

“Economic variables in action”
European Union economic area

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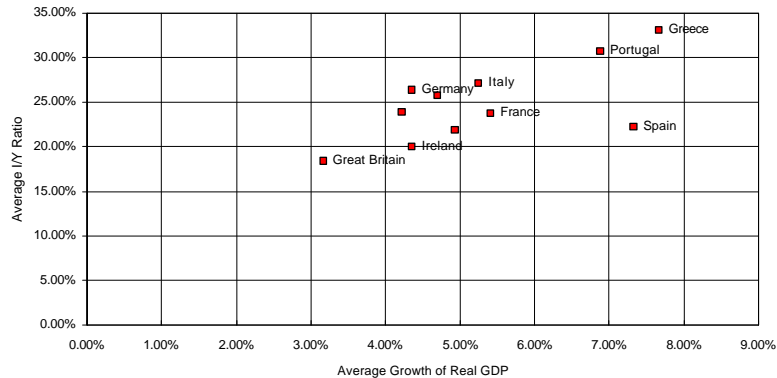
1 Explaining Growth and Finding Convergence

1.1 Examining the Investment/GDP and Saving/GDP ratios

Higher Investment/GDP and Saving/GDP are thought to lead to higher growth in economies. For each country I calculated the average Investment/GDP for 1960-72; 1973-85 and 1986-97. I then examine these ratios against the average growth rates of GDP for the first eight countries to see if the relationship holds. In my graphs the I/GDP series is plotted as the "A" series (for the Y axis) and the average growth rate is plotted as the X-axis series.

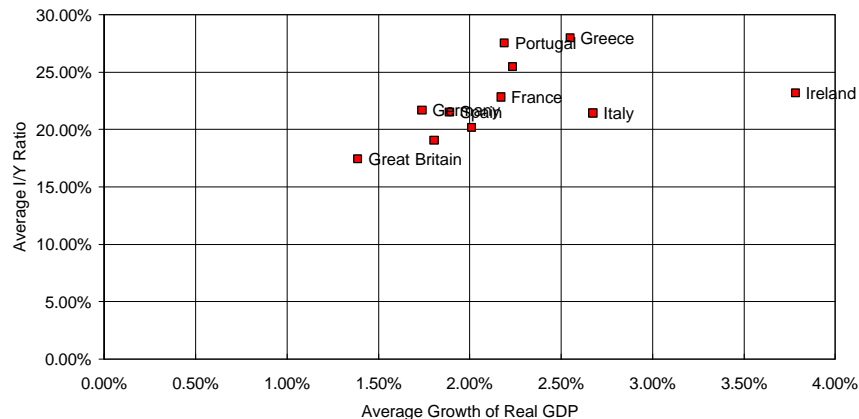
1960-73:

Big Four are lagging behind the Poor Four in this period. Greece is leading in GDP growth of almost 8% and high investments, with the highest I/Y ratio. Portugal and Spain are right behind it, whereas Spain has a much lower I/Y ratio relative to a strong average growth of 7.3%. Italy and France have the highest growth out of the Big Four (around 5.4%), then comes Germany and the Great Britain.



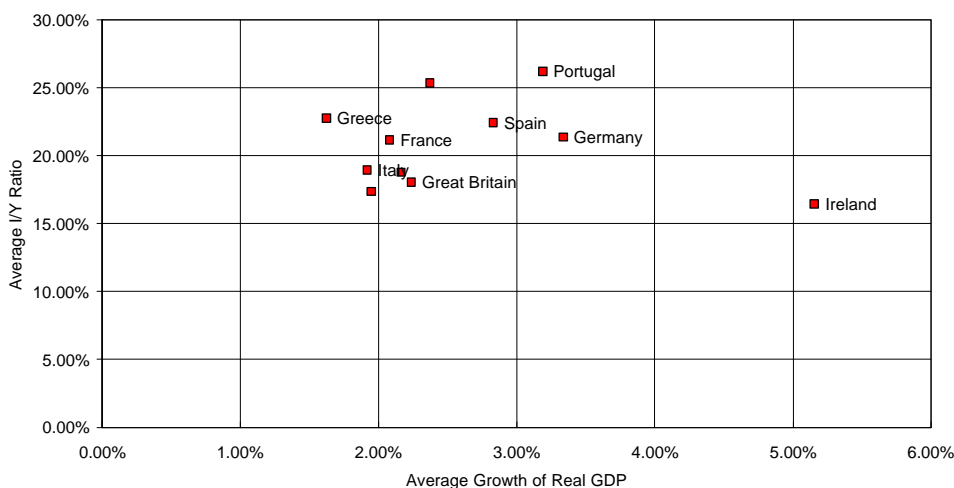
1973-85

It seems that only Ireland was able to keep its high level of growth, the rest of the countries slowed down drastically. Great Britain is still the last in terms of growth. The average growth of GDP for most countries decreased to a half and more of the previous level. Interesting is that the I/Y ratio hasn't dropped more than by 5% in general for the countries.



1985-96

Ireland still leads with the highest average growth and the lowest I/Y ratio, making the investments in the country attractive. Greece economy is experiencing another decade of persistent fall in GDP growth. Germany is a winner in this period, with an average growth of 3.34%, highest among the Big Four. GDP growth in Italy and France has been constantly slowing down. Britain takes off from the all low in the previous period and jumps to an average of 2.23%.

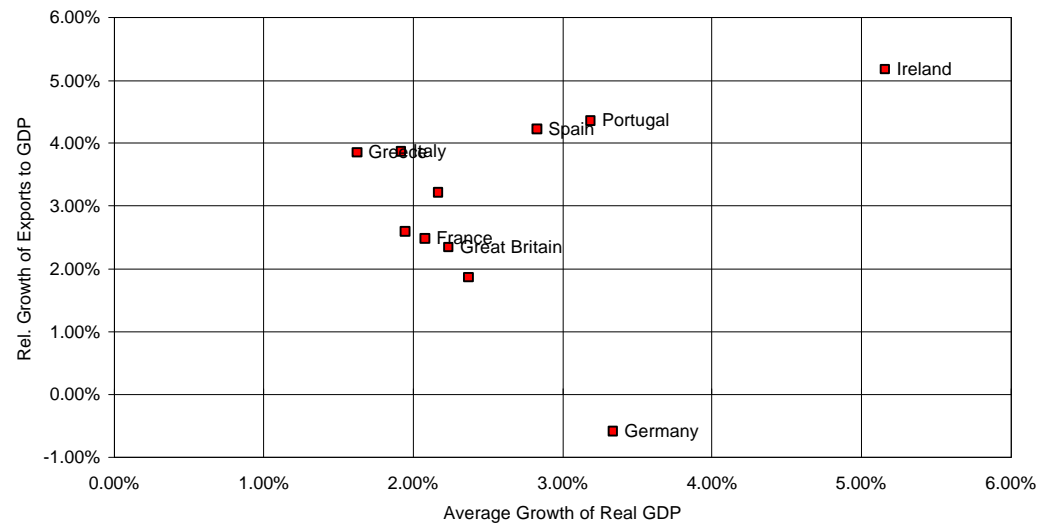
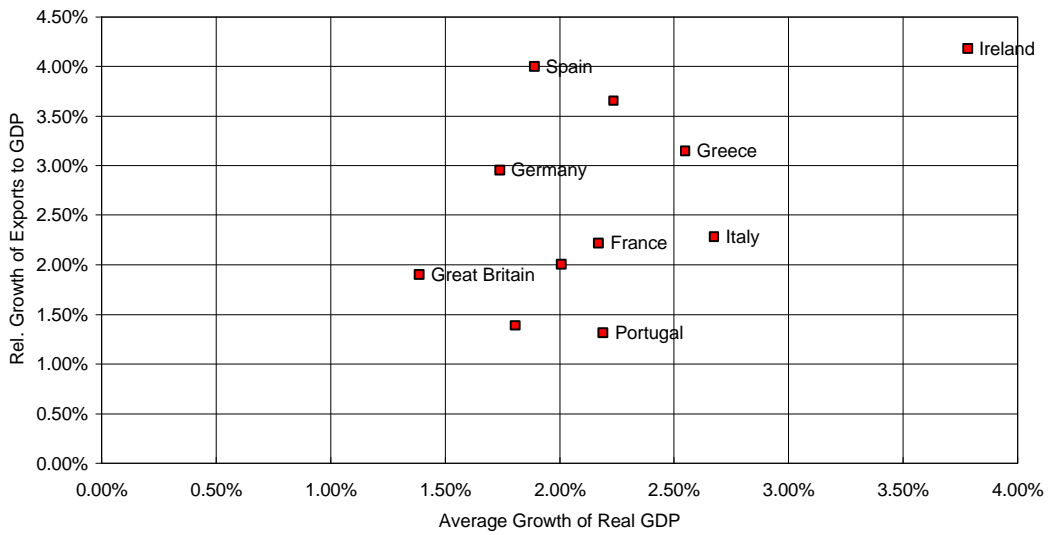
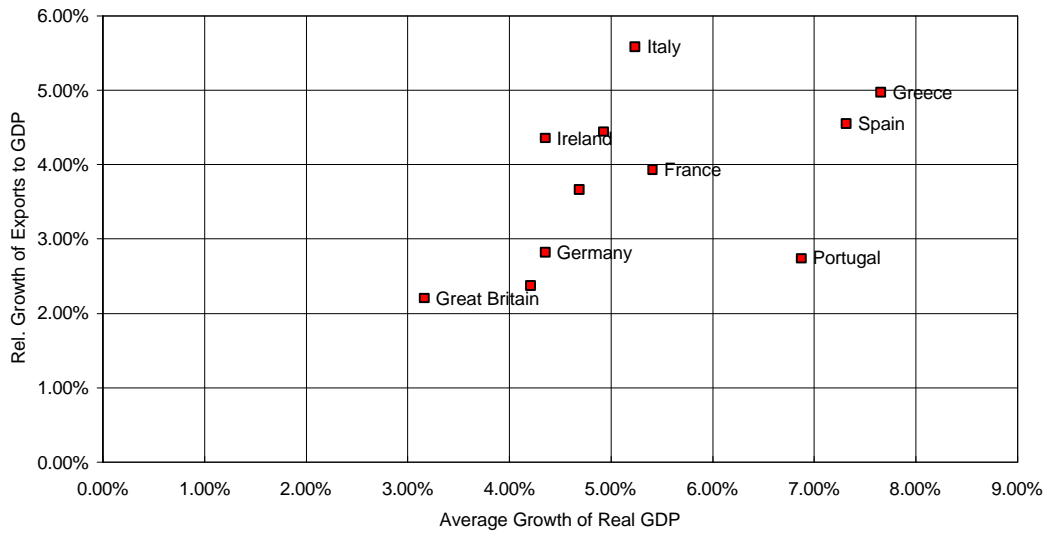


It can't be definitely proved, according to examined data, that the relationship between investments and growth of GDP holds. Many externalities affect economy's growth and these are not seen on the graph. For example Greece has constantly a high investment ratio and yet its growth has been slowing down for the whole period we examined.

1.2 Effect of exports on countries' GDP

Many economists argue that countries that follow an export-oriented trade policy grow faster than countries that follow import-substitution. Each country's average Export/GDP ratio is shown for the three periods, 1960-72, 1973-85 and 1986-1997, as well as its average rate of growth of GDP in the three periods. The rates of growth of GDP against the Export/GDP ratios are plotted for the first eight countries in three separate graphs, one for each period

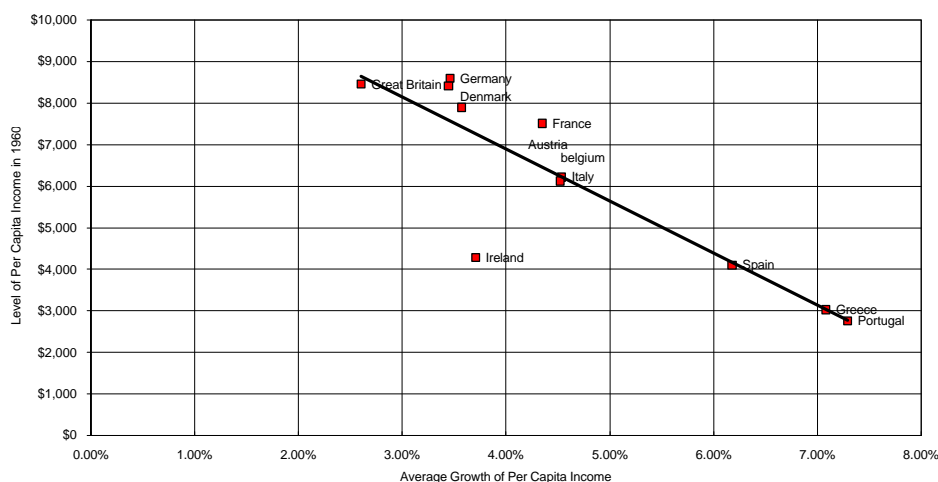
Italy has the highest exports to GDP ratio in the 60's and reaches the highest growth among the Big Four in the 70's. Higher exports have helped Italy's GDP growth. Export-oriented trade policy helps countries to grow faster. Another example is Spain. In 70's it has a high export to GDP ratio and in the 80's this puts it above France, Greece, Italy and Great Britain in terms of GDP growth. Examining the graphs Germany seems more independent from this relation than the others. It achieves a relatively high GDP growth without substantially rising exports. In my opinion size of the country plays a role in this export-GDP relation, because Ireland as one of the smaller countries has had the highest export-GDP ratio and subsequently high growth of GDP.



1.3 GDP/capita and economic growth

Countries with a higher GDP/capita tend to attain lower GDP growth than those with a lower income. These have a larger gap to make up for and achieve generally higher growth rates. A good example is my country: Slovakia. After the fall of the iron curtain the country has adopted new technologies with a dramatic speed. Technologies being developed and adopted by the western Europe have taken decades whereas here it took only years. This has led a tremendous growth. In terms of GDP the country has gone from negative GDP to 4% in less than a decade. Even more interesting is the fact that the technologies used after rehabilitation are more advanced than those in the western Europe, since it takes time before the old ones are replaced.

We can see from the graphs that there is a negative relation between GDP per capita levels and the average GDP growth rate. I sketched a graph in "Chart1" which shows the countries for all 3 periods. The higher bar in each couple for a given period is a proportionalized income per capita, the smaller bar is the GDP growth. We can see clearly from this chart that the dependence exists in most cases. The Germany may be reaching the high GDP growth nevertheless because of the unification, which gave it a lot of potential for growth, because as I wrote above, where there is room for development there is also a room for growth.

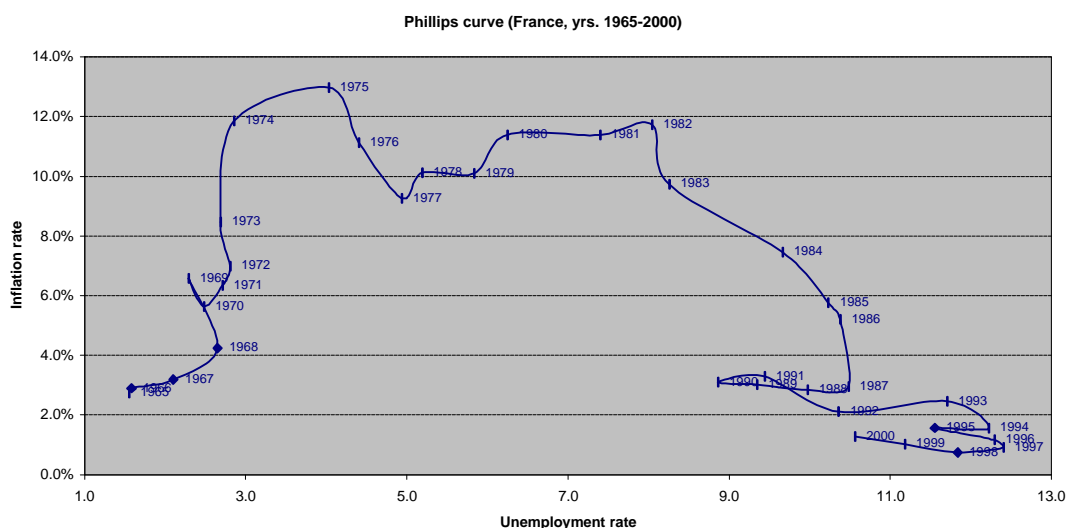


2 Natural rate of unemployment

2.1 Phillips curve

When we analyze the data for 60's and mid 70's the Phillips curve is vertical. In this period, it seems, we have reached the natural rate of unemployment little below 3%. The rate of unemployment does not fall with the rising inflation, according to the Phillips curve theory, but stays at around the natural rate of unemployment. Mid 70's to early 80's are marked by a steady level of high inflation. During the years 1975-1977 the inflation falls with the

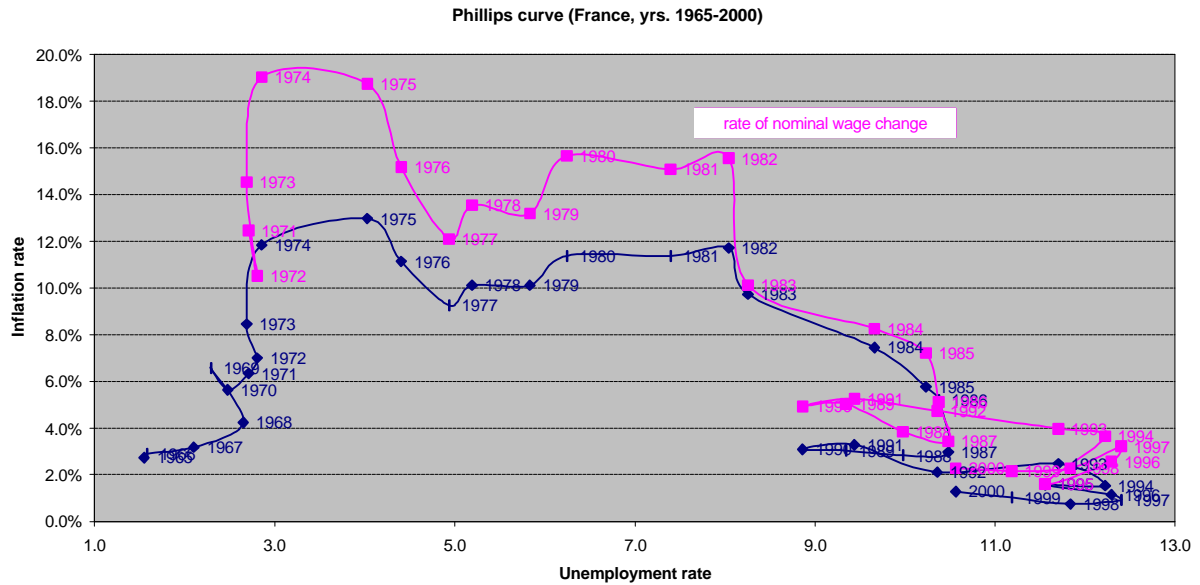
rising unemployment, just as the Phillips curve is expected to show. Yet, then it levels out and rises slowly as the unemployment rate sharply increases to around 8% in 1982. The 80's then show a nice negative relation between the inflation and the unemployment rate. At the end of the 80's an apparent natural rate of inflation is reached, when the inflation stays constant and immune to the movements of the unemployment rate. It seems, the governments have realized the destructive forces of high inflation as opposed to less harm caused by high unemployment. This can be seen as the inflation rate is kept low in the last decade at all cost, even at an unemployment rate of nearly 13%.



The sharply rising inflation of the 70's can be also associated by the collapse of Bretton Woods agreement and the currency loosing its real value, purchasing parity, hence inflating. The high unemployment difference during 1974 and 1975 may be caused by the 1st oil shock in 1973, assuming the rigidity of employment agreements, therefore the effect being delayed. The same sharp rise in unemployment can be recorded after the 2nd oil shock in 1979.

2.2 Unemployment and the rate of nominal wage

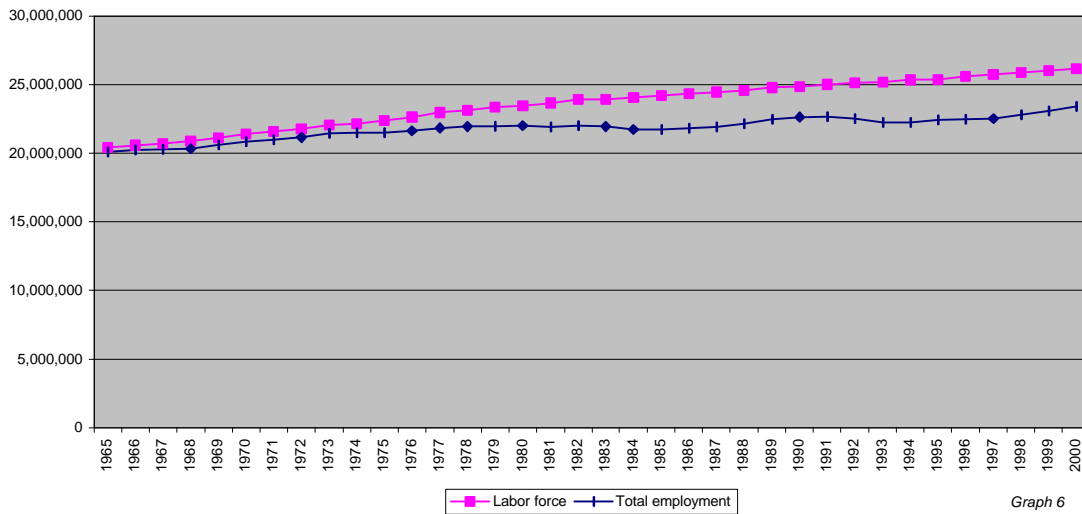
I plotted the relation between the unemployment and the rate of nominal wage change and put both curves into the following graph for an easier comparison. Natural rate of unemployment is the rate at which the nominal wage increases will begin to accelerate, because there will be less competition among workers for work, and more competition among firms to hire workers at this rate. Since the demand for labor will be at this point higher than supply, the wages and will begin to rise.



We can see a rapid acceleration in the nominal wage increases in the 60's to mid 70's. This proves the natural rate of unemployment theory. On the graph above we can also observe the positive relationship between the inflation and the nominal wage change rate. The natural rate of unemployment has except for the first period ending in the mid 70's not been attained. In the 90's we can instead observe a "natural rate of inflation", i.e. a stable inflation rate insensitive to the changes of the unemployment rate.

Population has been steadily increasing over the entire period at a slow rate with the proportion of the working population following the trend. In the next graph I plotted the data for the total labor force LF and the total employment ET. No data was available until 1965, so I'm starting the period with this year. A comparison shows that really the total employment has been falling as a proportion of labor force, since the number of unemployed and actively seeking employment has been the highest in the whole period. We can see that according to the forecasts the ET curve shifts upwards, which is consistent with the forecasts for the unemployment rate to decrease by the year 2000.

Labor force and total employment in France, 1965-2000

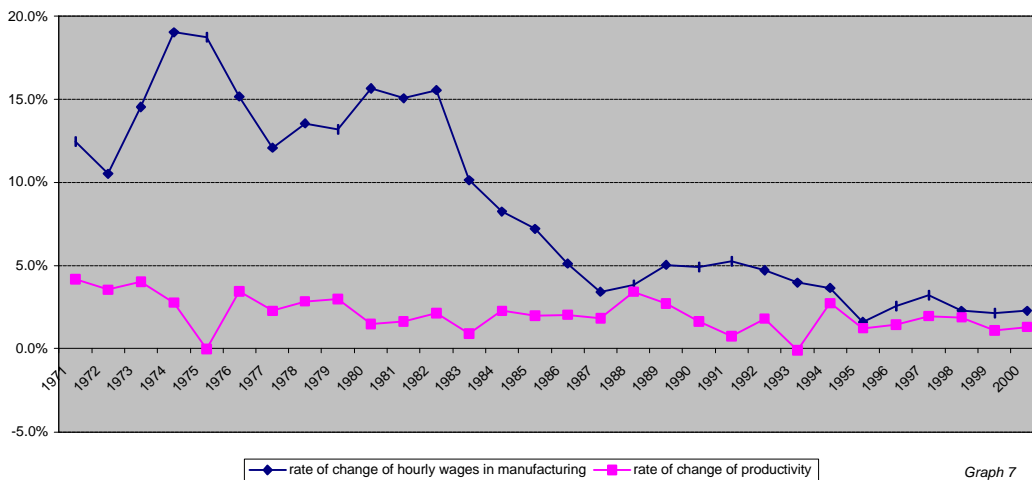


Graph 6

2.3 Rates of change of productivity and hourly wages in manufacturing

The next graph shows the series for the rate of change of Productivity and the rate of change of hourly wages in manufacturing. The curves for the two are reciprocal, since lower productivity implies higher cost of production, therefore higher wages and a rate increase. The sharpest increase in %dWRAM occurs during the 1st oil shock. The second increase occurs during the 2nd oil shock, but is much milder. In the last decade the changes in hourly wages become less sensitive to the changes in productivity. Actually in the period of 1993 to 1996 they move together. This can be explained by a constantly high unemployment rate. In such a situation the demand for labor on the market is so low that it never changes enough to cause a visible change in the rates of wages.

Productivity and rate of change of wages in manufacturing
 France, yrs. 1971-2000

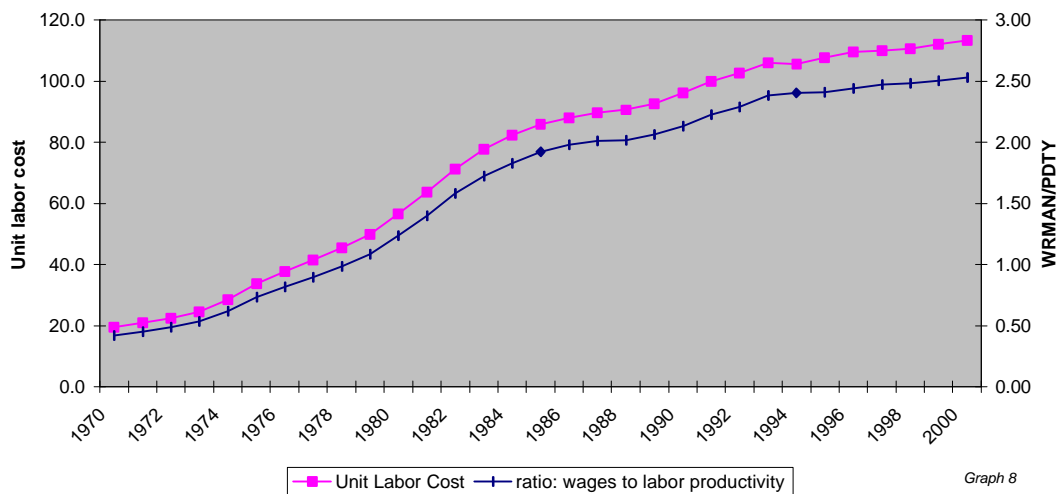


Graph 7

2.4 Unit Labor Cost and the ratio of hourly wages of labor productivity

Unit Labor Cost and the ratio of hourly wages of labor productivity (WRMAN/PDTY) have been moving together during the entire period. It is a paradox that wages have kept increasing relative to productivity even at the end of the period when the country is experiencing high unemployment (low demand for labor). Same can be said about the Unit Labor Cost. Also the costs have slightly accelerated after the oil shocks in the 80's.

Unit labor cost, Wages to hourly labor productivity ratio, France, 1970-2000

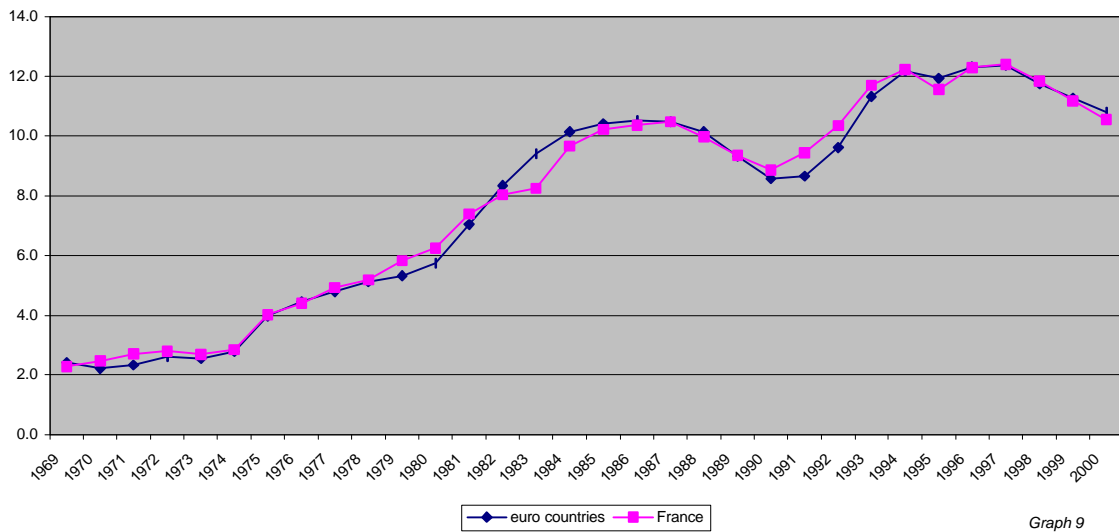


Graph 8

2.5 Hysteresis

Hysteresis (persistence of high unemployment after an adverse shock) can be observed after the 1st and even stronger after the 2nd oil shock in Graph 9. It can also be seen after the 3rd shock, which France experienced after the German reunification. It had been affected by the shock because it decided to lock in with the German monetary policy after Germany was least hurt by the 2nd oil shock. Unemployment rate of France is consistent with the average movements of the unemployment rate of the rest of the euro countries. Hysteresis effect occurs because of institutional arrangements and strong national labor unions, which set work conditions for a certain period of time. Therefore the reaction of unemployment to the growth or decline in the rest of the economy is rigid and slow.

Unemployment



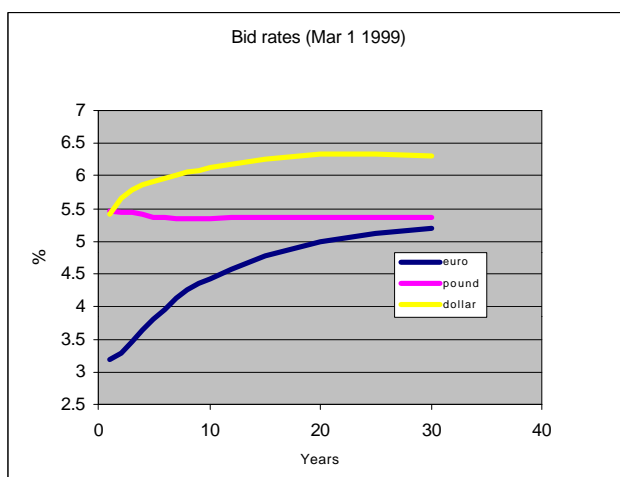
Graph 9

3 The european monetary system

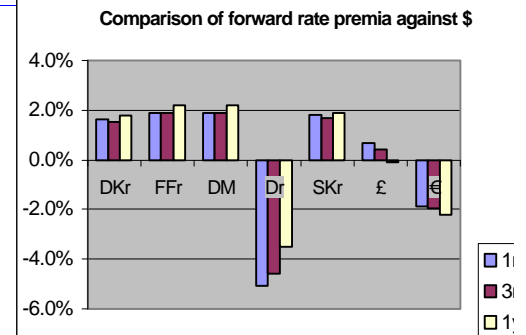
The European Central Bank (ECB) has lowered the interest rates for the introduction of Euro to restrain volatility of the new currency and to prepare a stable ground for its adoption. Low rates of Euro help European manufacturers compete on world markets. Higher rates would drive Euro above \$ making prices of European manufacturers less attractive to the world markets. The Euro has fallen further though over the first months since it has been introduced, due to fears of economic slowdown in Europe. These negative expectations have weakened the Euro against the \$ yet further.

Yield curves (bond rates)

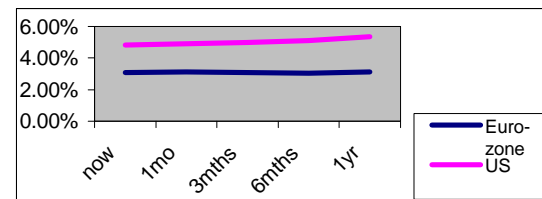
t(contract)	bid rate		
	euro	poun	dollar
1	3.2	5.46	5.42
2	3.3	5.43	5.67
3	3.46	5.44	5.78
4	3.64	5.42	5.86
5	3.81	5.38	5.91
6	3.97	5.36	5.96
7	4.12	5.35	6.01
8	4.25	5.35	6.05
9	4.35	5.35	6.09
10	4.43	5.35	6.13
12	4.58	5.36	6.19
15	4.78	5.37	6.27
20	5	5.37	6.34
25	5.12	5.36	6.34
30	5.19	5.36	6.32



	forward rates against \$				annualized forward rate premia			
	cl. m.p.	1mo	3mo	1yr	1mo	3mo	1yr	1mo/mo
DKr	6.7995	6.79	6.7737	6.678	1.6%	1.5%	1.8%	0.14%
FFr	5.995	5.43			1.9%	1.9%	2.2%	0.16%
DM	1.7889				1.9%	1.9%	2.2%	0.16%
Dr	294.19				-5.1%	-4.6%	-3.5%	-0.43%
SKr	8.2275				1.8%	1.7%	1.9%	0.15%
£	1.6078				0.7%	0.4%	-0.1%	0.06%
€	1.0934	1.095	1.0987	1.1178	-1.9%	-1.9%	-2.2%	-0.16%



World interest rates - Money rates, difference					
	now	1mo	3mths	6mths	1yr
Euro-zone	3.09%	3.13%	3.09%	3.03%	3.13%
US	4.81%	4.91%	5.00%	5.09%	5.34%
iUS-iEuro	1.72%	1.78%	1.91%	2.06%	2.22%
per month		0.15%			



Assuming same interest rates for €, DM, FFr, DKr, the expected change in their \$ exchange rate 1mth. later was:

	$PA = (i_{US} - i_{Euro}) + D$	exch. spot	expected	actual
€	0.01%	1.0934	1.0935	1.0834
DM	0.01%	1.7889	1.7891	1.8053
FFr	0.01%	5.9995	6.0001	6.0546
DKr	-0.01%	6.7995	6.7986	6.8596

Assuming same interest rates for £, Dr, SKr, the expected change in their \$ exchange rate 1mth. later was:

	$PA = (i_{US} - i_{Euro}) + D$	exch. spot	expected	actual
£	-0.01%	0.62189	0.6218	0.62081
Dr	-0.38%	300	298.8734	299.555
SKr	0.20%	8.228	8.2444	8.271

£ rate 1m	5.50%
Δ to \$	-0.59%
per mth.	-0.05%

Exchange rate of Greek drachma would have to appreciate by 8.88%, Danish kroner by .34% and the British pound would have to devalue by 4.48% to reach the European central rate. Given the 1 mth market expectations according to the tables above DKr would continue to loose value, just as Dr. £ is expected to gain value, which is in terms with the goal of reaching the central rate. The actual rates on April 9 show, though, that the movements of the currencies was contrary to their expected values. If Sweden would want its central rate to equal that of Denmark it would have to appreciate. Market assessment in March favored such movement.

Possibilities:

\$1,093.40	3.13%	€1,031.25 after year
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euro spot 1.0934

1yr \$ int. rate	5.34%
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forward rate on € for \$ 1.1178
=> I will need $1.1178 \times 1000\$$ to have the 1000 € in a year
that means i need $\$1117.8 / (1 + 0.0534)$ dollars now
and that is: **1061.0976**

possibility of going for the FRA and getting i.rate for \$ for the yr.

1 yr € int. rate	3.13%
\$ spot rate	1.0934
€'s needed now	968.75
in \$\$	1059.23

option of buying the € immediately, collecting interest rate for it over the yr. period

...second method of payment seems to be slightly more convenient.

Data used in the previous example were compiled from the Financial times for respecting time periods.

End of the paper