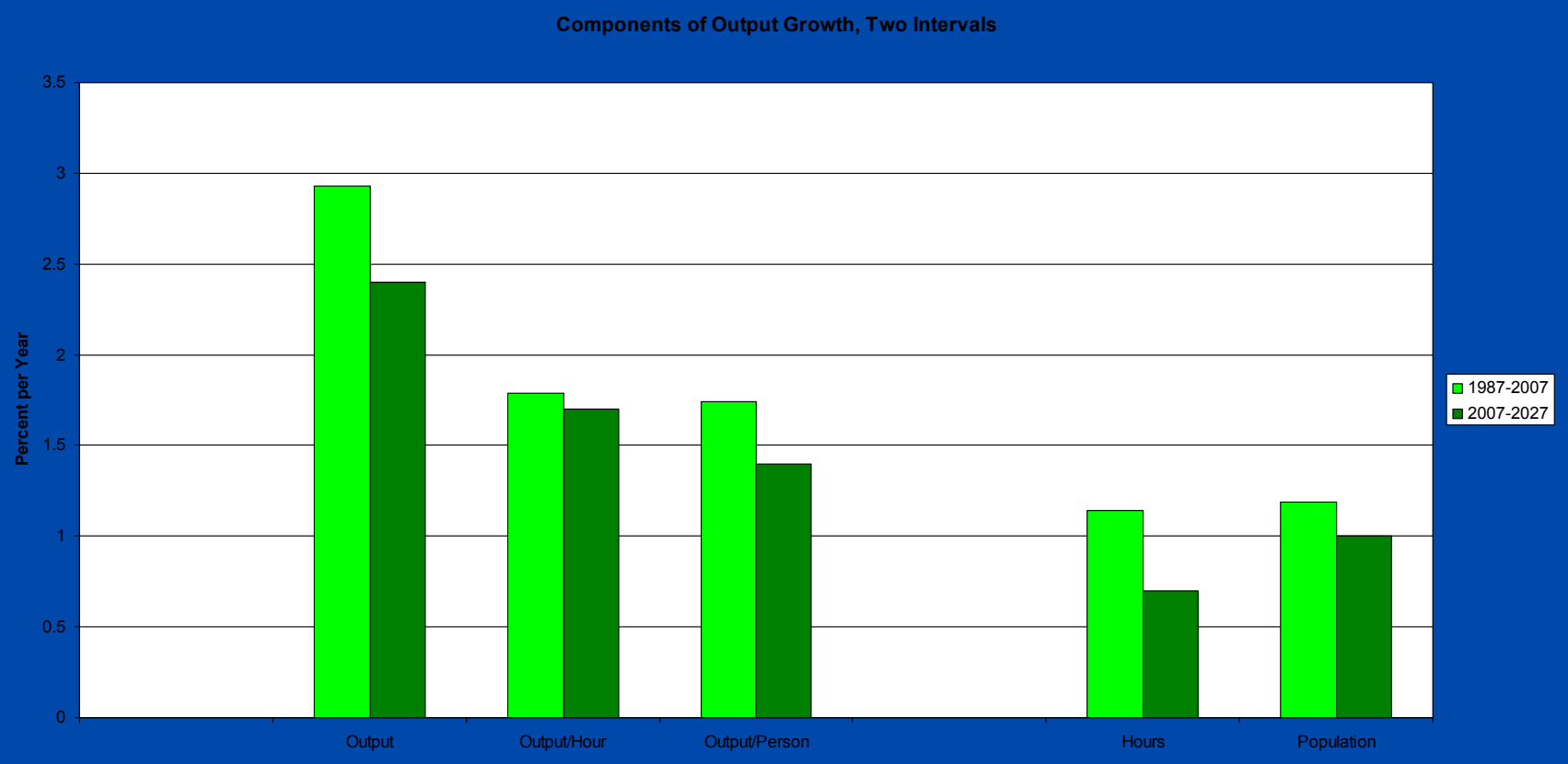
Review Relationships Between Y/N, Y/H, and TFP

- Production function $Y = AF(K,H)$
- Implies relationship in growth rates
  - $y = a + bk + (1-b)h$
  - $y - h = a + b(k - h)$
- How is per-capita income growth $(y-n)$ related to TFP growth (a)
  - $y - n = (y - h) + (h - n)$

    $= a + b(k - h) + (h - n)$


Growth in MFP and Real GDP per capita, selected intervals, 1891-2027
Percent per Year
3
2.5
2
1.5
1
0.5
0
1891-1928
1928-1950
1950-1972
1972-1987
1987-2007
2007-2027
MFP
GDP/Pop


Components of Growth of Labor Productivity, Two Intervals
Percent per Year
2.5
2
1.5
1
0.5
0
Output/Hour
Capital Deepening
Labor Quality
MFP
1987-2007
2007-2027


Components of Output Growth, Two Intervals
Percent per Year
3.5
3
2.5
2
1.5
1
0.5
0
Output
Output/Hour
Output/Person
Hours
Population
1987-2007
2007-2027

Possible Further Room for Pessimism

These projections are based on the historical record of growth between years of "normal" utilization (1987, 2007)

No allowance here for long-run "tainting" effects of the deep recession and painfully slow recovery

- Loss of skills and human capital
- Years of low investment will increase the age of the capital stock and reduce the growth of both capital quantity and capital quality
- Capital stock actually declined in 2009

Policy Prescriptions for Long-Run Growth Problem

Slowdown reflects aging of population and stagnation of educational attainment

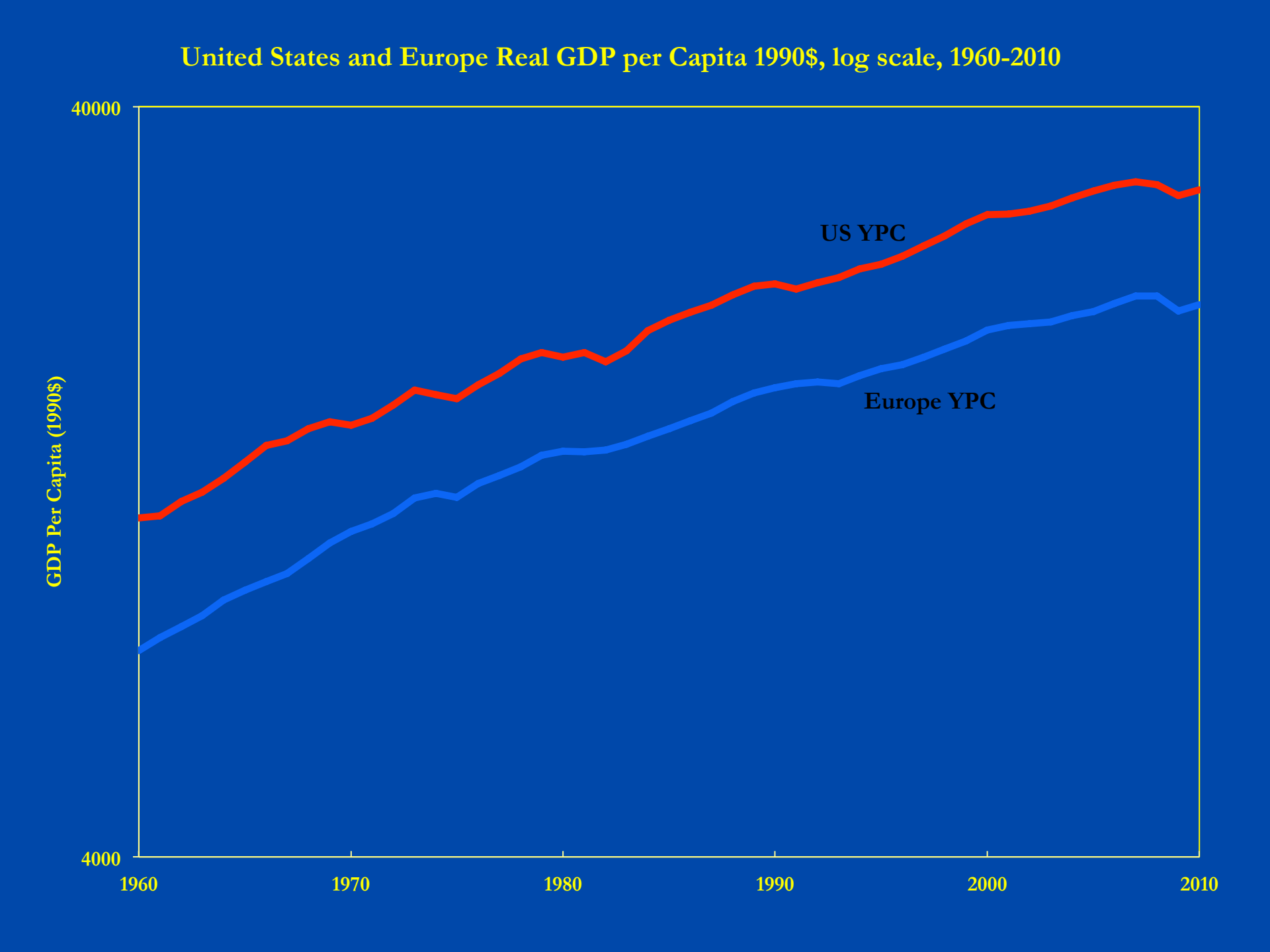
Solve the first by immigration, particularly of high-skilled people

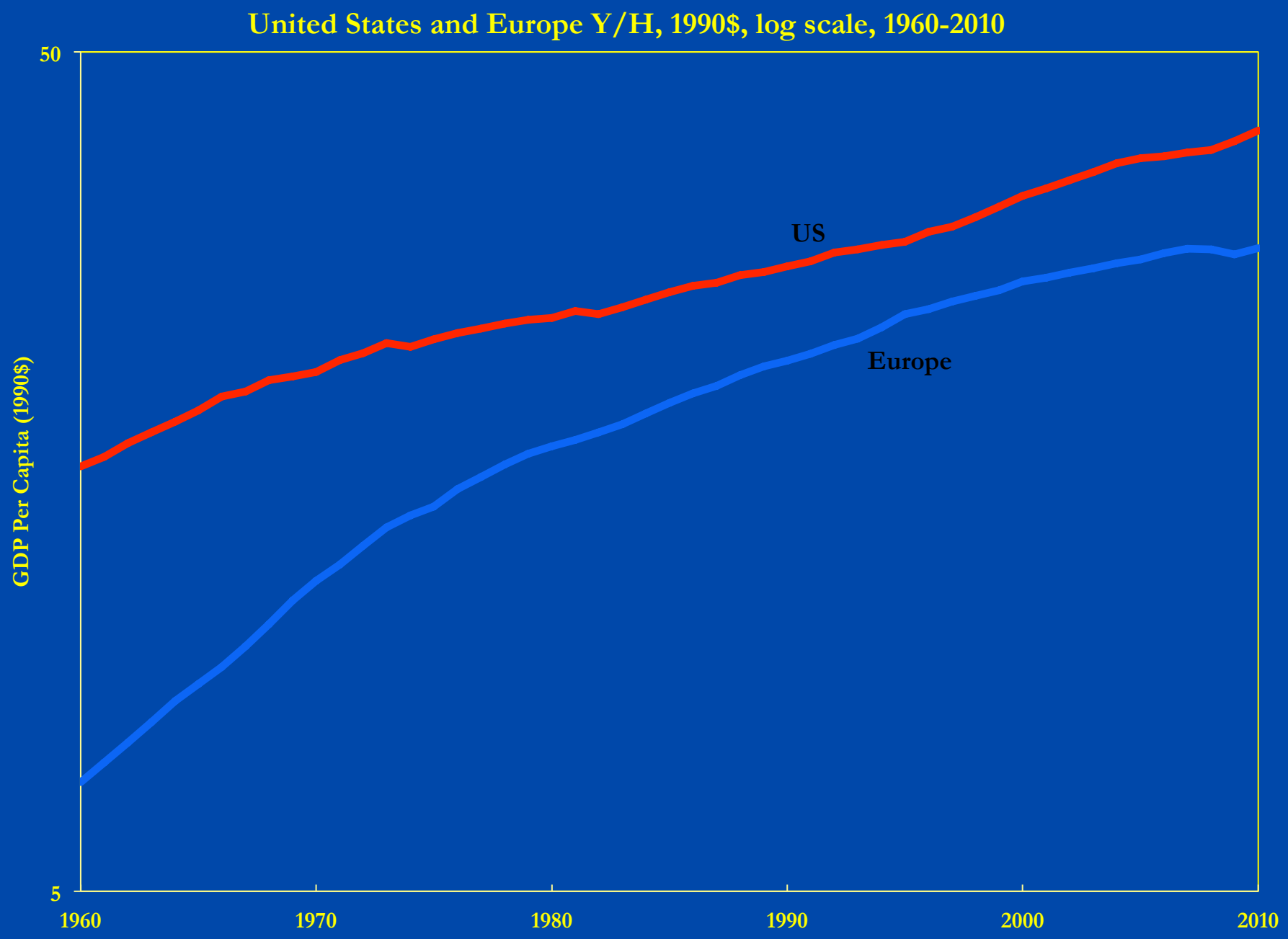
Work on the second by better government-run student loan programs and direct measures to address the rising relative price of college education ("higher education cost disease")

Stimulate demand to avert long-run supply sclerosis

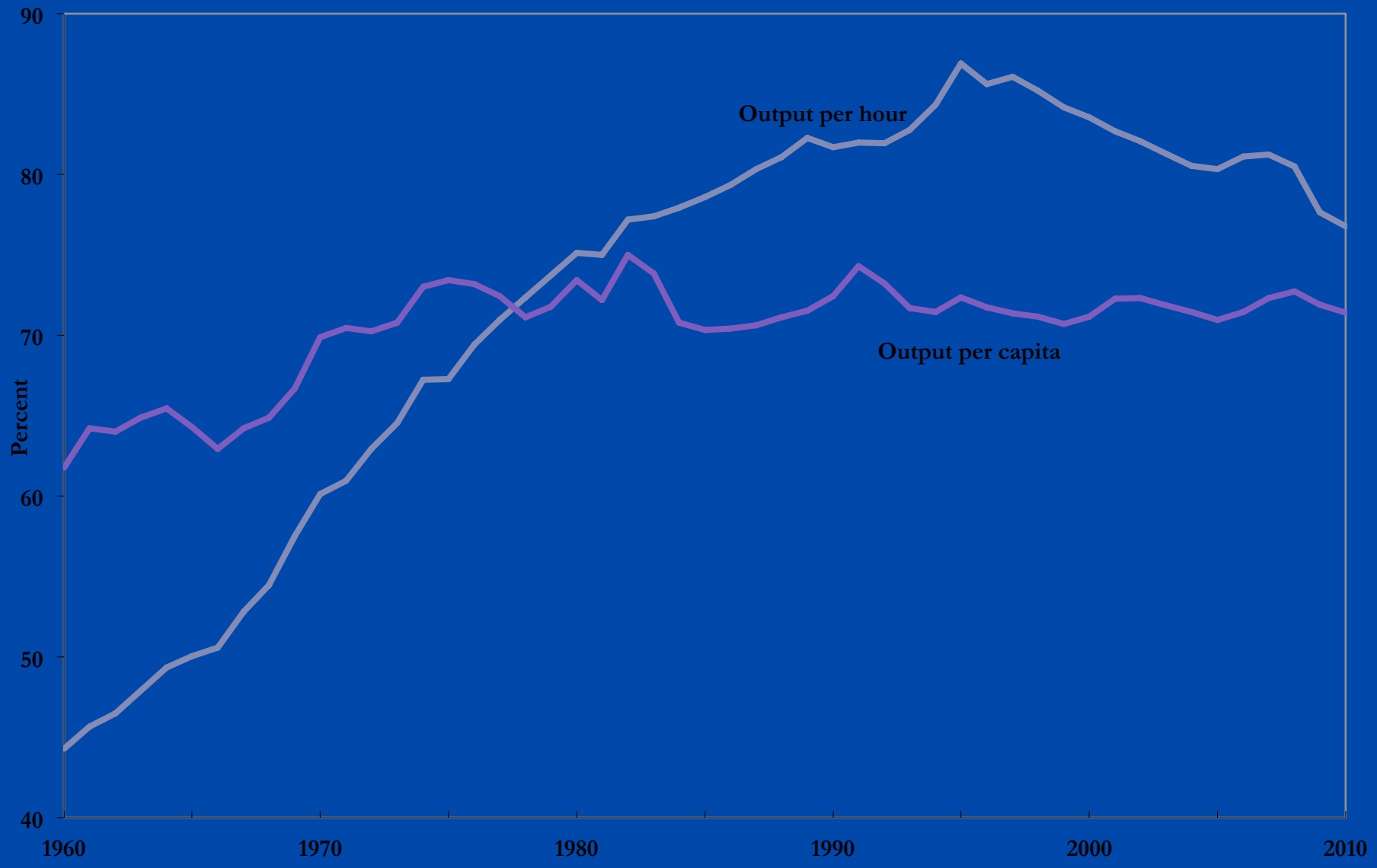
Next Section: Comparison of Europe / US Ratios Since 1960

- Overriding themes
- Plateau of Y/N at 70% 1970-2010
- Catchup of Y/H to >90% 1995, slippage since then
- Y/H performed better than Y/N only because H/N declined


United States and Europe Real GDP per Capita 1990$, log scale, 1960-2010
40000
4000
GDP Per Capita (1990$)
US YPC
Europe YPC
1960
1970
1980
1990
2000
2010

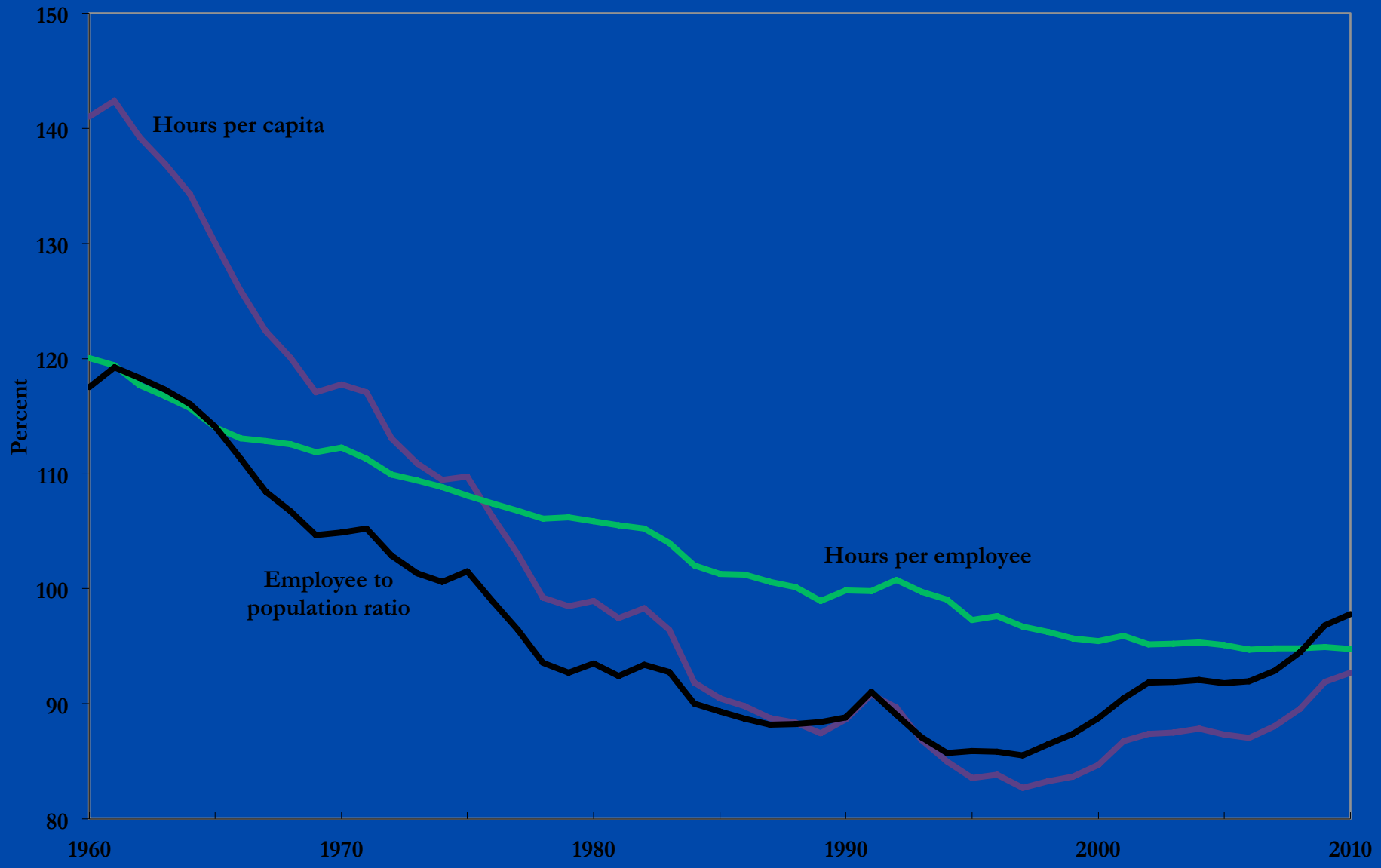

United States and Europe Y/H, 1990$, log scale, 1960-2010
50
5
GDP Per Capita (1990$)
US
Europe
1960
1970
1980
1990
2000
2010

Ratio of Europe-15 to the United States, Output per Capita and Output per Hour, 1960-2010



What Caused the Difference in Behavior of Y/N vs. Y/H?

Ratio of Europe-15 to the United States, Hours per Capita, Hours per Employee, and Employees per Capita, 1960-2010



When and How Did Europe Fall Behind?

- Initially 1913-50, Europe fell behind
  - Wars, interwar
- The early period of industrial revolution was dominated by US
  - Compare electrification or motor car use in Germany and France vs. US in 1912, 1948
  - U. S. in 1929 had 90% of motor vehicle registrations, 80% of worldwide production

Ingredients in U. S. Success, 1870-1920

- How can this decline be explained? 1870-1950 was when the US "common market" really mattered
  - Mechanisms that retarded European growth pre-1950
    - Drain of capital and inventive energy into war production, e.g., dreadnought competition UK and Germany 1900-1914
    - Investment in synthetic rubber, petroleum in anticipation of blockades, import disruptions
  - U. S. growth 1880-1920 was "materials intensive" (Gavin Wright)
    - Agricultural research, state universities
    - Leadership in agricultural machinery
  - U. S. entrepreneurial culture. The second industrial revolution was created by individual entrepreneurs, not giant corporations

Europe's Golden Age, 1950-72 and Beyond

- Catch-up in utilization of great inventions
  - Homes: electricity, central heating, plumbing
  - Autos, trucks: autobahn, autostrade
  - Continued development of passenger RR under heavy government subsidies, TGV
  - TV, motion pictures

How Europe Evolved, 1970-1995

- Continued convergence toward the frontier
  - Multinationals emulated US practices
  - Expansion of European motorway network brought potential transport productivity up to US levels
  - Qualification: European RR freight still primitive and its stagnation compares poorly to US freight railroads
  - US inferiority in passenger rail remains in the context of a high-effiency freight rail network

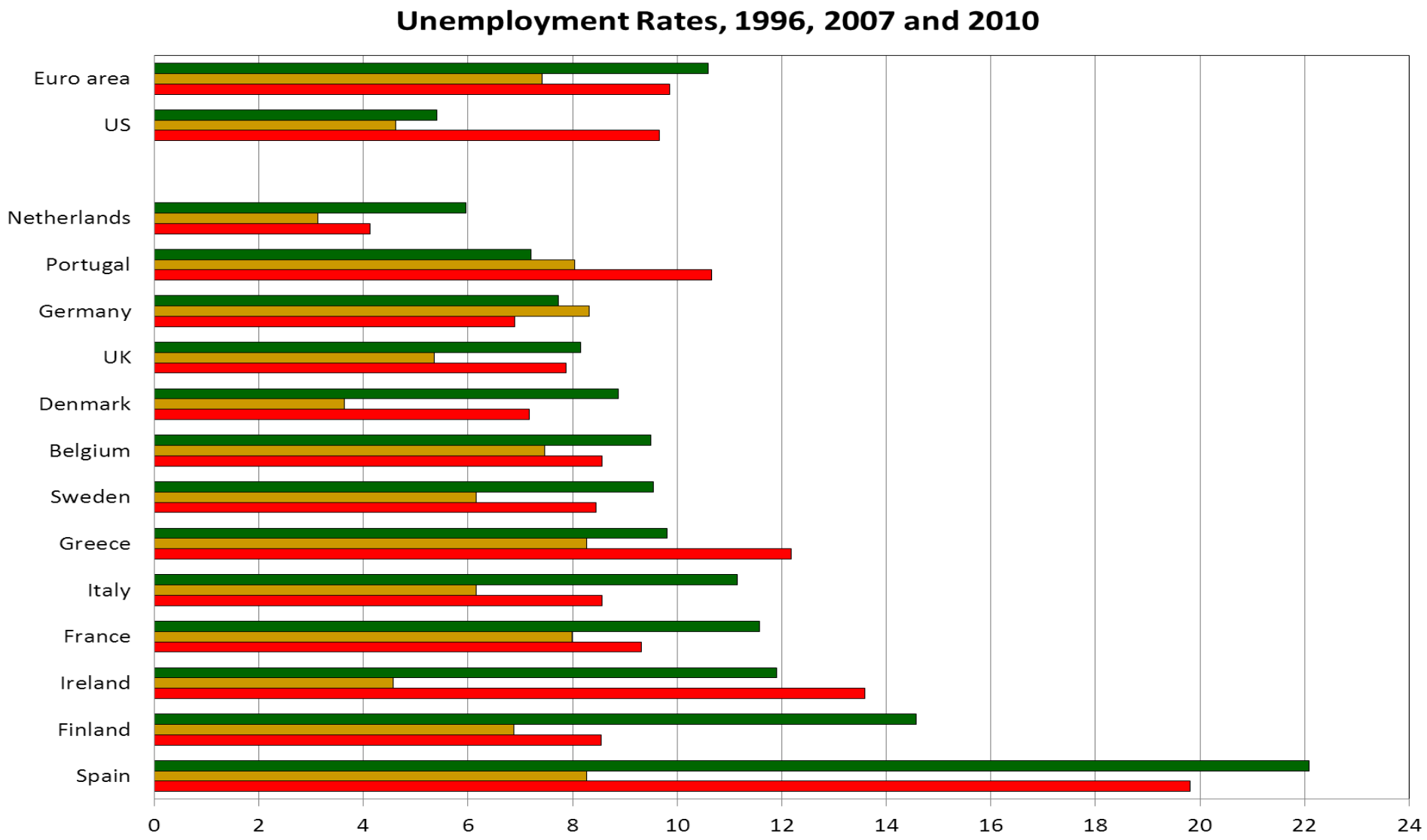
Europe After 1995

- The EU vs. U. S. ratios show a marked turnaround after 1995 toward faster hours growth and slower productivity growth
- Explanations will be considered later in Session #2
- The final topic in Session #1 will be the sharp differences in EU vs. U. S. employment and productivity behavior during the crisis and recovery period of 2007-10.

Short-Run Responses: The Cycle of 2007-10

- U. S. response:
  - In 2007-09 downturn, *relative to the decline in the output gap*
    - Aggregate hours gap declined much more than in previous recessions
    - So did employment gap
  - Result was a temporary bubble in productivity growth
- Much bigger increase in US unemployment rate than in Europe
- Europe's productivity slumped while U. S. productivity soared

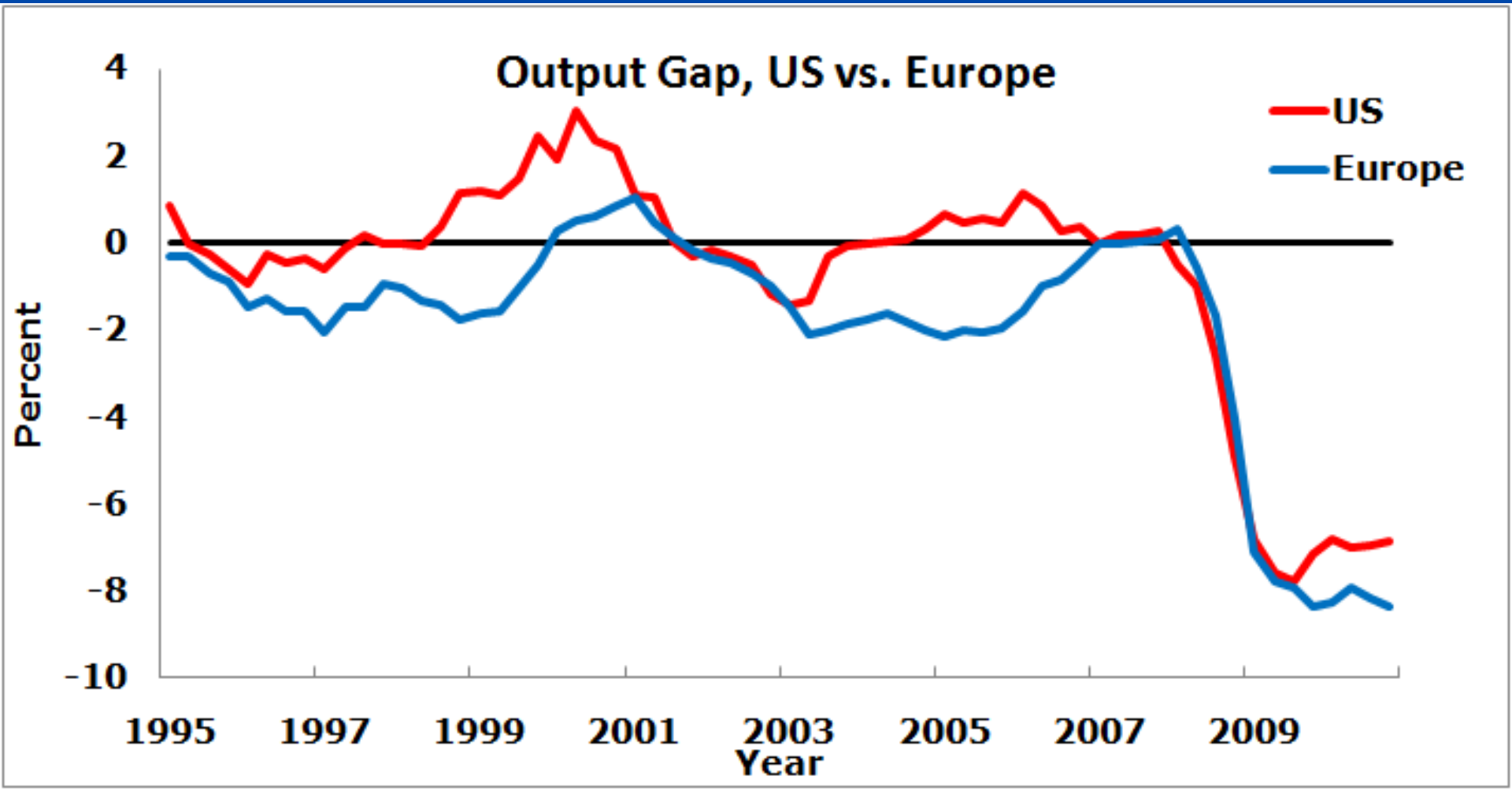
Unemployment Rates: 1996, 2007, 2010



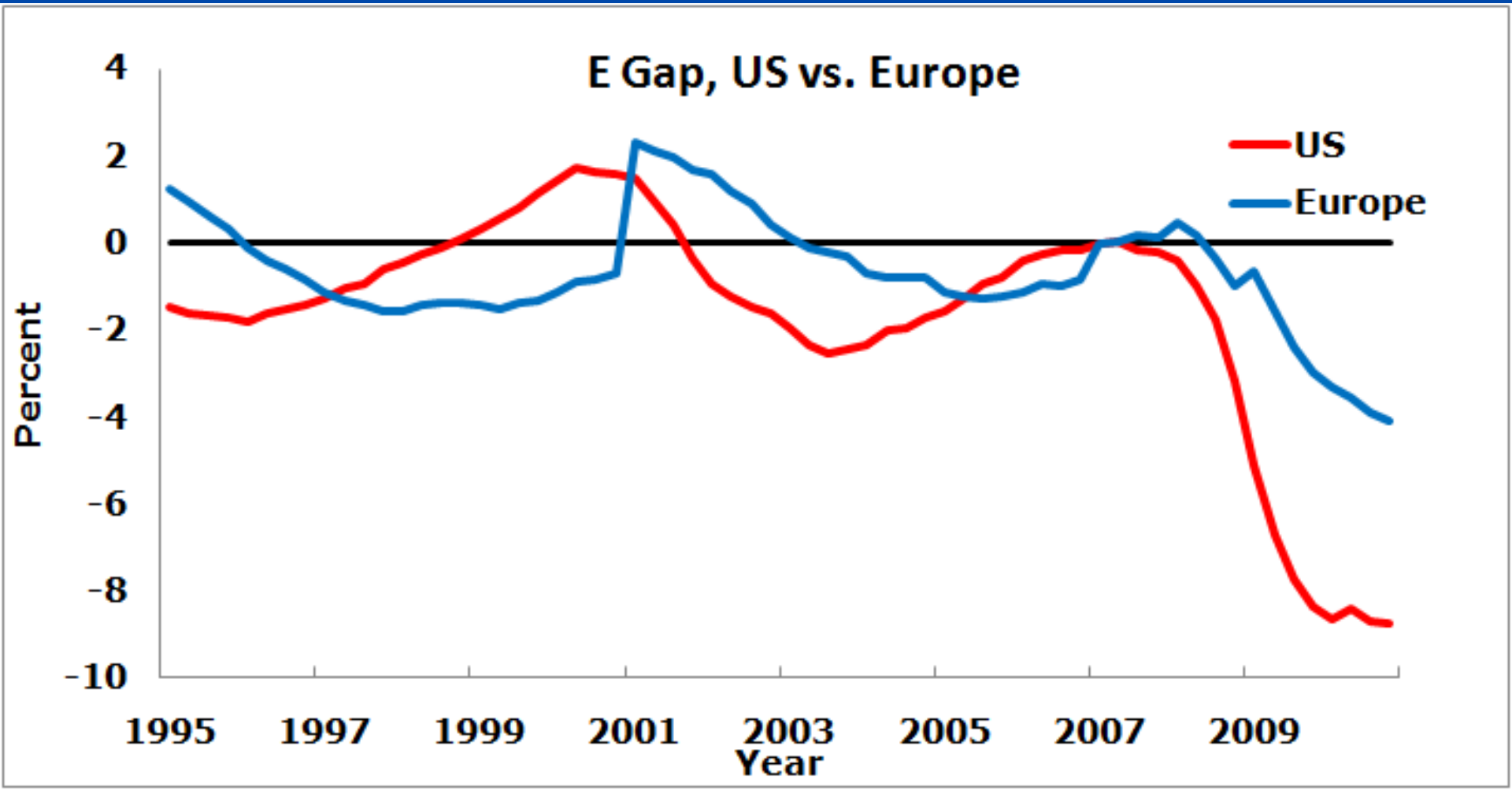
The Next Graphs Show the Contrasting Behavior of "Gaps"

- Take data on actual real GDP *(Y)*
- Use statistical techniques to estimate the trend in real GDP ("Potential" or "natural" GDP = *Y**)
- The output gap is = *100*LN(Y/Y*)*
  - When *Y/Y* = 100*, the output gap is zero.
  - When *Y/Y* = 90*, the output gap is -10.5%
  - When *Y/Y* = 110*, the output gap is +9.5%
- Same for the employment or hours gap

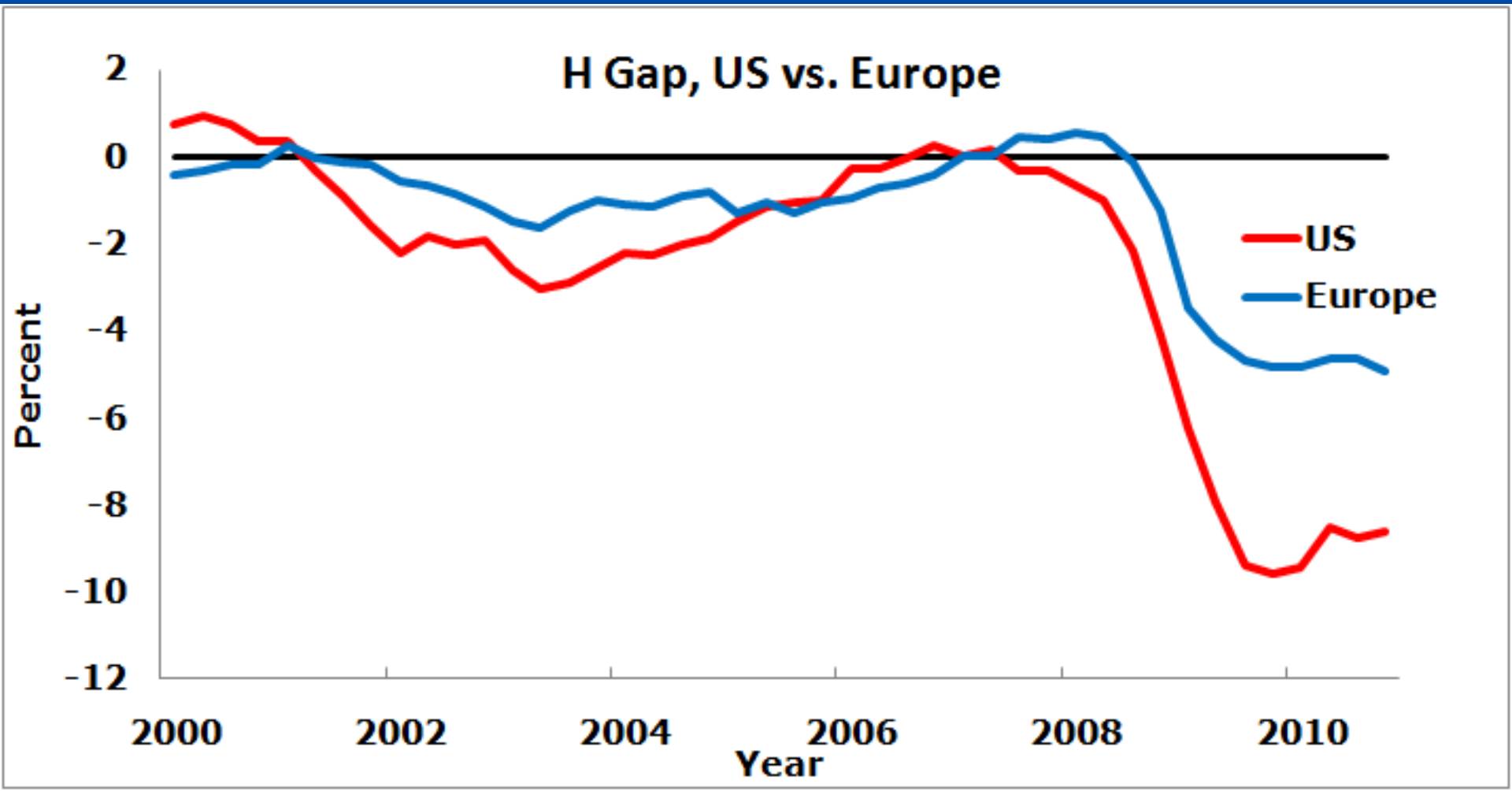
Output Gap (LN Actual/ Trend), 1995-2010



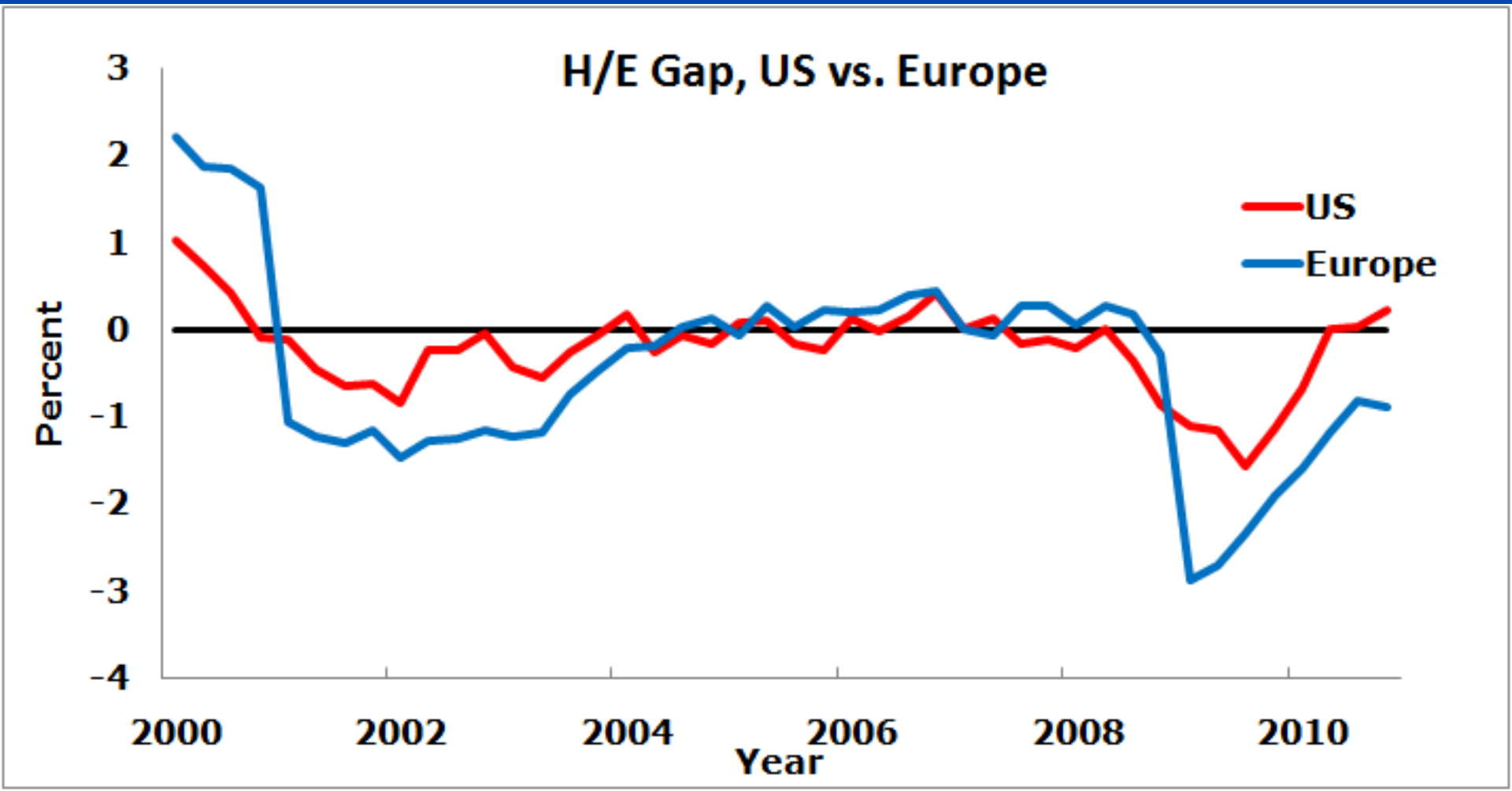
Employment Gap, 1995-2010



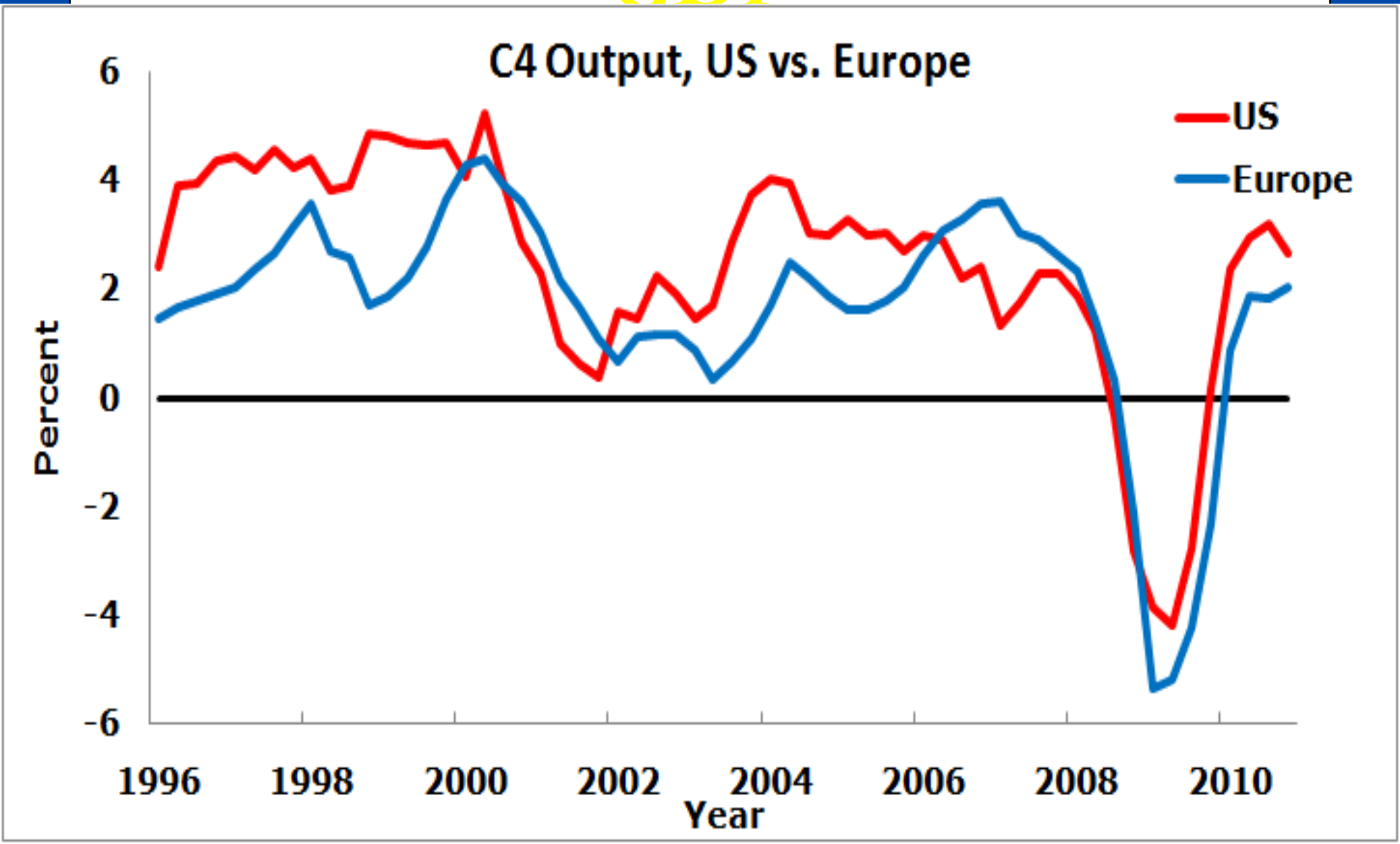
Hours Gap, 2000-2010

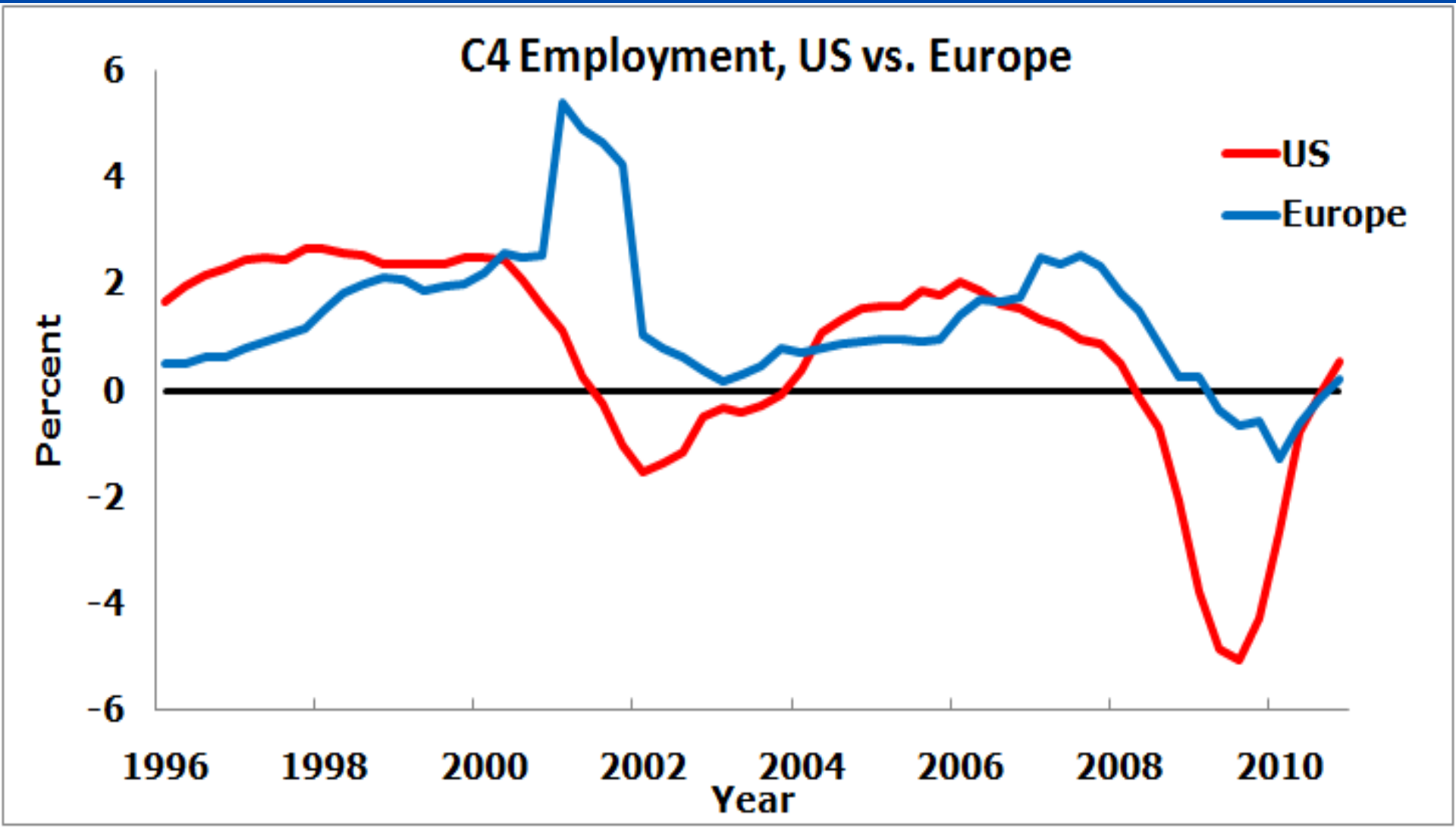


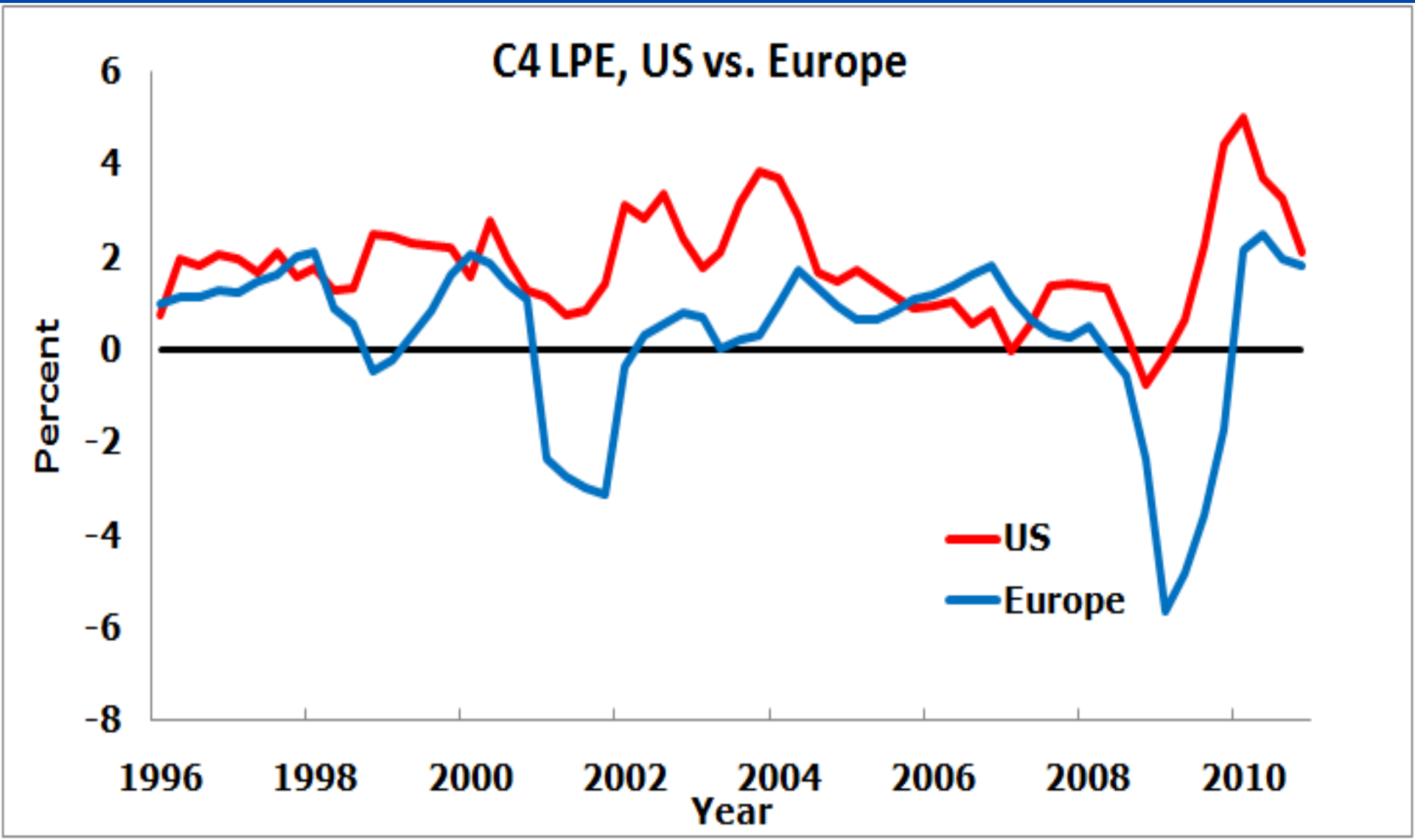
Hours per Employee Gap, 2000 - 2010



Four-Quarter Change in Real GDP




C4 Employment, US vs. Europe
US
Europe
Percent
6
4
2
0
-2
-4
-6
1996
1998
2000
2002
2004
2006
2008
2010
Year


C4 LPE, US vs. Europe
6
4
2
0
-2
-4
-6
-8
Percent
1996
1998
2000
2002
2004
2006
2008
2010
Year
US
Europe

Summary of Responses

- EU and U. S. had same decline in the output gap
- U. S. had a much larger decline in the employment and hours gap
  - This implied a much greater jump of the U. S. unemployment rate
  - This implied a big bounce of U. S. productivity growth
- So far there has been little tendency for these differences to be reversed

Hypotheses to Explain Differences

- Explanations for the U. S.?
  - "The Disposable Worker Hypothesis"
  - Increasing managerial power, diminishing worker power
  - Related to causes of increased long-run US income inequality
- Explanations for Europe?
  - Traditional employment protection legislation, time lag before firing, severance pay
  - Emphasis in NL, GE, and AU on work-sharing
    - Employee is retained, works shorter hours, government replaces part of income loss

Time for a Break!

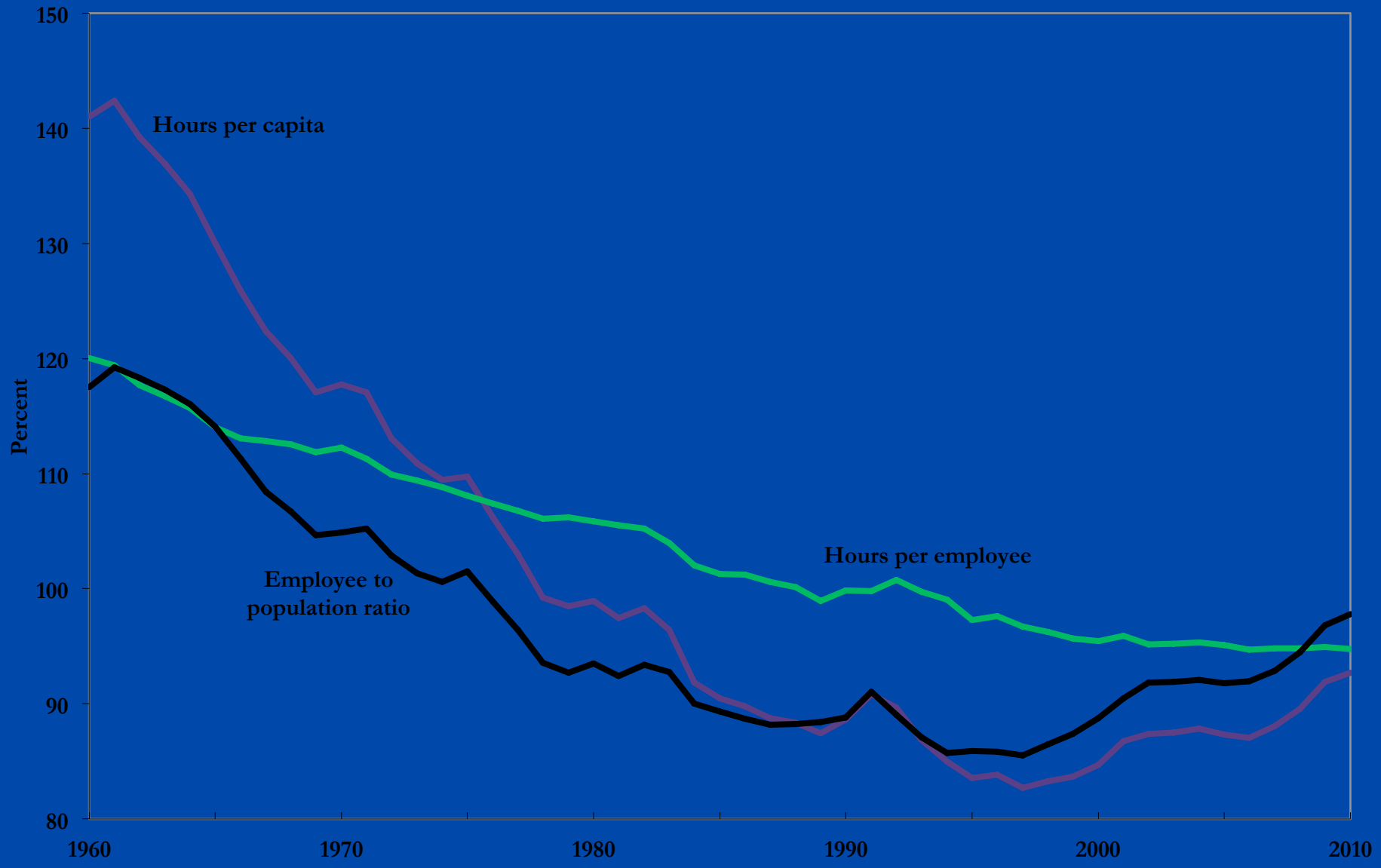
Session #2: Implications and Interpretations of Europe's Low Hours per Capita

- Implications: Europeans spend less time at market work: does Y/N understate European welfare relative to U. S.?
- Causes: The great debate about institutions, taxes, and regulations as the cause of Europe's decline in H/N

What are the Substantive Issues?

- "Why is Europe so Productive yet so Poor?"
- If Y/H caught up but Y/N languished, then the superficial Answer is H/N has been falling
- Why?
  - Blanchard (*JEP*, p. 4): "The main difference is that Europe has used some of the increase in productivity to increase leisure rather than income, while the United States has done the opposite."
- Blanchard will be the straw man in this discussion of more subtle interpretations

Ratio of Europe-15 to the United States, Hours per Capita, Hours per Employee, and Employees per Capita, 1960-2010



An Opposing View to Blanchard's "Taste for Leisure"

- The notation: $Y/N \equiv Y/H * H/N$
- And: $H/N \equiv H/E * E/L * L/N$
- By definition the decline in Europe's Y/N related to Y/H can be divided into:
  - Decline in relative H/E (35% 1960-95)
  - Decline in relative E/N (65% 1960-95)
- Voluntary Leisure?
  - Some of decline in H/E is not voluntary
  - Most of decline in E/N is not voluntary

Summary of Turnaround in E/N vs. H/E, Ratios of EU/US

Levels and Growth Rates of European Hours per Capita, Hours per Employee, and Employees per Capita Compared to the United States, 1960-2004, percent

	Hours per Capita	Hours per Employee	Employees per Capita
Levels			
1960	119.8	102.4	115.9
1970	102.4	97.4	105.6
1995	73.6	87.1	85.7
2004	77.2	85.4	91.7
Annual Growth Rates			
1960-70	-1.6	-0.5	-0.9
1970-95	-1.3	-0.4	-0.8
1995-2004	0.5	-0.2	0.8

An Outline of Issues for Discussion

- Europe's failure to converge is not just a matter of voluntary vacations
- Much more of the change 1960-95 was the decline in employment per capita
- Even lower hours are not entirely voluntary
  - "If the French really wanted to work only 35 hours, why do they need the hours police?"

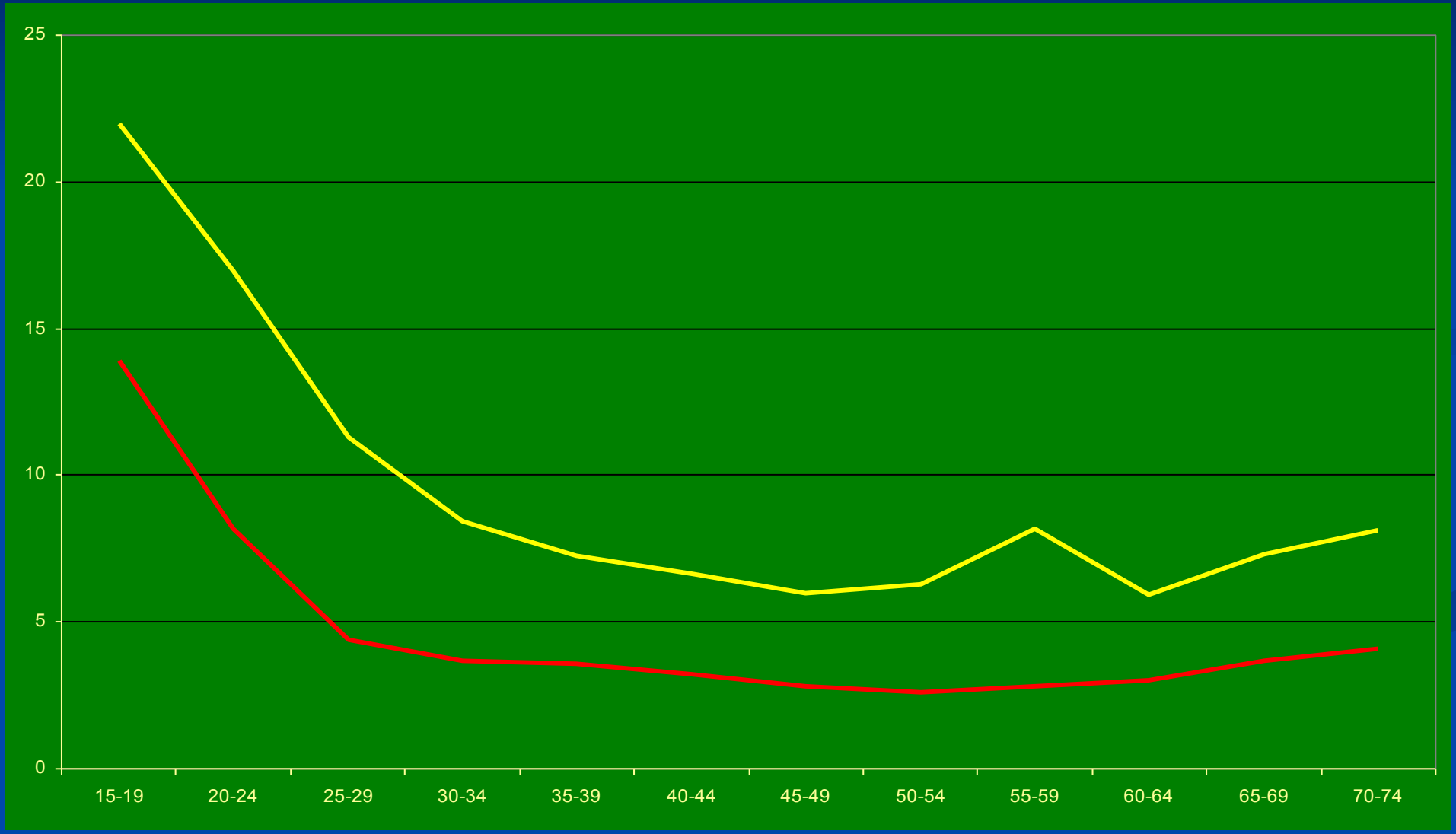
What Matters for Welfare is Y/N + Differential Leisure, not Y/H

- Europeans have "bought" their high productivity ratio with every conceivable way of making labor expensive
  - High marginal tax rates (payroll and income taxes)
  - Unions
  - Firing restrictions
  - Early retirement (55! 58!) with pensions paid for by working people
  - Lack of encouragement of market involvement by teens and youth

The Decline in Europe's E/N Matters more than H/E

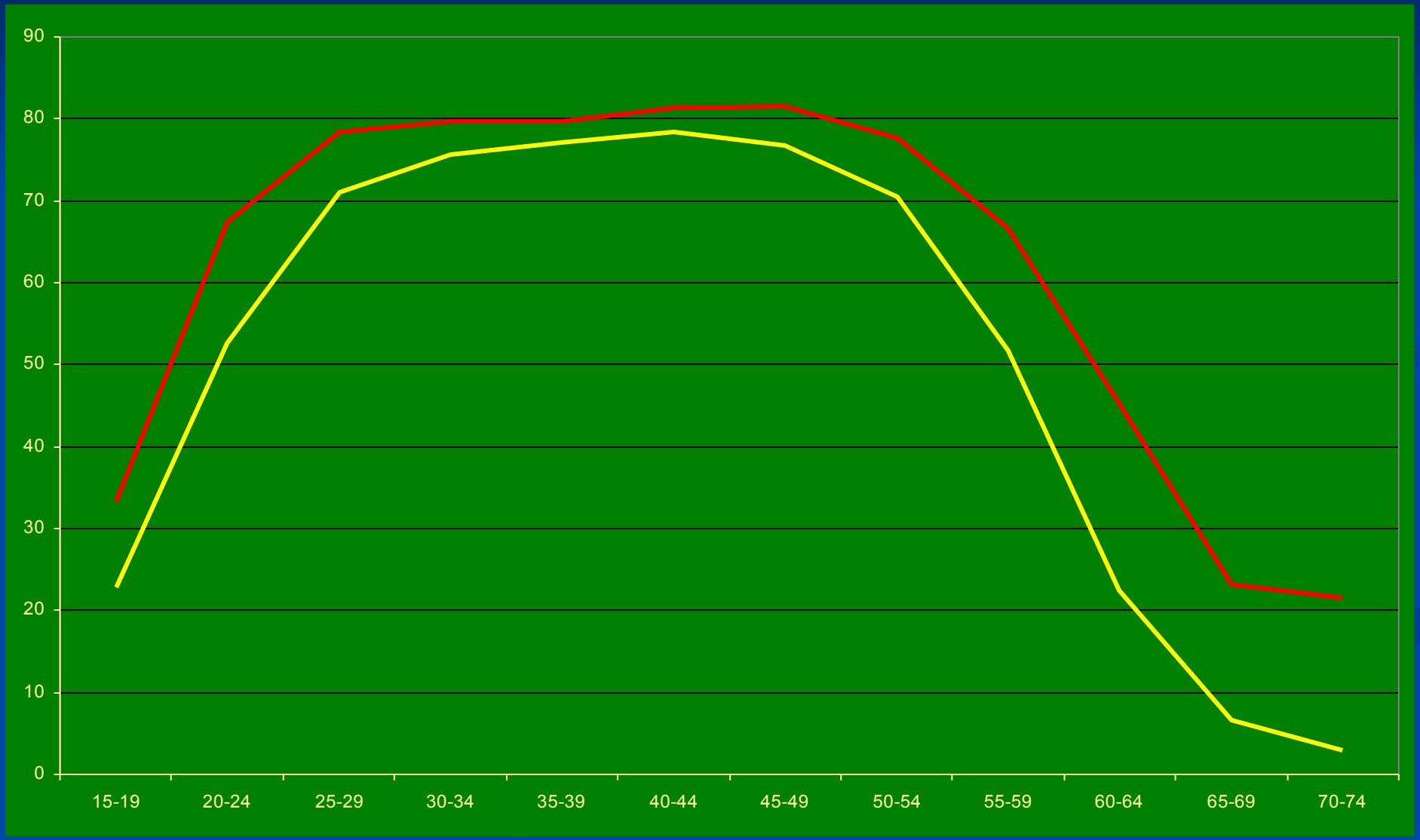
- First, which age groups are suffering from higher unemployment in Europe?
- Second, which age groups experience lower labor force participation in Europe?
- Third, how does it come together in the distribution of low E/N by age group?
- Note: These graphs are for total population by age and blur male/female differences.

Unemployment by Age: EU vs. US in 2002



Labor-force Participation by Age

Putting it Together: Europe vs. US E/N by Age Group



Decomposing the EU/US Difference in the E/N Ratio

age distribution	unemployment	LFPR	E/N ratio
EU	EU	EU	87.14
US	EU	EU	86.19
EU	US	EU	91.23
EU	EU	US	97.11
US	US	EU	90.77
EU	US	US	102.1

Brief Summary of the Recent Prescott Debate

- Prescott says it's all higher taxes in Europe
- This is consistent with
  - Firms cutting jobs
  - Employees choosing untaxed leisure
  - So decline in both H/E and E/N are involved
- Problems:
  - Alesina, labor supply elasticities don't match
    - The labor-supply elasticity for adult men is zero
    - The elasticity for females and teenagers is high, but they are only half of the story
    - Thus Prescott can explain only half of labor withdrawal
  - Me, not consistent with age distribution story

So Far I've Provided an Indictment of Europe

- Income per capita remains at 70% of US
- Attempts by analysts to attribute additional welfare based on European "extra leisure" are unconvincing
  - Leisure of employees unconvincing, it's all home production
  - Welfare gained by unemployed and early retirees isn't really welfare
  - Those Italian men aged 30 living with their mothers are a drag on the welfare of Italian society.

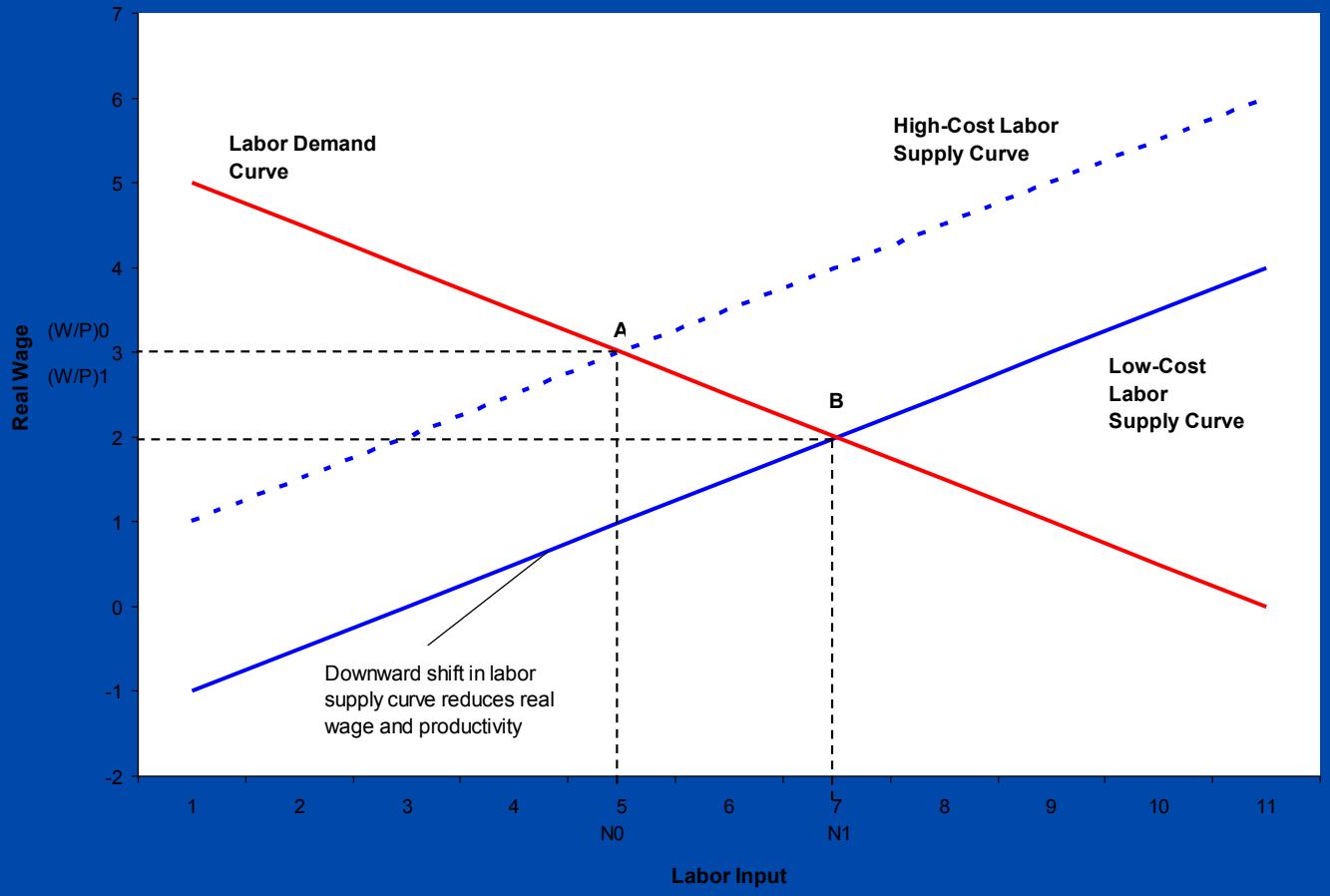
Ljungqvist-Sargent's skepticism on the "national family"

- Prescott assumes national family, voluntary redistribution to those who withdraw labor because of high taxes
- In reality most of those who withdraw labor supply because of high taxes are not supported by voluntary family transfers
- "Government expenditures are poor substitutes for private consumption"
- Yet by comparing EU vs US income *pre-tax* we're equating one dollar of welfare transfer to one dollar of market consumption
- Thus you can't say EU is better than US because of its welfare system. EU pays real money for that system.

Alesina on Unions and Regulation

- Contrast between U. S. and EU
- U. S. union penetration peaked in late 30s, 1940s, declined after 1950s
- Europe peaked in late 1970s, early 1980s
- No disagreement about what unions do to the labor supply and demand diagrams
  - Unions push the economy northwest

Textbook Labor Economics



Channels of European Union Influence (Alesina)

- Unions keep wages artificially high
- Unions may pursue a political agenda to reduce work hours
- Unions have pushed for early retirement financed by state pensions
- Unions impede the reallocation of labor in response to sectoral shocks

- Neither Alesina nor critics notice turnaround in Europe's E/N after 1995

Critique of Modern Macro Interpretations

- About Alesina, timing is wrong. Union density increased 1960-80, but then fell to 1995 to about the same level as 1960
- This argument from Rogerson (2006) ignores inertia in political process
- Decline in unions and decline in taxes consistent with post-1995 turnaround in H/N
- Later in this session we develop regressions to address the response of E/N to six policy and institutional variables

A Broader View: The Welfare Cost of Higher Unemployment

- The distinction between marginal hours of leisure (40 work, 80 leisure) vs. inframarginal hours (20 work, 100 leisure)
- Leisure hours on vacations and weekends are more valuable than mid-week leisure hours
  - Apply analysis to unemployment
  - Apply analysis to early retirement

The Welfare Effect of Early Retirement: Back-of-Envelope

- Baseline: work age 20-65, retire 65-84
- No saving, investment
- 30% tax finances pay-as-you-go pensions with balanced govt budget
  - Tax finances equality of consumption in retirement to consumption during work years
- Alternative retirement age at 55 requires tax increase to 45.6%, 25.1% decline in consumption during work years and retirement
- Important perspective on Prescott: higher European tax rates are *endogenous* to lower hours per capita

Welfare calculation

- With 55 retirement age, after-tax wage is 25% less
- Extra hours switched from work to retirement leisure are low-valued (2/3)
- Total welfare = market consumption plus total value of leisure
- Market consumption declines 25.1 percent, welfare declines 22.6 percent, ratio 90% (i.e., leisure offsets 10%)

Some Time of Unemployed is Spent In Home Production not Leisure

- Freeman-Schettkat, *Economic Policy*, January 2005
- M=market, H=home production, L=leisure, P=personal time (sleep)
- I set P>9.0 as Leisure

	Men				Women			
	M	H	L	P	M	H	L	P
US 1992	6.3	2.3	6.3	9	4.1	4.3	6.2	9
EU early 90s	6.2	1.9	6.8	9	3.0	5.8	6.3	9

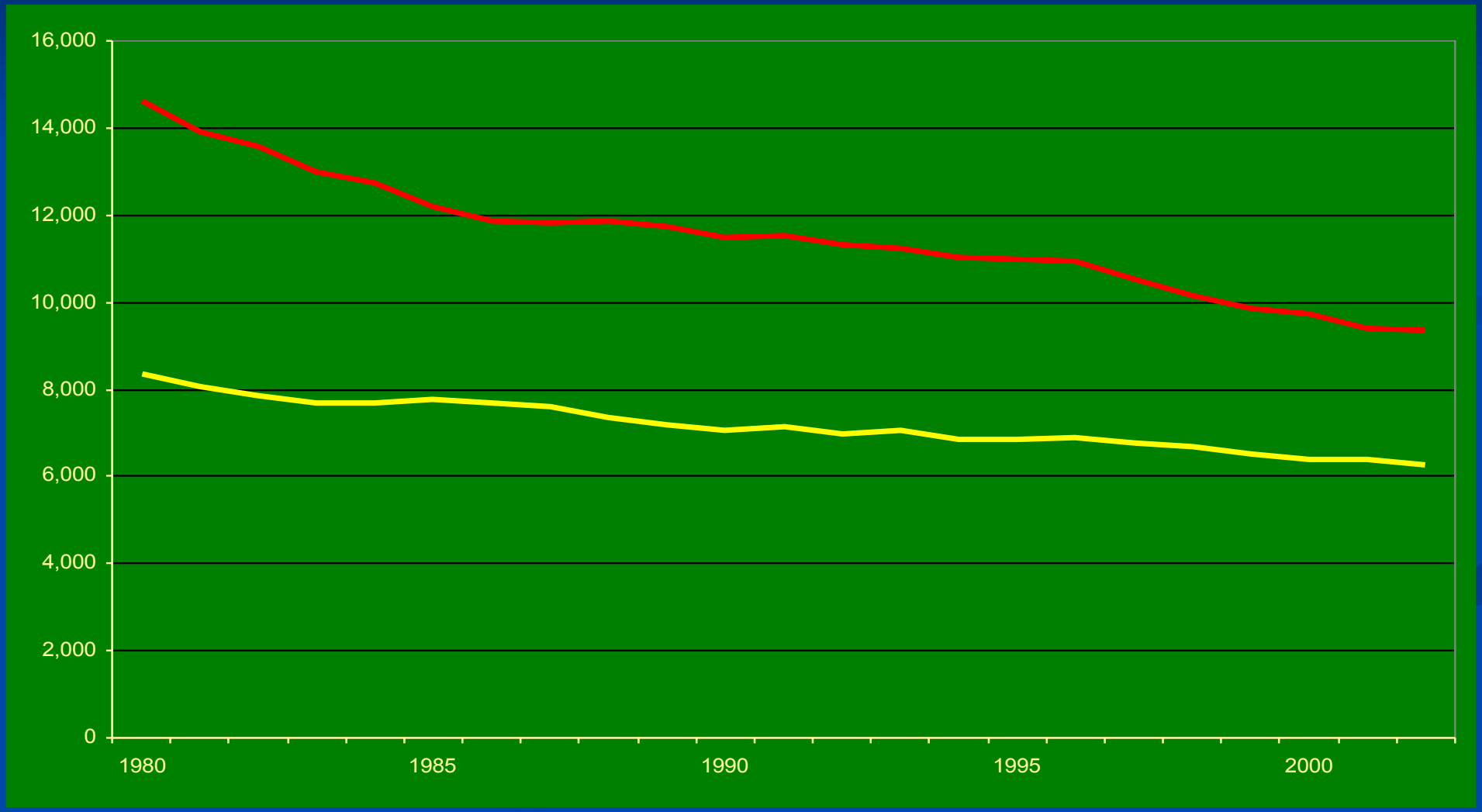
Welfare Interpretation of Work vs. Home Production

- Surveys have asked respondents to rate a large number of activities on a scale of 1 to 10
- Traditional leisure activities rate highest, including socializing, watching TV
- But some aspects of home production rate lower, including cleaning, shopping, some aspects of child care
- "Work" is in the middle
  - Reasons? Stigma of not working? Socializing at work?

Turn the Tables on the U. S.: The "Disconnect" between Welfare and PPP-Adjusted GDP

- GDP Exaggerates U. S. GDP per Capita
  - Extreme climate, lots of air conditioning, low petrol prices, huge excess energy use
  - U. S. urban sprawl: energy use, congestion
  - Crime, 2 million in prison
  - Insecurity, lack of employment protection, lack of citizen's right to medical care
- How much is this worth?

BTUs per GDP: The EU-US Difference is only 2% of GDP



US vs. EU Energy Expenditures

- In 2005 US spent 7.4 percent of GDP on all energy use.
- EU consumption was roughly 2/3 of US measured as BTU/GDP
- EU consumption then was 2.5 percent less of GDP than US
- Rough estimate: of that 2.5 percent, 1.0 percent of excess US energy use was not welfare-enhancing because it represented compensation for a severe climate
- What about all those hurricanes and tornados in the US? Recent estimate that insured losses amount to 0.15 of one percent of US GDP

Other Additions or Subtractions from Europe's Welfare

- Urban Congestion?
  - London vs. NY? Paris vs. Chicago?
  - Time spent in London underground vs. in a Chicago automobile?
- Prisons, perhaps 1% of GDP
- Inefficiency of U.S. Medical Care
- Undeniable U. S. superiority: housing
  - People value interior square feet (2X in US)
  - People value exterior land (4X in US)

Health Care Comparisons for the U.S. and Other Nations

Health Care Spending and Outcomes, U. S. versus Six Other Nations, 2003

	Health Spending As Percent of GDP	Life Expectancy at Birth	Doctors per Capita	Nurses per Capita	Acute Care Hospital Beds per Capita	MRI Units per Capita	CT Scanners per Capita
United States	15.0	77.2	2.3	7.9	2.8	8.6	13.1
Canada	9.9	79.7	2.1	9.8	3.2	4.5	10.3
France	10.1	79.4	3.4	7.3	3.8	2.8	8.4
Germany	11.1	78.4	3.4	9.7	6.7	6.2	14.7
Italy	8.4	79.9	4.1	5.4	3.9	11.6	24.0
Japan	7.9	81.8	2.0	7.8	8.5	35.3	92.6
United Kingdom	7.7	78.5	2.2	9.1	3.7	5.2	5.8

Note: Doctors, nurses, and acute care beds are per thousand population. MRI and CT per million population.

Source: www.oecd.org, "OECD Health Data 2005 - Frequently Requested Data" release of 12 October 2005.

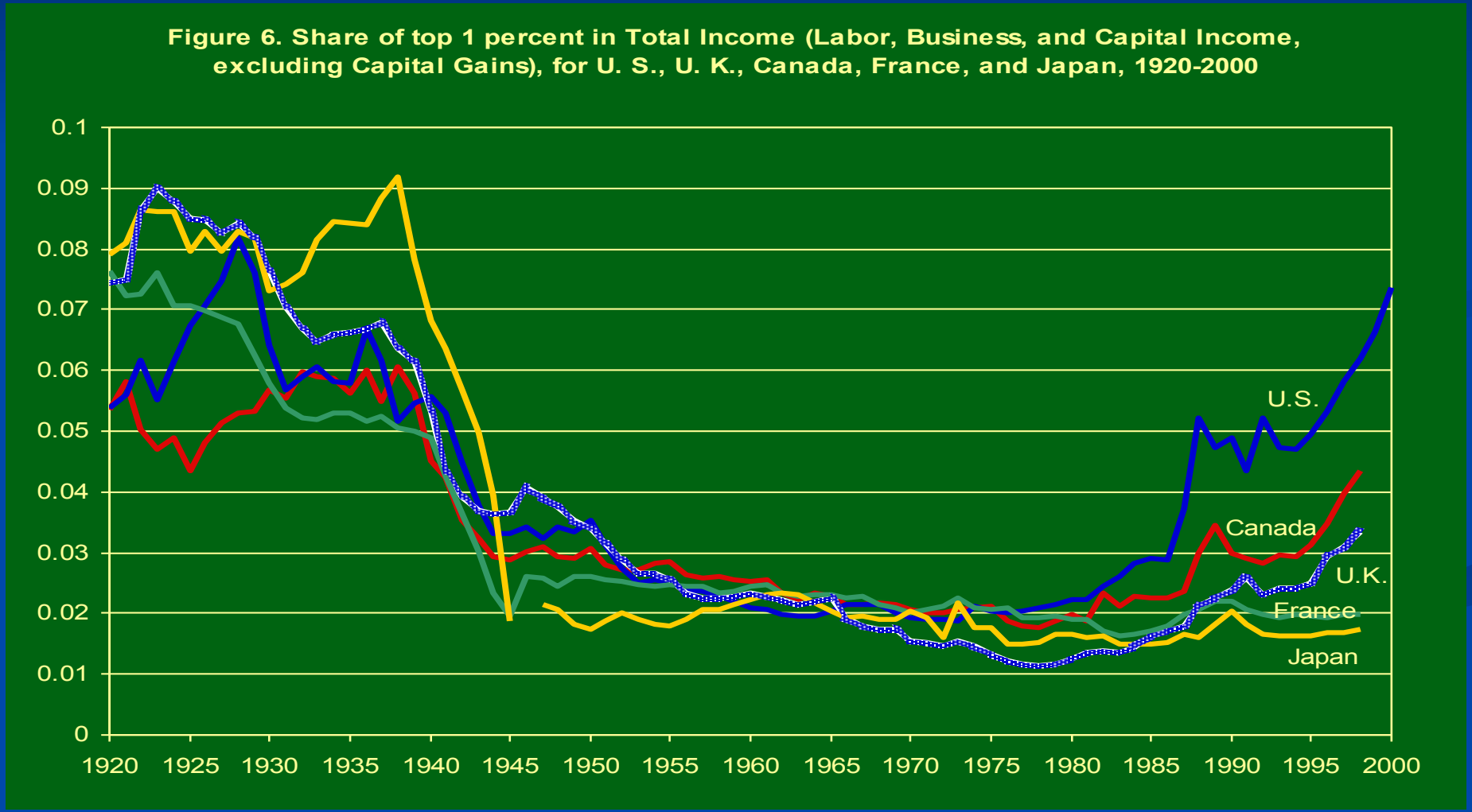
The Value of Extra Security in Europe

- By Measuring Y/N Pre-tax instead of Post-Tax, we treat EU Welfare System as Valuable as Equivalent in Market Consumption
- Prescott counts only the substitution effects of higher labor taxes
- Europeans get full value back per tax dollar in valued government services
  - U comp, maternity leave, pensions, severance pay
- To Make an extra allowance would be double counting
- Sargent – Lundqvist claim they don't get full value back because taxation is compulsory

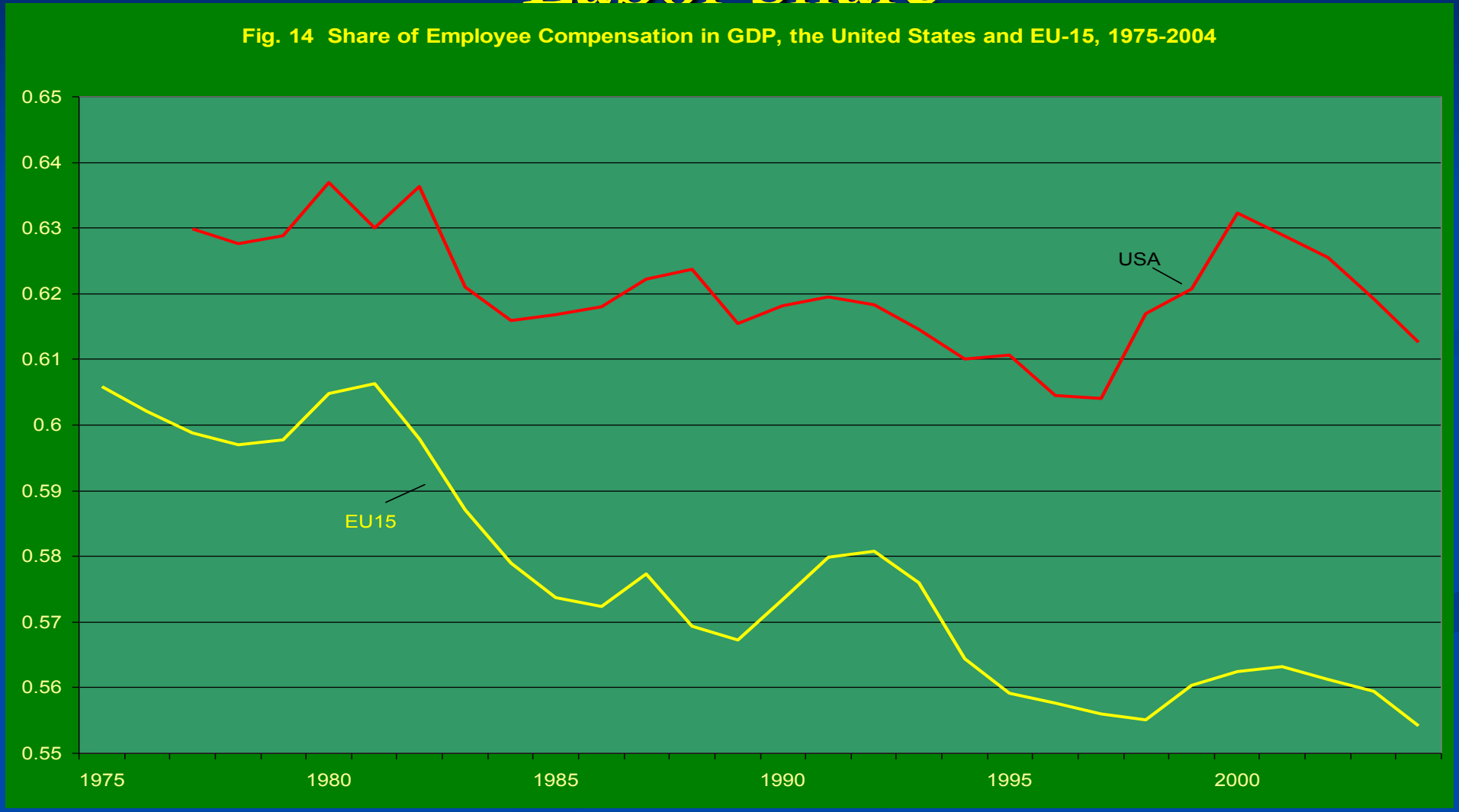
Additional Subtleties

- Immigration?
  - U.S. Illegal but Voluntary
  - Illegal Immigrants have jobs
  - Alienated French *banlieues*
  - US illegal immigration would be totally benign if the political system would accept it. We *love* our illegal immigrants.
- Inequality
  - U. S. median real income grows slower than mean real income, increasing skewness of income distribution

International Comparison of Inequality: the top 1%



Partial Offset to Higher US Inequality is the Decline in EU Labor Share



Overall Summary: No Welfare Adjustment for US Inequality

- Why?
- People above the US median gaining the extra income have positive marginal utility of income
- At the moment no data on EU growth in median vs. mean income
- Partially offset by decline in EU labor share
- This is at the top of the future research agenda

Adjustments Summary

Summary of Adjustments to the Europe-to-U.S. Ratio of Per-capita Income, 2004			
	Europe-to-U. S. Ratio of Real GDP per Capita	Adjustment to Leisure Component of Hours	Adjustment to GDP
Market PPP Ratio of Y per Capita	68.8		
Add: 1/2 times 2/3 of Difference in Hours per Employee (11.8)		3.9	
Add: 1/10 of Difference in Employment per Capita (8.6)		0.9	
Add: Half of Energy Use Difference			1.0
Add: Prisons and Other			1.0
Add: Medical Care Inefficiency			3.0
Sum of Market PPP Ratio and above Additions	78.6		
Market PPP Ratio of Y per Hour	89.2		
Percent Productivity Gap Explained	48.0		
Percent Total Gap Explained	31.4		

What are the Causes of Low European Hours per Capita?

- There are many hypotheses, but so far there have been few papers that provide a unified treatment of the pre-1995 decline in hours per capita and the post-1995 recovery
- The candidate explanations for low H/N : high taxes, employment and product market regulation, generous unemployment benefits, and strong unions
- These are called "policy variables" although unions better described as an "institutional" variable
- Much of the literature is a battle of assumptions and anecdotes; we provide econometric evidence quantifying the role of the policy variables in the decline of hours before 1995 and the post 1995 recovery

Europe's Self-Destructive Period: 1970-95

- Evidence on declining H/N already provided. This is why Europe came closer to catching up for Y/H than for Y/N
- Entitlements about pensions
- "Lump of labor fallacy"
  - Shorter hours, the French "hours police"
  - Shop closing hours; an example which raised Y/H while reducing Y/N
- Components of EU labor market policy
  - Minimum wage, employment protection policy, product market regulations

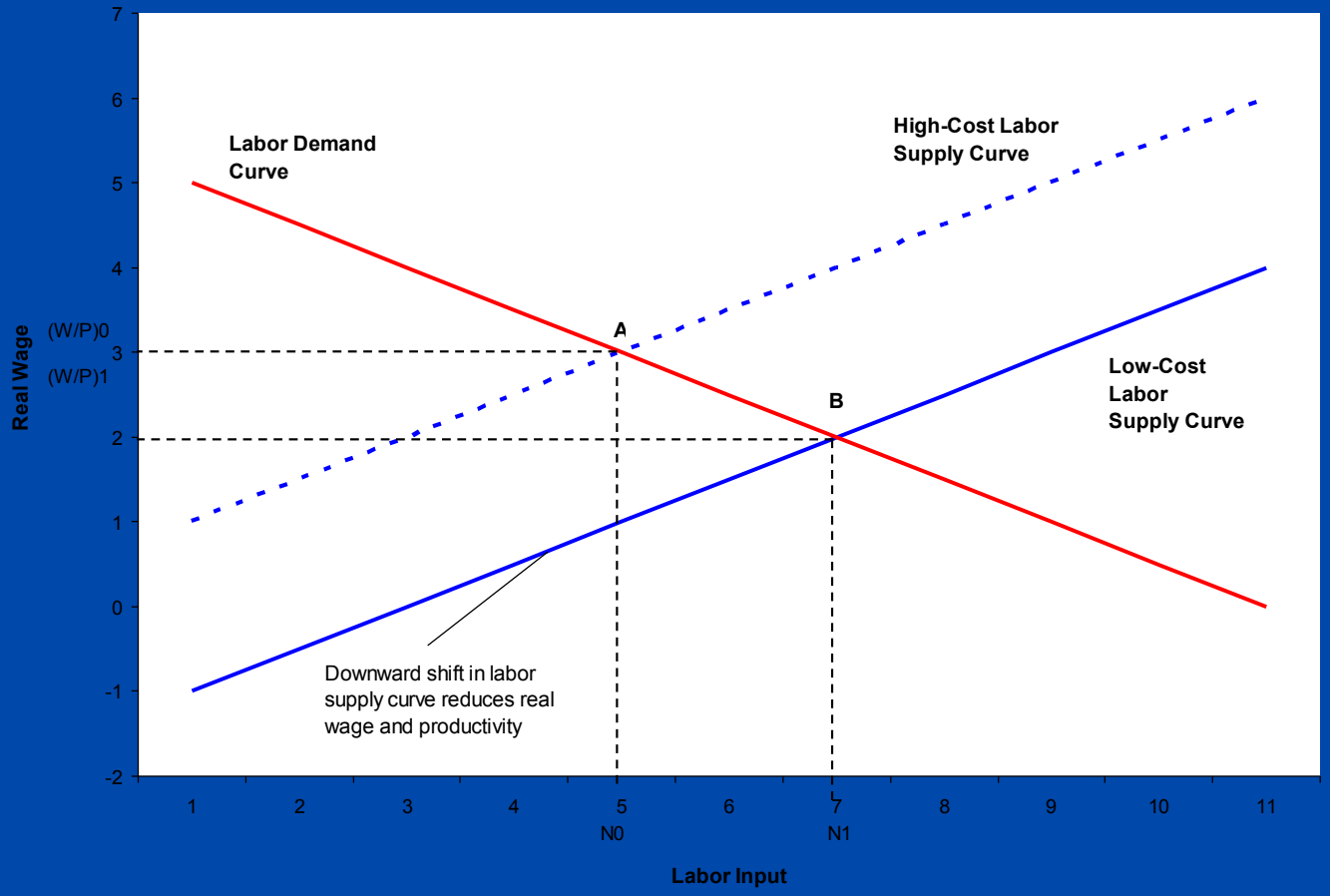
A Central Debate about Europe: The Employment-Productivity Tradeoff

- 1972-95
  - US rapid growth of H due to increase in female LFPR and baby-boom teenagers
  - Low experience, low productivity
  - Reduction in capital-labor ratio
  - US productivity slump allowed Europe to catch-up (partially)
- 1995-2008, all was reversed
  - European employment growth, particularly of southern European females
  - Europe productivity growth slump 1995-2008 as I the US 1972-95

The Employment-Productivity Tradeoff

- Take any CRS production $Y = F(K,H)$
  - Intensive form $Y/H=f(K/H)$
- As long as capital is fixed, an increase in employment lowers labor productivity
- We don't know how fast capital adjusts; the tradeoff may be quantitatively small
- Our 2008 paper quantifies the effects of institutional and policy variables as determinants of the post-1995 EU employment turnaround

Textbook Labor Economics



Pre-1995: Moving Northwest

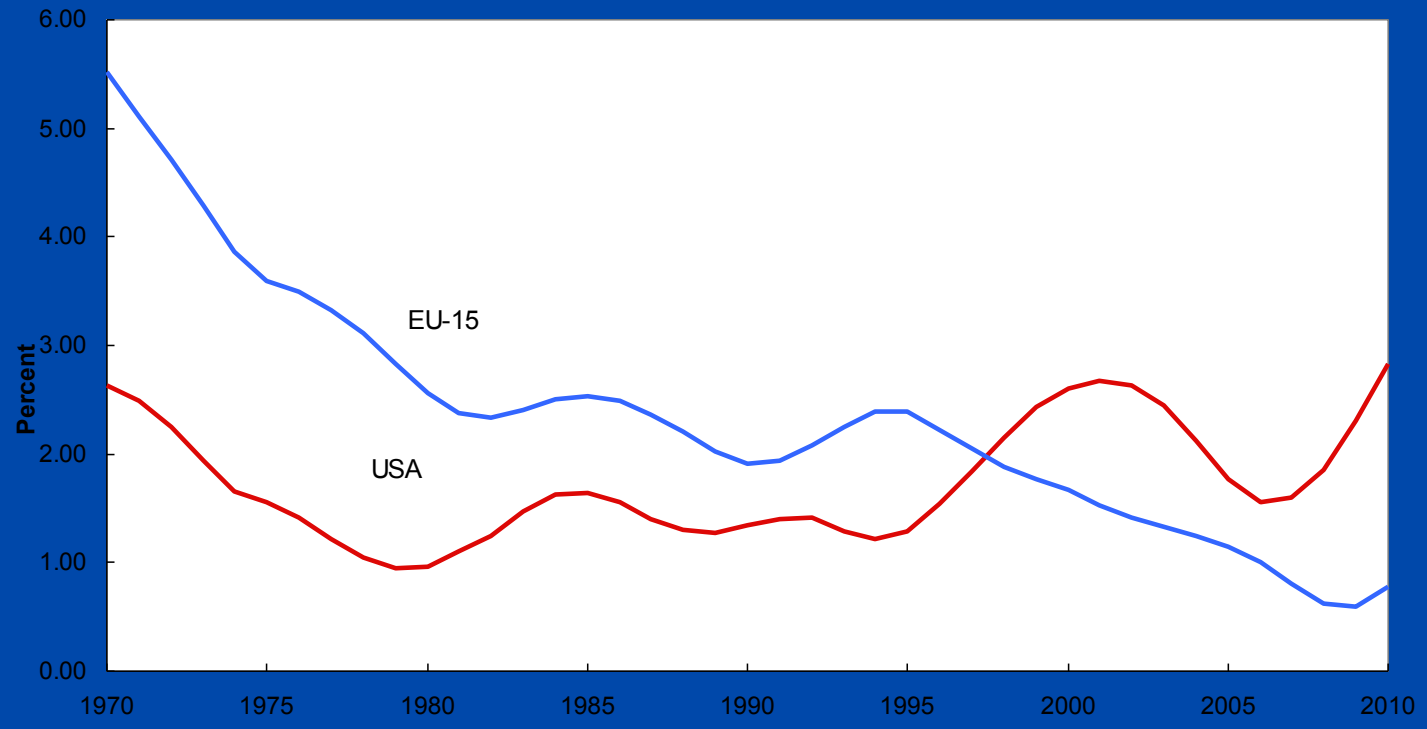
- 1970-95 EU climbs to the northwest
  - Hours per capita decline, average labor productivity increases
  - In this sense much of Europe's 1970-95 productivity catchup was "artificial," propelled by policies making labor expensive
    - No busboys, grocery baggers, valet parkers
    - Product market 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

- 1995-2008 EU slides southeast
  - Hours per capita start increasing while they decline in the US
  - Effects are magnified by slow reaction of capital.
    - Depending on the model, expanded employment should eventually stimulate growth of capital, shifting the labor demand curve up and eliminating much of the productivity decline
- Much of the literature on declining H/N misses the post-1995 turnaround in hours
  - Since 1995 decline in tax rates and employment protection measures
  - We are unaware of much macro-level research on the turnaround in hours

Updated Contrast EU vs. US Labor Productivity Growth, HP Filtered, 1970-2010

US and EU-15 Output per Hour, Annual Growth Trend: 1970-2010



Source : See Appendix C-4

What to Notice About LP

- The EU Slowdown is steady and continuous
- The US post-1995 revival is looking increasingly temporary
  - We created the US trend from quarterly data through 2010
- The fact that the US trend is turning around is important for interpretations of what caused the post-1995 US revival
- The empirical work on the tradeoff just looks inside the EU-15, doesn't compare EU with US.

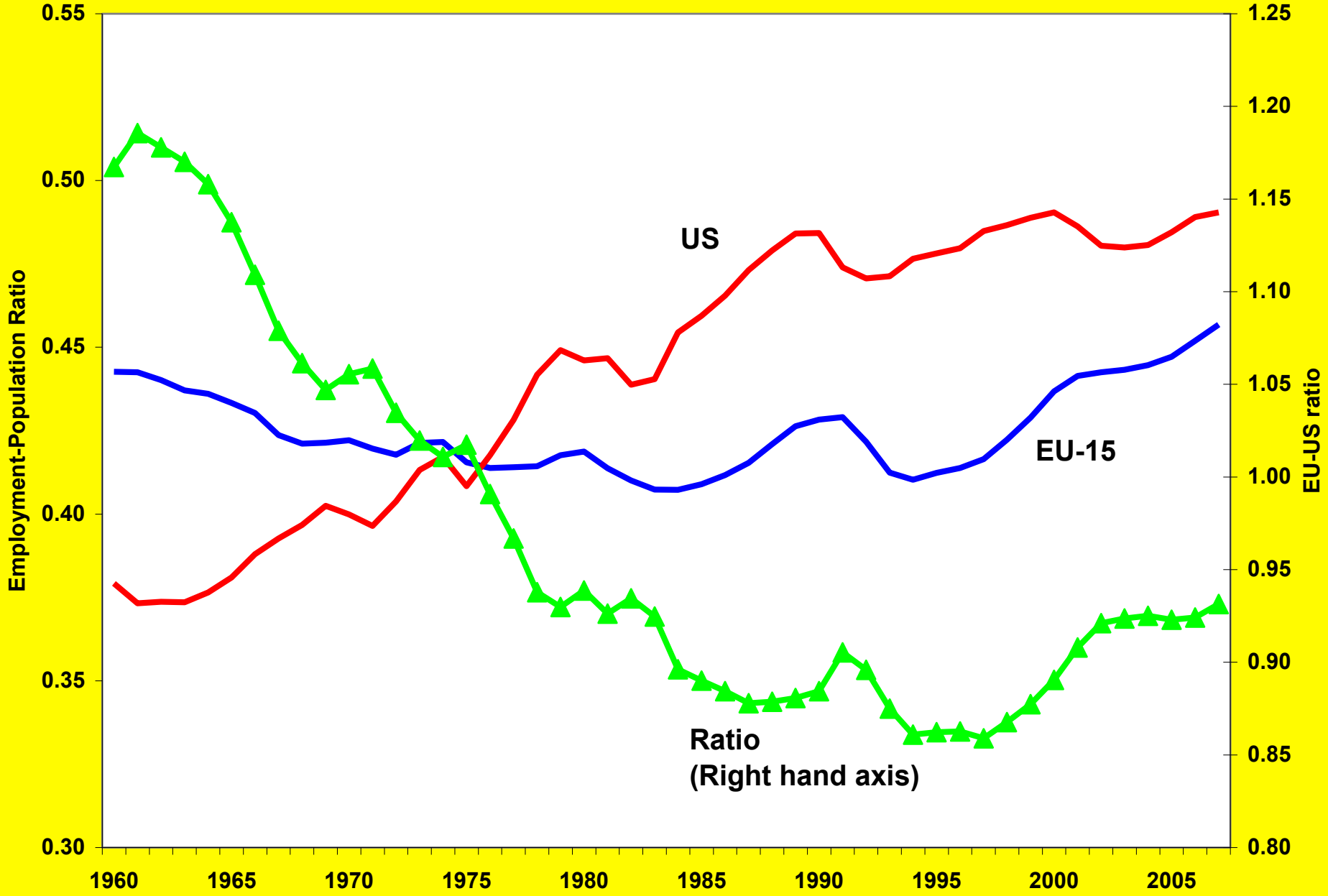
Turnarounds in Hours and Output

- Turnarounds are 1995-2006 minus 1980-1995 growth
- The relative turnarounds (EU minus US) almost cancel each other out for Y/N

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 from its *level* ratio of 70 percent

US vs EU E/N


0.55
0.50
0.45
0.40
0.35
0.30
Employment-Population Ratio
1.25
1.20
1.15
1.10
1.05
1.00
0.95
0.90
0.85
0.80
EU-US ratio
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
US
EU-15
Ratio
(Right hand axis)

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 their post-1995 annual growth rates of output per capita, Spain would be a Tiger, behind only Greece and Ireland

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
- All variables are rates of changes, not levels
- **Explanatory Variables:**
  - Output Gap
  - Product Market Regulation (PMR)
  - Union Density
  - Employment Protection Legislation (EPL)
  - Average Replacement Rate (ARR)
  - Corporatism Dummy
  - Tax wedge
  - Dummies for time shift and for each country
- Previous literature – a subset of these variables, levels vs. growth rates

Regression Results

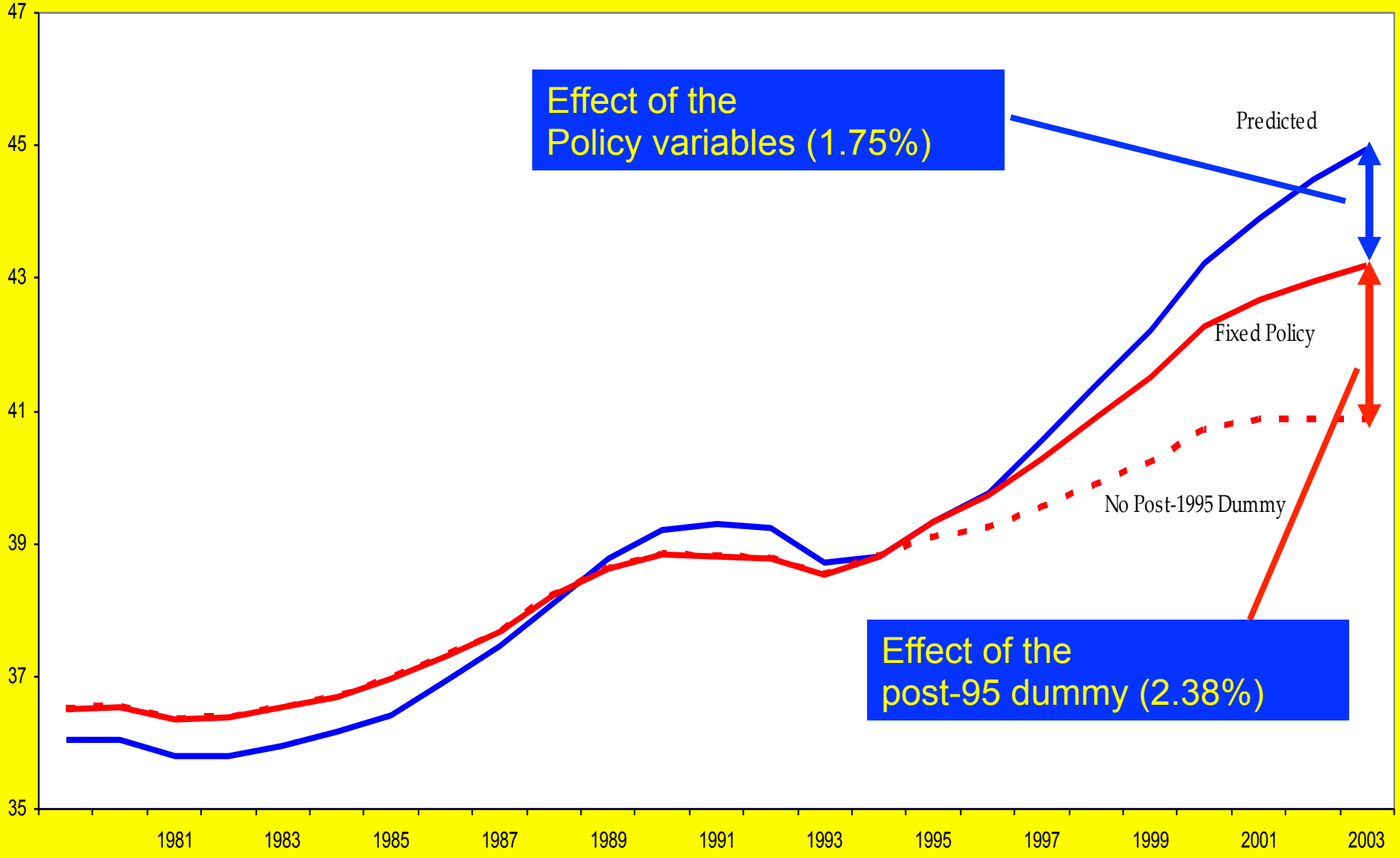
Output Gap	0.52	***
	(0.05)	
Product Market Regulation	-0.44	
	(0.55)	
Union Density	-0.46	***
	(0.10)	
Employment Protection Legislation	0.86	
	(0.79)	
Unemployment Benefits (ARR)	-0.18	***
	(0.05)	
High Corpratism Dummy	-2.04	**
	(0.98)	
Tax Wedge	-0.28	***
	(0.07)	
Post-1995 Dummy	0.94	***
	(0.15)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

- Our tax wedge coefficient is consistent with what others have found, -0.3 to -0.45
- EPL and PMR seem to have no significant 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 for unexplained reasons

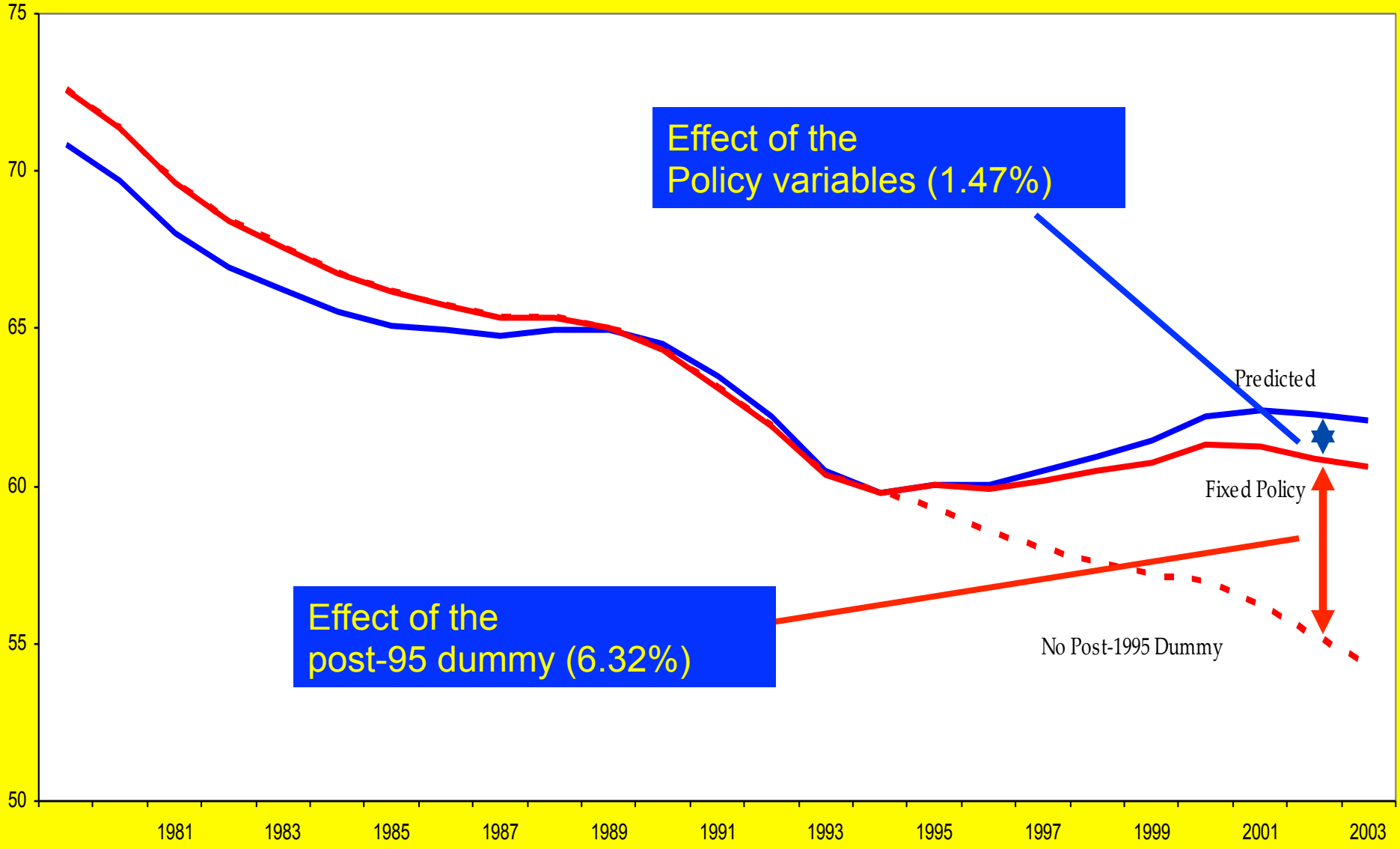
Interpretation of Time Shift Dummy

- In mid-1980s there was an enormous disparity in E/N for females across European countries, ranging from 30 percent in Spain to 70 percent in Scandinavia
- Gradually, but especially after 1995, there has been entry of females into the labor force, esp. in Southern Europe
- A separate literature documents these facts and links them to changes in cultural attitudes and social norms.
- Post-1995 immigration has also contributed to the post-1995 time-shift dummy
- Employment vs. productivity effects

Female Employment



Male Employment

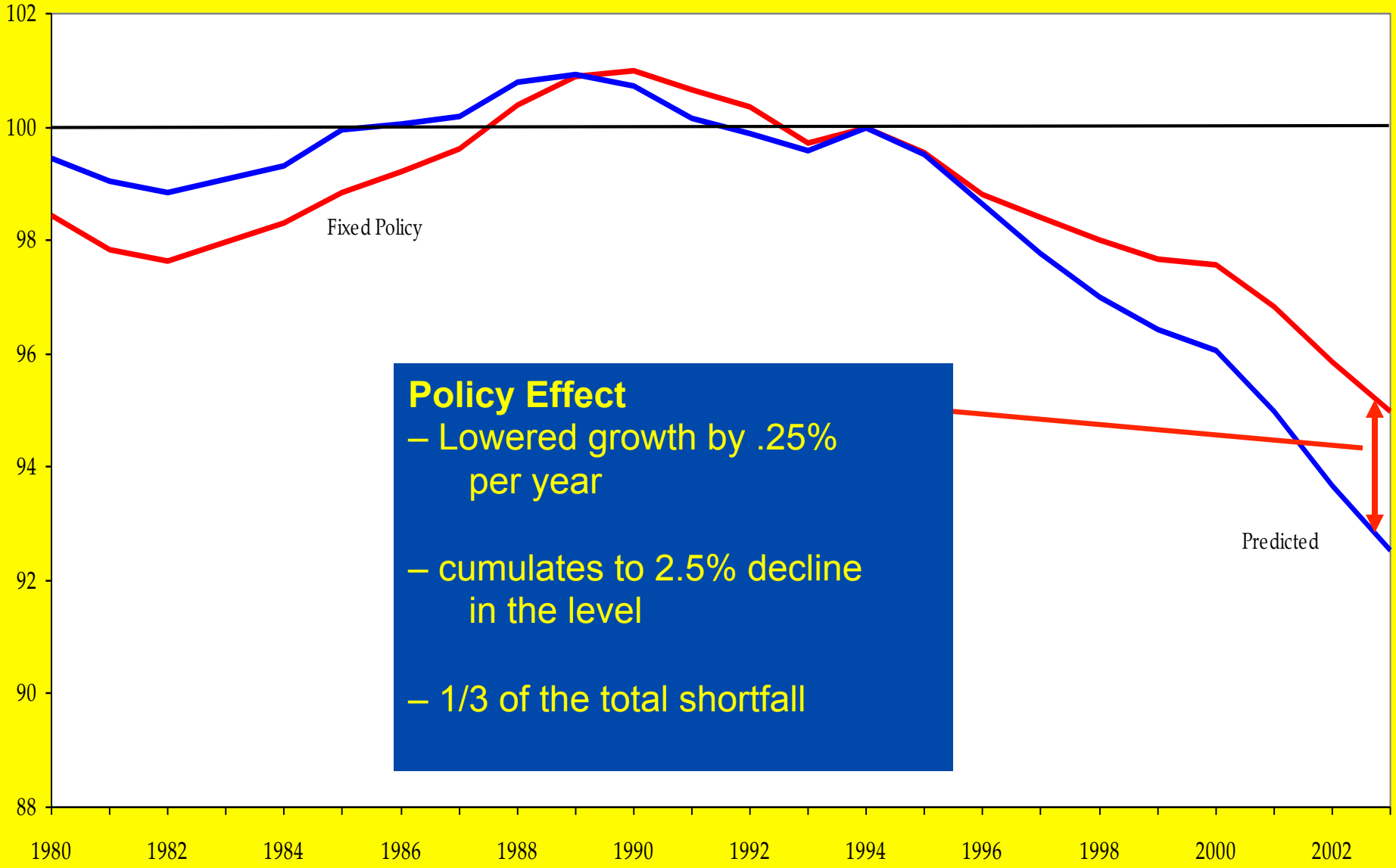


Productivity Regressions

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

- Coefficients on policy/inst variables on productivity are expected to be positive, the opposite of the negative coefficients in the employment regressions
- 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 the Med group of countries

Level of Labor Productivity



Policy Effect

– Lowered growth by .25% per year

– cumulates to 2.5% decline in the level

– 1/3 of the total shortfall

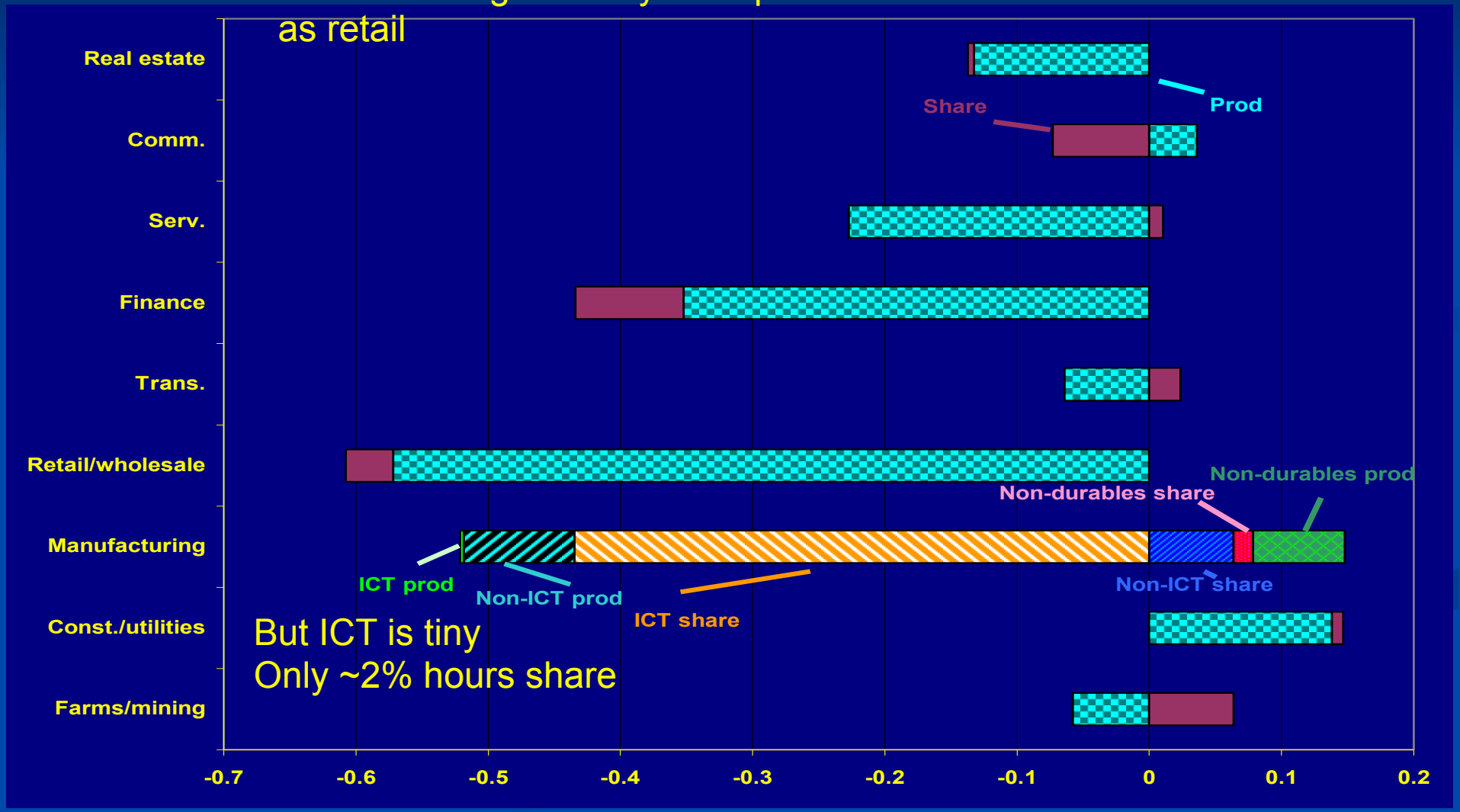
Conclusions from Employment and Productivity Growth Regressions

- 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

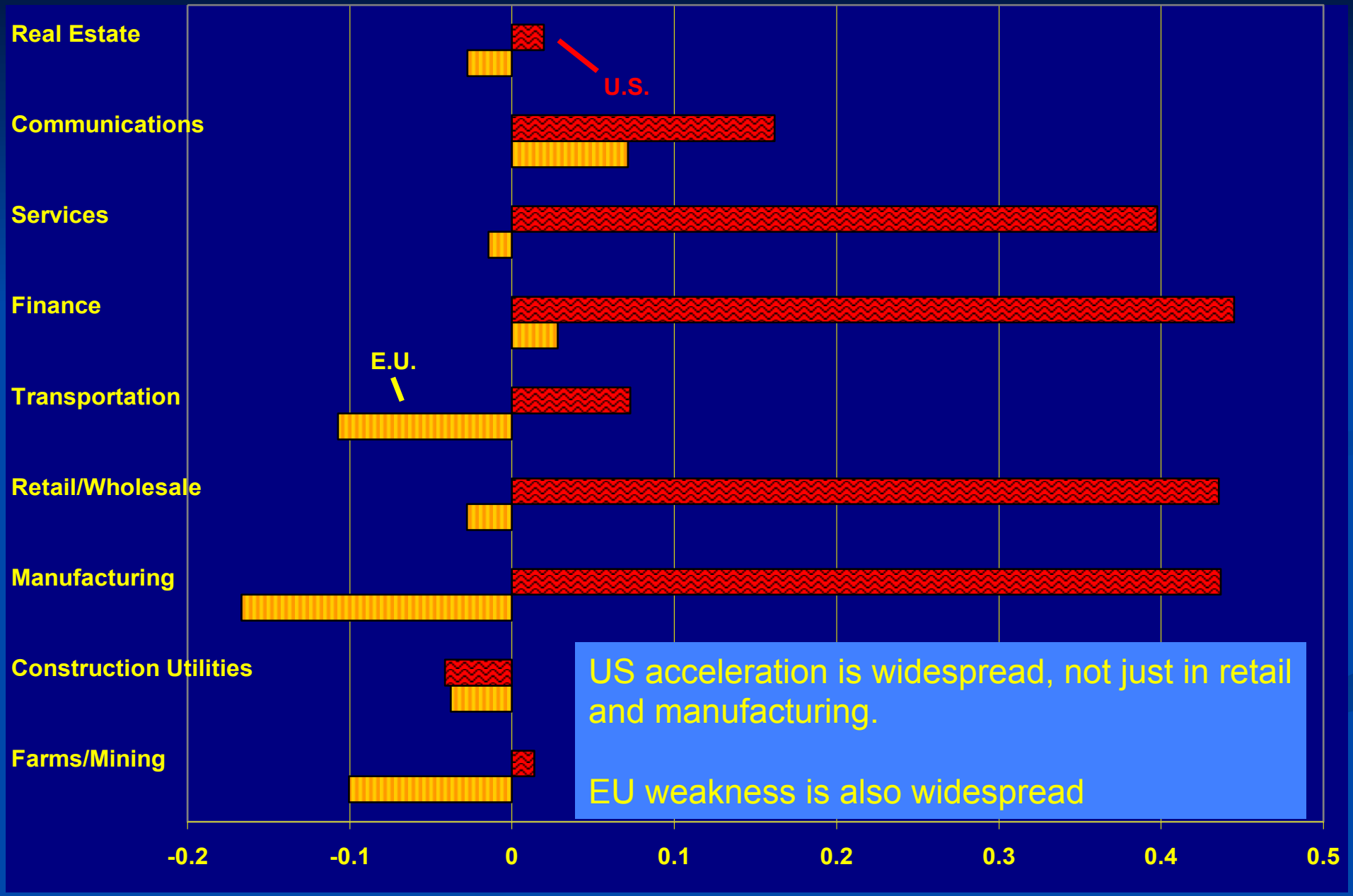
The New Results in this Paper at the Industry Level

- 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

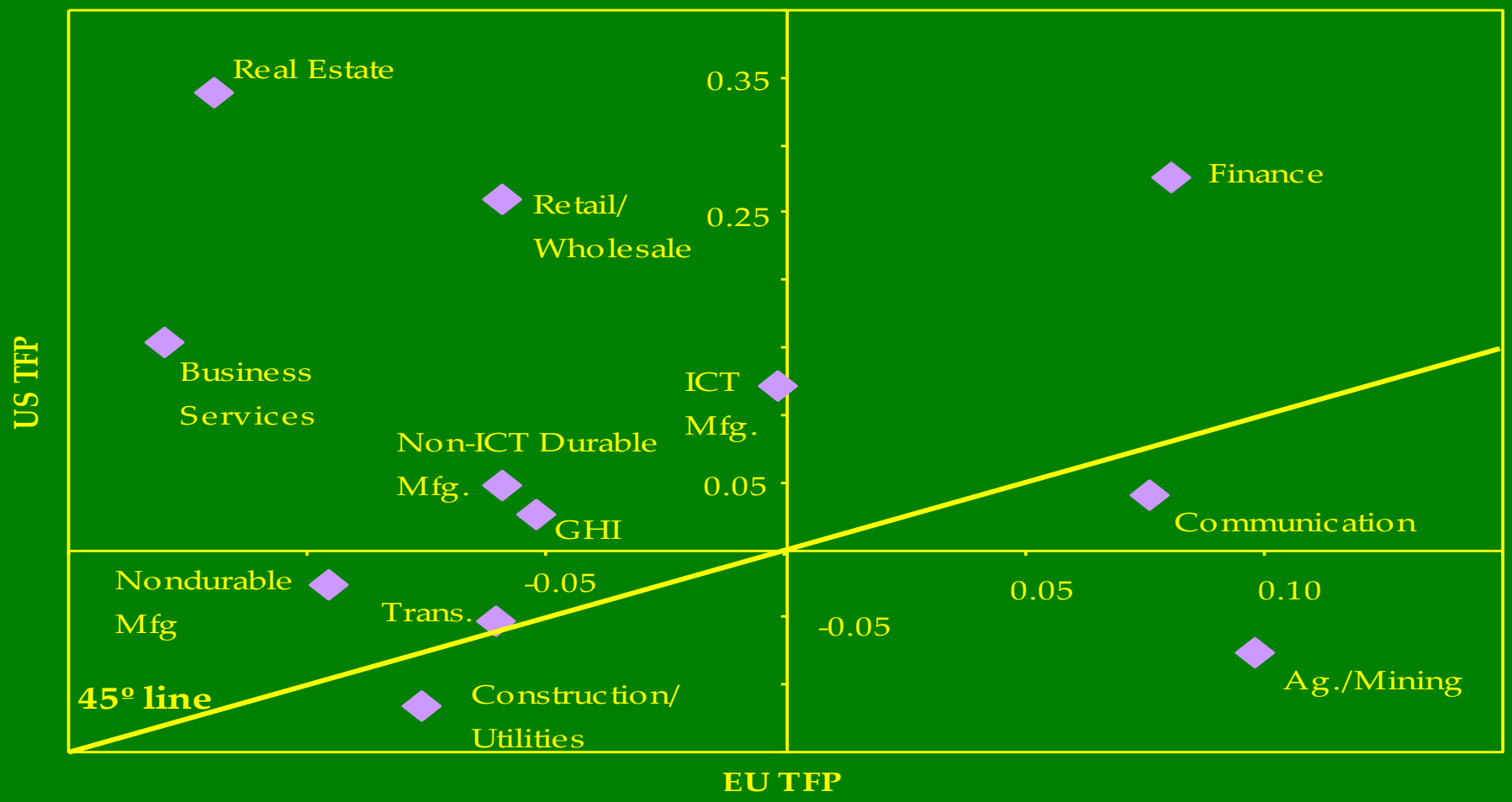
Contributions, Productivity vs. Share Effects, in EU-US, 1995-2003



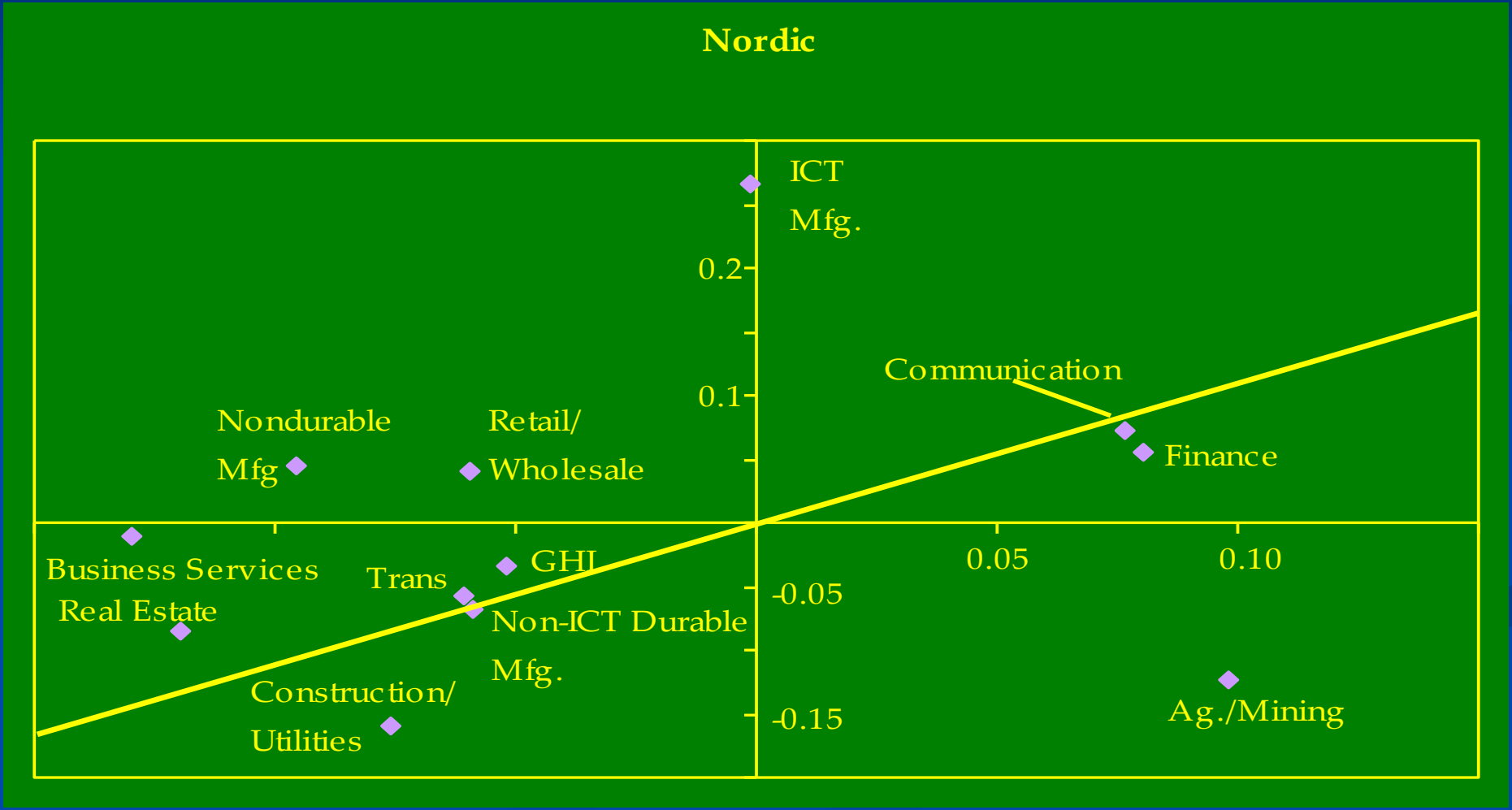
ALP growth multiplied by nominal shares



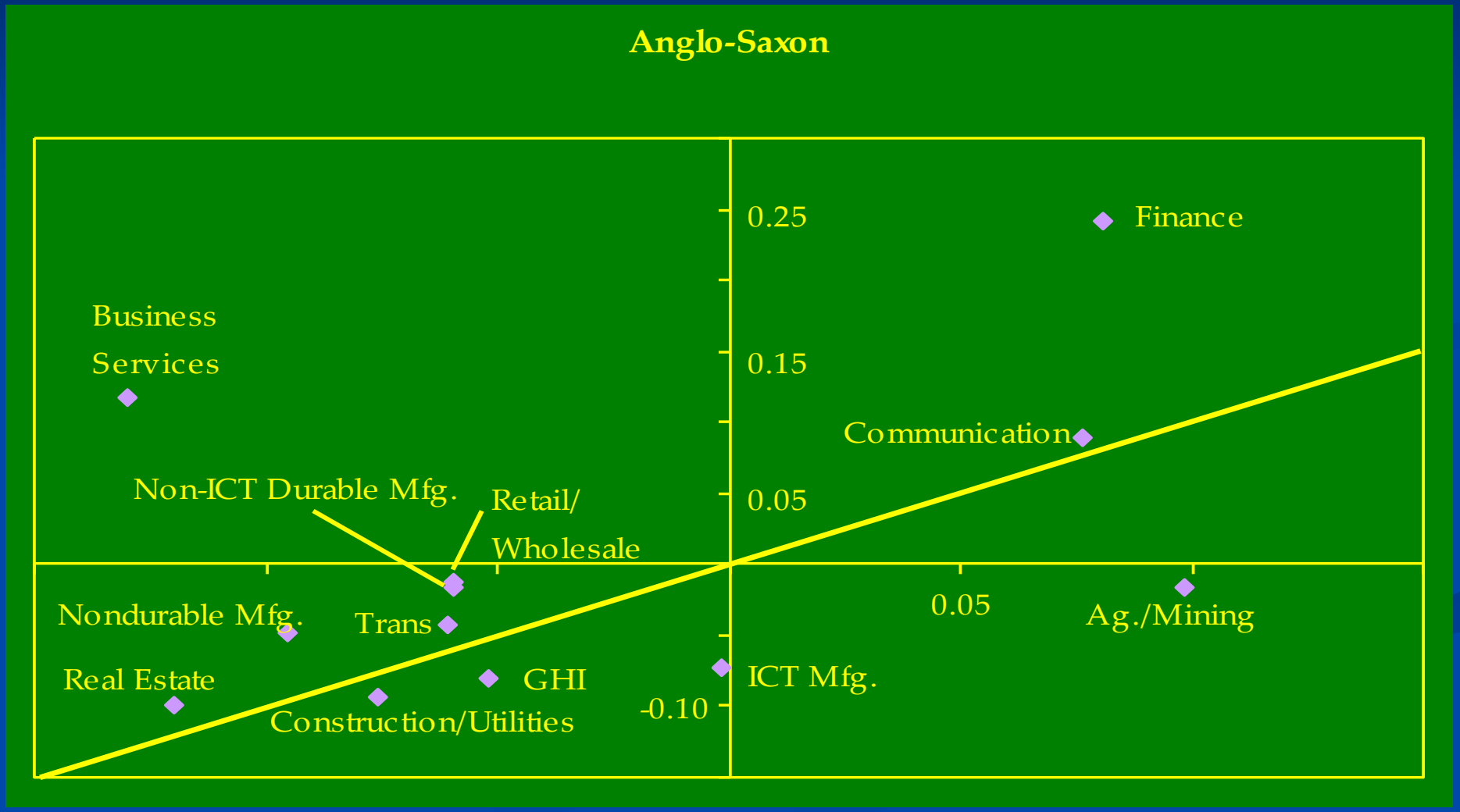
Comparing US with EU-15



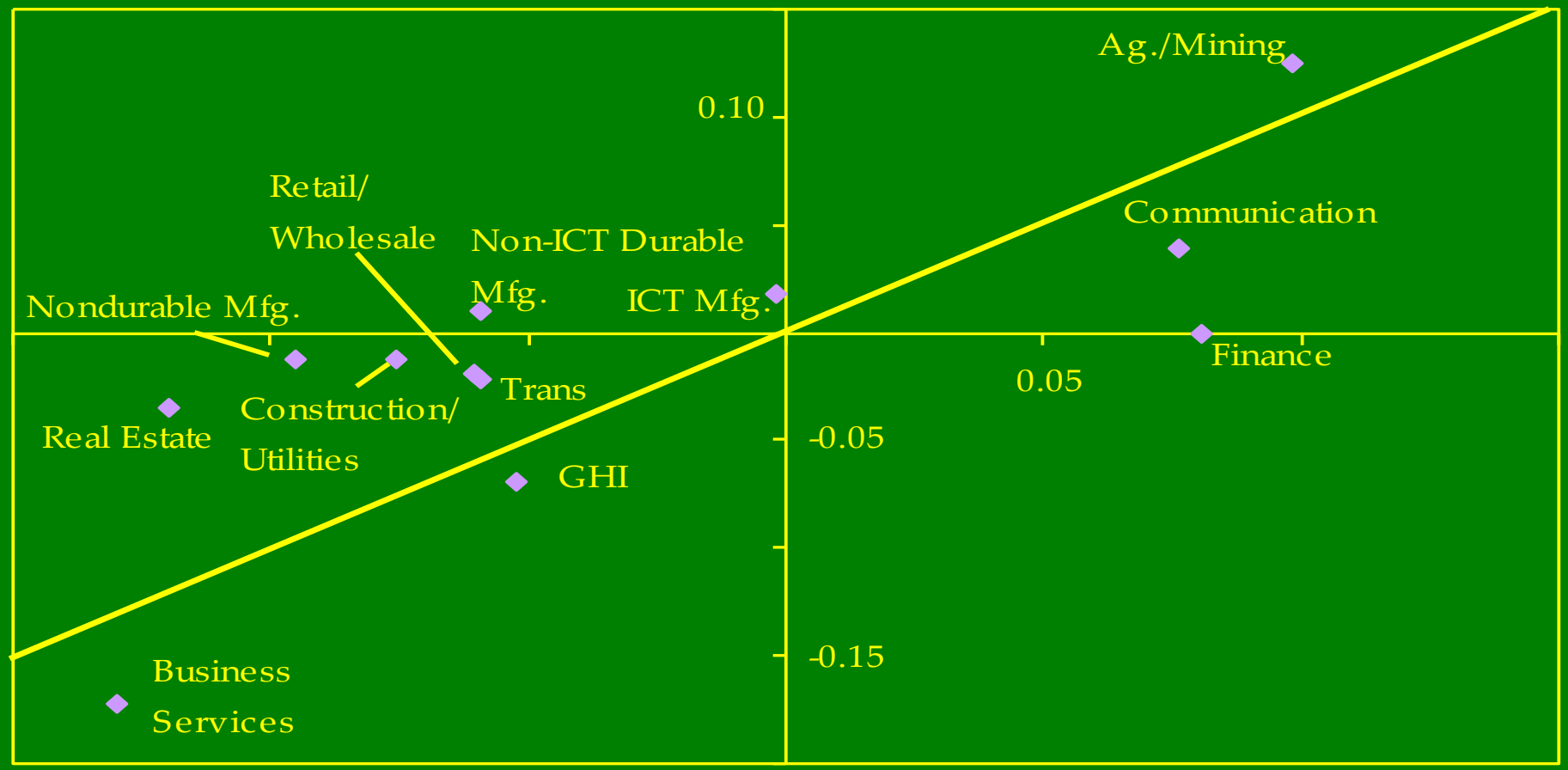
Comparing Nordic with EU-15



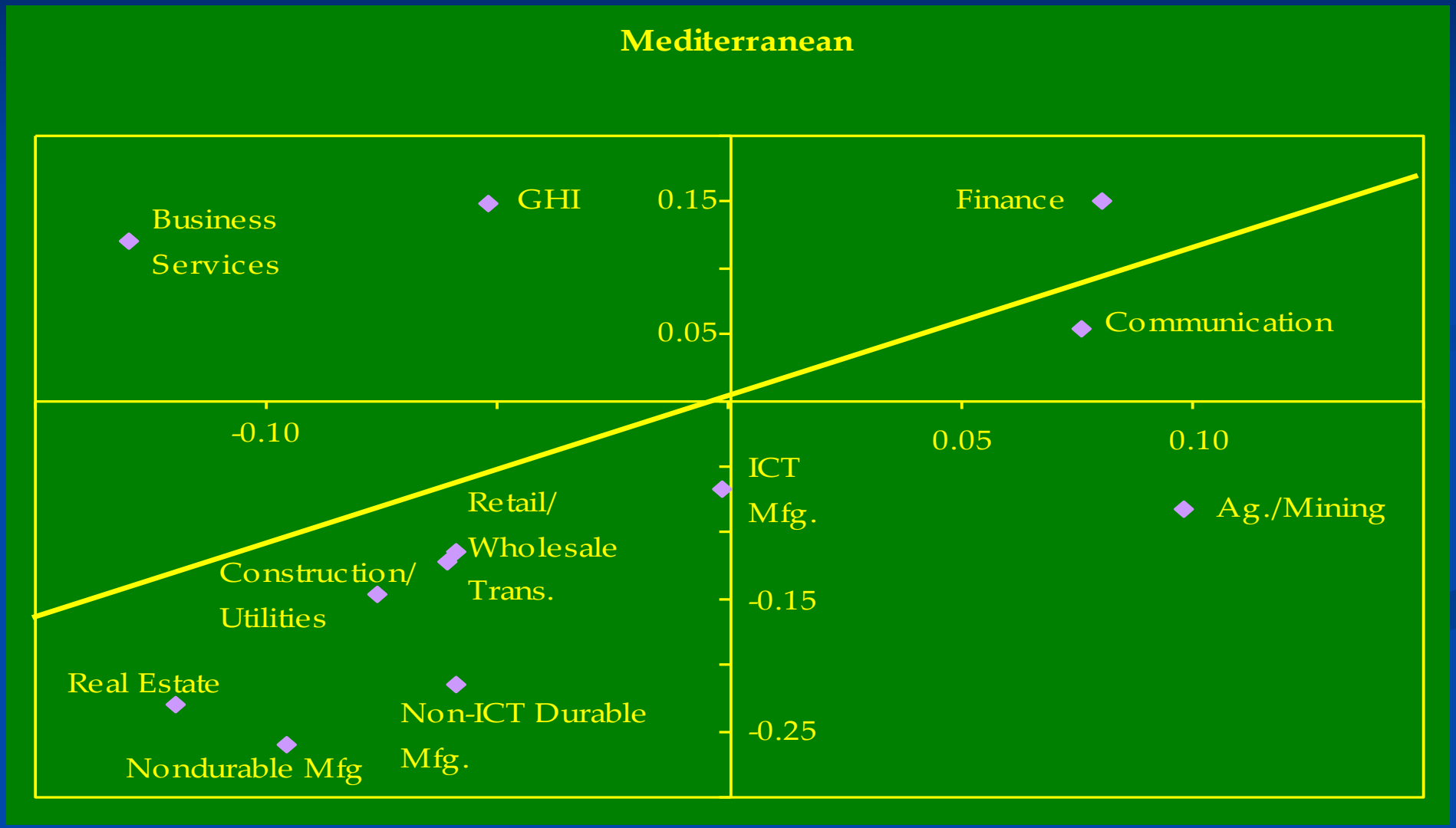
Comparing Anglo-Saxon with EU-15



Comparing Continental with EU-15



Comparing Med with EU-15



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

Overall Conclusions, Pros and Cons for U. S.

- U. S. Pro
  - Higher level of *Y/N* survives a detailed welfare comparison
  - Higher productivity reflects significant advantages, esp. retail, wholesale, finance
  - Potential for future high-skilled immigration
- U. S. Con
  - Related issues of rising inequality and "disposable workers."
  - Inequality, lack of security which aggravates current high unemployment
  - Edication plateau, cost-disease in medical care and higher education

Overall Conclusions for Europe

- Pro
  - Welfare state, more humane society
  - Less of an increase in inequality
  - Work-sharing and other beneficial responses to business cycles
- Con
  - Slow growth in standard of living and Y/H
  - Continuing heavy hand of regulations
  - Low birth rate, more difficulty integrating immigrants
  - Basic conflict between preservation of historic cities and adopting the benefits of ICT
- Big Puzzle: How can sourthern Europe become more like the Nordic countries?