WHY THE EU IS GROWING AT A SLOWER PACE THAN THE US?

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1) Introduction

The long process of construction of the EU had, from the start, a clear political objective: to consolidate, forever, the peace process in Europe, after having suffered two of the most bloody wars ever remembered. But with the time, and especially after the fall of communism, another priority of the EU has become to create an economic power that could counterbalance the growing weight of the US in the world economy. Not everybody agrees with this second priority. For some EU politicians and thinkers, the EU should, above all, try to consolidate a model of liberal democracy that combines economic efficiency and social cohesion and that becomes a model of prosperity that will be imposing itself in the rest of the world as the most balanced and most inclusive. Jacques Delors is a staunch defender of this outcome for the EU when he says: "Europeans should attempt to create a grand liberal democracy, which combines competition, as an element of fostering economic growth, cooperation, as an instrument of political consensus, and solidarity, as a factor of achieving a stronger union and a deeper social cohesion". Nevertheless, the idea of creating the euro as a reserve currency that could compete with the dollar for world leadership and the decision of going ahead with enlargement to twelve new countries point clearly to the objective of creating an economic might that can have a say, on equal footing with the US, in all economic international issues.

Naturally, it is very difficult to compare the US and the EU when the latter has not achieved a single political unity. Nevertheless, there is a growing conviction that it may end up, in not a very distant future, becoming a federation of states, more or less "sui generis", but in any case closer to the existing one in the US. This seems to be one of the principles underlying the present Convention, which is working under the spirit of deepening the political union before embarking in the ambitious process of enlargement. The expansion of the EU towards the east has also a political objective. The EU needs to achieve an area of stable peace and security further away from its eastern frontiers and made easier for the newcomers to make a rapid transition to democracy and capitalism. The problems of disunity that have been so present in the war in Iraq have shown the perils of a politically fragmented Europe and should enhance the chances of reaching, sooner than later, a closer political union in the EU.

With the aim of showing if the EU has any chance of achieving its economic goals and becoming another economic power comparable to the US, this paper looks at the relative performance of both economies in the last decades, at the causes of the slower pace of growth of the EU, at the way the EU could improve its rate of growth in the medium and long term, and at the probabilities that the EU may have to achieve it.

2) The relative economic performance of the EU

In order to measure the economic performance of the EU in respect of the US, this paper is using mainly the statistics provided by the European Commission, in the different official documents published by the Directorate General for Economic and Financial Affairs, and EUROSTAT so as not to be treated as unfair, given that other statistical sources tend to show even poorer relative economic performance of the EU. OECD statistics are use as well when EU statistical sources are not available or suitable. There are a few very important reports and papers, which deal with the issue of the relative economic performance of the EU and the US and the structural factors underlying EU growth, all of them produced after the Lisbon European Council of Spring 1999. The first one is the result of a EU Commission's seminar organized by the Directorate General of Economic and Financial Affairs in September 2000, on the forces driving EU growth, which has been published in European Economy, Number 1, 2001(European Commission, 2001,a) The second is the European Competitiveness Report 2001, published by the European Commission (European Commission, 2001,b) The third one is the paper by Mary O'Mahony on "Productivity in the EU, 1979-1999", written for the National Institute of Economic and Social Research and published by the UK Treasury in February 2002 (UK Treasury, 2002) The fourth is the number 33 of the review "Economic Studies", published by the OECD, which deals with the driving forcers of economic growth in the OECD countries (OECD, 2001) Finally, there is the paper by Robert J. Gordon on "Two Centuries of Economic Growth: Europe Chasing the American Frontier", prepared for the Economic History Workshop, Northwestern University (R. Gordon, 2002) All these sources are used extensively along this paper.

Table 1, shows the real GDP growth in the EU and the US over the past 27 years (EU Com, 2001b) The US economy has been growing, on average, at the faster rate than the EU economy over the whole period. Between 1975 and 1985, the average annual real GDP growth in the US was 3.4%, while in the EU was 2.3%. In the next five years, 1985 to1990, both economies grew at the same average annual rate: 3.2%. But the US grew again, between 1990 and 1995, at 2.4% versus only 1.5% in the EU. Finally, the growth gap widened, during the period 1995 and 2001, and the US annual growth rate reached 3.9% versus a EU growth of 2.6%. This differential rate seems to have kept growing in 2002, were the estimated growth of the US has been 2.4% while in the EU reached only 0.8%, and the present consensus growth forecasts for 2003 are of 2.1% for the US and 0.9% for the EU. In sum, the US has had an average annual real growth in the last 27 years, between 1975 and 2001, of 3.2% versus 2.4% in the EU. Both rates represent clearly the long-term potential growth of the two economies, being the one of the US 0.8 percentage points higher than in the EU, but such a potential growth gap keeps increasing faster in the US in the last decade, what is very worrisome.

If we compare the total GDP of the EU, measured in terms of billion of euros at purchasing power parities (PPP), in 1991, the EU GDP was 85 billion larger than the US one. The EU had reached 5,690 billion euros (thanks to the reunification of Germany which added the GDP of its eastern part) and the US was only 5,605 billion euros. Eleven years later, in 2002, the US GDP was 700 billion larger than the one of the EU. The US GDP reached 9,853 billion versus 9,152 of the EU. That means that the US, in only eleven years, has taken an advantage, in terms of PPP GDP, of 785 billion euros, or 8.5% of the total EU GDP and a figure close to the size of the GDP of Spain. Nevertheless, the twelve new eastern European countries, that will become members in the next few years, will add more GDP to the EU. In PPP terms, they will add, collectively, around 950 billion euros. Therefore, the size of both economies will be again very similar after the enlargement of the twelve new members is completed.

It is interesting to show how the annual report of the European Commission: Broad Economic Policy Guidelines changes the basic EU statistics in the short period of one year. In the 2001 version, the 2001 EU GDP, in PPP terms, was 8,831 billion euros and the US one was 9,947 billion, a difference in favour of the latter of 1,116 billion euros. In the 2002 version, the GDP, in PPP terms for the same year 2001, was 8,812 billion euros for the EU and 9,368 billion euros for the US. As a result, the difference between the two came down to 556 billion euros more than half of the previous year version, most of them as a result of a much lower US figure. The same happens with the 2000 figures in both versions. In the 2001 version the difference between the EU and the US GDP, in PPP terms, was 1,156 billion, closer to the size of the GDP of Italy, but in the 2002 version it comes down to 583 billion.

When comparing levels of GDP per head of population, in PPP terms, the results are even worse. Being the US=100, the EU GDP per capita, was, as shown in Graph 1, in 1991, 70.5% and, eleven years later, in 2002, came down to 65%, that is, 5.5 percentage points less and the lower level of the last 27 years. This increasing gap has been obtained in spite of the US population growth increasing by 35.3 million people in the eleven years, while the EU population growth has been only of 14.2 million people. Table 2 shows that, in 2001, only Luxembourg had a GDP per capita larger than the US, but with only 350,000 inhabitants is not a significant comparison. Most of the large EU countries percentages were close to the EU average: France was at 64%, Italy at 66%, UK at 67% ant Germany at 68%, except Spain, which level was only 53%.

In this case, the EU enlargement towards Eastern Europe is going to reduce, even further, the present level of 65%. The twelve expected new member countries have a population of 106 million and a weighted average GDP per capita, in PPP terms, of around 8,000 euros, while the present EU population is of 381.8 million and their PPP GDP per capita level is of 23,900 euros, three times higher. As a result, the total EU average weighted GDP per capita, if the twelve new countries were today full members and the total population were 488 million, will come down, in PPP terms, to 20,700 euros, that is, 59.8% of the US average that amounts to 34,600 euros.

It is also interesting to outline, as it has been shown previously, the statistical differences of GDP per capita in the EU and the US between the 2001 and 2002 versions of the quoted Commission annual report. In the 2001 version, being the EU=100, the US GDP per capita was 155.9% in 2000 and 153.6% in 2001. In the 2002 version of the same document, it came down to 141.1% and 142.4% for both respective years, a drop of 14.8 percentage points and of 11.2 percentage points respectively. It seems to be a truly strong revision!

3) Break-down of the causes of poorer growth performance by the EU

A) The Determinants of Economic Growth

A nation's economic growth is determined by the rate of utilization of the factors of production, capital and labour, and the efficiency of their use. Until very recently, economic growth was analyzed in a production function that, essentially, linked output to factor inputs. Recent research on the determinants of growth has not only refined the framework of analysis

but has also extended it and has considered a broader set of factors seen as contributing to growth. It looks now clearer that, apart from the quantity and quality of factor inputs, other factors play a crucial role in enhancing economic growth through innovation, creativity and dynamism. This is the reason why the role of policy makers becomes more important in creating an institutional framework conducive to enhance research and technology, innovation and human knowledge and skills.

Today, the main controversy in contemporary growth theory is focusing on the relative importance of factor accumulation versus technical progress in driving economic growth. Specially, the role of investment in physical capital is the most disputed subject.

In standard neoclassical growth theory (Solow, 1956) (Swan, 1956) output is produced by capital and labour. Economic growth is compatible with labour-augmenting technical progress, which acts as if it were increasing the available amount of labour. In the long-term, output per capita and labour productivity grow at an exogenously give rate of technical progress, but the latter is entirely exogenous to these models. An increase in the investment rate tends to have decreasing returns to scale and raises the rate of growth only during the transition to a higher level of economic activity, that is, a balanced growth path with the capital stock growing in line with GDP in the so-called “steady state”. Given that some of its determinants, such as capital productivity, the saving ratio and time preference, are quite sticky over time, the investment / output ratio is deemed to be constant in the medium to long run.

Therefore, with investment being endogenously determined, there is not great leeway for economic policy to raise labour productivity growth through capital deepening on a sustained base. In line with this limited role of capital accumulation in the long term, most early growth accounting exercises identified a large “Solow residual” or, what is the same, a high total factor productivity growth, TFP, attributing the main role in explaining growth to technical progress, which is regarded as exogenously determined. Under these circumstances, richer countries tend to grow at a slower rate than poorer countries adjusted for demographic differences. However, evidence of this process of “unconditional” convergence has weakened, at least amongst OECD countries, in the most recent decades. Thus, the concept of convergence can only be reconciled with the data if one moves to “conditional” convergence, that is, the relation between the growth rate and the initial conditions after controlling for other political, institutional and geographical variables.

Later, empirical studies in the 1990’s, based on the neoclassical tradition, set out to reconcile the Solow-Swan model with international empirical evidence on convergence. Mankiw, Romer and Weill (1992) augmented the aggregate production function with human capital proxied by educational attainment. They found out that the Solow model performs well in explaining cross-country differences in income levels when human capital is taken into account, but only assuming that the level of productivity and the rate of technical change are the same across nations.

This standard neoclassical theory has been challenged, in the 1980’s, by new so-called “endogenous growth” theories (Romer, 1986) (Lucas, 1988) (Aghion and Howitt, 1998), which explain long-term growth endogenously by relaxing the assumption of diminishing returns to capital and by rendering technological progress endogenous to the model. Some authors add human capital to physical capital to derive a concept of “broad capital” characterized by constant or even increasing returns to scale (Lucas, 1988 and Rebelo, 1001) Others introduce externalities to the accumulation of capital whereby private returns to scale may be diminishing but social returns can be constant or increasing, due either to “learning by doing” (Romer, 1986

and Young, 1991) or by R&D (Romer, 1990, Grossman and Helpman, 1991 and Aghion and Howitt, 1992) With constant or increasing returns to “broad capital”, the long term rate of growth becomes endogenous, in the sense that it depends on investment decisions which, in turn, could be influence by policy and institutions. Some of these endogenous growth models imply “conditional convergence”, while others do not, depending on the assumptions about the specification of the production function and the evolution of broad capital accumulation (Barro and Sala i Martin, 1995 and Durlauf and Quah, 1999)

A firm’s production function is defined by firm specific variables (capital, labour and R&D inputs) and a shift term called “index of technology” which is a function of the stock of knowledge available to all firms. That is, the knowledge generating activities, such as R&D, become a public good. The shift term reflects a “learning by doing” process or the influence of the stock of human capital. They consider innovation and specially the accumulation and diffusion of technical knowledge as the driving force of long-term growth and they try to shed some light on the factors behind technical progress, their modeling and their interaction with factor accumulation. These theories find that knowledge accumulation becomes, through investment, the key mechanism for achieving technical progress. The main reason is that knowledge and technical advances have to be embodied in the capital stock in order to raise productivity. Therefore, without more investment in human and physical capital, knowledge, and R&D, technical progress would not necessarily conduce to higher rates of growth. As a result, capital accumulation becomes a fundamental element to achieve higher growth.

New empirical evidence by the OCDE and the European Commission, find out that the investment share is significant in cross-country growth regressions and that the age of capital accumulation is a main determinant of TPF growth, although the evidence is not yet fully conclusive (Bassanini, Scarpetta and Visco (2000) There are a few elements that make it difficult to improve such ambiguous evidence.

The first one is the definition and measurement of the capital stock. Since TFP is the residual in growth accounting exercises, it is distorted by any inaccuracy in measuring the input factors, not only in the physical capital but also in the human capital stocks, given that, introducing in these exercises the improvement of the quality of capital and labour, the share of growth driven by exogenous technical progress tends to be lower. The second one is that the composition of investment matters. Investment cannot be treated as a homogeneous factor. On the one hand, Investment in equipment, in construction and public capital all have different productivity-enhancing properties. On the other hand, the evidence of vintage models suggests that, in order to measure correctly the size of the capital stock, the productivity of new capital tends to be higher than of ancient capital. Furthermore, technical progress shows up in declining prices, and this fact needs to be properly reflected when capital stock series are calculated in real terms, given that a failure to capture quality improvements in falling prices tends to underestimate the capital stock and overestimate the importance of technical progress. The construction and use of hedonic price indices to measure this effect is not yet applied in most EU countries.

Finally, it is very important to measure properly what it is meant by factor accumulation and utilization. Very often, when some countries consider a low investment ratio as a main obstacle to achieve a higher output growth, it is because they are using a narrow definition of capital, not including education, R&D and military-capital formation and they are not

elaborating the properly capital deflators. If these are taken into account the results will show an investment ratio considerably more in line with growth trends.

B) Growth Accounting

The standard models of growth accounting break down GDP growth into labour and capital accumulation and their combined productivity, measured as the average output per employed person or per hour worked and the average output per worker per unit of capital invested. The rest, that is, the growth of output that cannot be explained by the previous production factors, is considered as technical progress and treated as a residual measured by Total Factor Productivity, TFP. Let us have a look at this breakdown of growth both in the EU and the US:

a) Employment growth

The simplest, though least recommended, measure of labour as an input is a head count of jobs or employees. Such a measure fails to reflect changes in average work time for employee, multiple job holding, self-employment and the quality of labour. A first refinement is its extension to total employment, comprising both wage and salary earners and the self-employed. A second refinement is to estimate total hours “actually” worked to capture shifts towards shorter “normal” hours, longer paid vacations and a greater use of part-time work

Table 3 shows the employment growth, between 1975 and 2001, in the EU and the US as well as the employment rate in 2001(European Commission, 2001,b) The first conclusion coming out of the table is that the US has had a higher annual average rate of labour accumulation and utilization, during the whole period, than the EU. The US annual average rate of labour growth, in the last 27 years, has been 1.6% versus 0.55% of the EU, near three times higher. The second conclusion is that the level of the US employment rate in 2001, that is, the number of people employed as a percentage of the population at working age (aged 15 to 64) was much higher than the EU one. In the US, 75% of the population at working age had a job, while, in the EU, only 66% were employed, 9 percentage points less. Only the Netherlands, Sweden and Denmark had comparable employment rates to the US. Italy, Spain and Greece had employment rates below 60%. The main factor behind these lower levels was both the low participation rate and employment rates in the Latin countries, with the exception of Portugal, that has a high level of employment but a high rate of underemployment as well. The average level of the participation rare, that is, the number of people looking actively for a job, or active population, as a percentage of the population at working age, is shown in table 4, for 2001(OECD 2002) The participation rate was also larger in the US, with 76.8%, than in the EU, with only 69.2%, that is, 7 percentage points less. Only Denmark and Sweden had higher rates of labour utilization than the US.

Graph 2 shows the evolution of employment rates in the last 27 years. It is striking to see that the EU rate, in 2001, is still lower than in 1975, when it reached 67%, although it has been growing steadily since 1994 when it was at its through with 62%. On the contrary, the US rate, which started in 1975 at a lower level than the EU has been growing steadily, except a drop at the beginning of the 80's, reaching the peak in 1999 and dropping slightly in 2000 and 2001.

Labour market reforms in the EU have made GDP growth more labour intensive. More flexible workplace arrangements, such as part time jobs and fixed term contracts have allowed firms to get around job-protection laws and to encourage more hiring. Cuts in social security contributions for low-paid workers have priced some of the jobless back into the labour market. As a consequence, participation and employment rates have risen and unemployment has fallen. Over the past five years, employment in the EU has increased at an annual rate of 1.4% even faster than in the US, with only 0.8%. One final interesting fact, coming out of the chart, is that the large increase in the US employment rate from 1992 to 1999 did coincide with the highest rates of capital deepening in the history of the US, showing that there was not a capital for labour substitution process. Therefore, the employment growth together with a larger capital investment has contributed significantly to US economic growth over the past decades.

A study by the European Commission (2000) looked at the contribution of labour inputs to growth, using a broader definition of inputs than just the employment rate, that is, working age people in total population, labour force participation, total employment as a proportion of labour force and average hours worked per person employed. In the fist half of the 1990's the estimated contribution of labour inputs to growth of GDP per capita in the EU was negative, due to declining employment rates and reductions in working time. In the second half of the decade, the overall contribution of labour inputs to growth turned positive, although average hours worked continue to decline, because employment and participation rates rose enough to more than compensate the drop in working time. But such a contribution to growth of GDP per capita was only one third than in the US. Estimates for 1998 indicate that lower labour accumulation and utilization in the EU accounted for two thirds of the gap with the US level of GDP per capita, while the remaining third was due to lower labour productivity. Such a lower labour utilization in the EU versus the US was due to a higher rate of unemployment and a shorter working time. The conclusion of the study was that the UE had a huge potential of labour utilization. If it were to match the US employment rate it would create 18 million new jobs!

Another important measure of labour input is the number of hours worked per average person employed, which is a way of knowing the level of part time employment, that is slightly higher in the EU than in the US, and also the working time per year of the full time employed. Part time employment is 13.8% of the total in the EU and 13% in the US. The standard deviation is very high in the EU, given that the Netherlands level is 33%, the UK one is 23% and the ones for Spain and Greece are only 7.9% and 4.8% respectively (OECD Employment Outlook, 2002). Women have a higher weight, in part time employment, in the EU, with 76.7%, than in the US, with 67.5%.

There are two ways of comparing the average annual hours worked in every country: one is through the contractual working time and another, more realistic, through hours actually worked per year The latter measure shows that, in the US, the average person employed works effectively 331 hours more, per year, than the average employed in the EU. Table 5 shows the average effective working time, per year, in 2001. In the US, it was 1,821 hours per year and, in the EU, it was only 1,490 hours per year. Portugal and Luxembourg are excluded for lack of data (OECD Employment Outlook 2002). The Netherlands, with 1,346

hours; Germany, with 1,467; Denmark, with 1,560 and France, with 1532 hours were the countries of the EU with lower actually worked time

b) Labour productivity.

Table 6 shows the evolution of the annual average rate of growth of labour productivity, measured as the average annual growth of GDP per person employed, in the EU and the US, during the last 27 years, as well as the level of labour productivity in 2001(European Commission, 2001,b) The average annual rate of labour productivity growth in the EU has been slightly higher than in the US: 1.8% versus 1.60%, that is, 0.2 percentage points more per year on average over the 27 years. Only between 1995 and 2001, the US rate has been higher in the EU: 2.5% versus 1.3% in the EU, almost the double. On the contrary, the level of labour productivity, in 2001, keeps still being much higher in the US. Being the US labour productivity = 100, the EU level is only 73%, 27 percentage points lower. Luxembourg is the only EU country with a higher level than the US, but it is not representative, given its tiny size. Belgium, with 92% and Italy and Ireland, with 82% and 87% respectively, are the countries with the second highest levels. Of the large EU countries, after Italy, France is the second highest with 78%, followed by the UK with 72% and Germany with 71%.

Graph 3 shows its evolution, since 1975, where the EU level has been growing steadily from 66%, in 1975, to 78%, in 1993, when it reached the peak, dropping, since then, until reaching 73%, in 2000 and 2001. Therefore, the gap has been widening in the last eight years and it has continued to widen in 2002 and, most probably, it will in 2003 as well.

The measurement of labour productivity by GDP per person employed should be complemented with the productivity per hour worked, given that, having the EU a much lower employment rate, its productivity per person employed tends to be higher. Such a measure avoids also the large differences in part time employment between countries that makes those with the higher levels to have a lower productivity per person employed. According to a recent report by the UK Treasury (2002), table 7 shows that the level of output per hour in the US is 115% being the EU 100, 15 percentage points higher. The dispersion of levels in the UE is very high. Luxembourg, Belgium, and Netherlands have higher levels than the US, Italy and France have levels of 113% and Greece and Portugal have only 74% and 63%, respectively.

. Nevertheless, Graph 4 shows that there is not a clear correlation between the average annual hours worked and output per employed person. The US has a lower productivity per employed person than Japan, although the average employed person works approximately the same number of hours than in the US. Italy, France and Germany have a higher labour productivity than the UK working less number of hours. The reasons could be, on the one hand, different rates of labour flexibility and, on the other hand, different capital / labour ratios, as it will be shown later. For instance, the defunct France’s 35 hour week was achieved, after long negotiations with the industrial associations, which were against such a measure, at the price of allowing the French companies to allocate the resulting 1,575 hours around the year with a high degree of flexibility, to suit their individual different needs.

The sum up of all the different measures applied to the EU and the US, are the following: For every 100 people at working age, in the US there are 9 people more who are employed than in the EU. Every average person employed in the US works 331 hours more, per year, than the EU average employed. The GDP per employed person in the US is 27 percentage points higher than in the EU. Finally, the output per hour worked in the US is 15 percentage points higher than in the EU. Therefore, both the levels of labour accumulation and utilization and of labour productivity are still much higher in the US than in the EU.

c) Capital Deepening

Labour productivity is also determined by capital deepening, that is, the growth in the stock of capital per employed person. Capital deepening is a long-term process determined primarily by investment. Nevertheless, in the short run, changes in employment can have a great impact on the capital / labour ratio. For instance, an increasing capital / labour ratio in the EU helped it to catch up with the US in terms of labour productivity up to the mid-1990's, but it was due mainly to a declining employment rate more than to an increase in capital deepening.

Table 8 shows the evolution of capital deepening in the EU and the US in the last 27 years, measured as how much, in percentage points, capital deepening or the substitution of capital for labour contributed to overall labour productivity growth. The average annual contribution to labour productivity, in the whole period, was 0.68 percentage points in the EU and only 0.32 in the US. The EU has been leading the US through the elected period, except in the last 5 years, where the capital deepening in the US has been very rapid, thanks to an investment boom, associated to the quality of information and communication technology (ITC) products, combined with a steep decline in their relative price, which decisively boosted ITC investment. The level of capital per hour worked, in 1999, for the US was 107%, being the EU 100, according to a recent paper by the UK Treasury (2002). Table 9 shows the distribution of capital per hour worked in the EU. As a general rule, the dispersion is extremely high. Luxembourg has 193% and Portugal 39%. There are 5 more EU countries, besides Luxembourg, with higher levels than the US: Belgium, 145%; France, 124%; Finland, 120%; Netherlands, 115% and Italy, 111%. Austria has the same level 107% and the UK has only 81%. Without the UK, the average EU level would be 104%, closer to that of the US.

d) Total Factor Productivity (TFP)

TFP is another very important factor behind labour productivity and it is an estimate of underlying residual productivity. Growth in TFP is measured by the difference between output growth and the growth of inputs, that is, the weighted average growth of labour and capital. An increase in TFP means that more output can be produced with a given level of labour and capital inputs. As a residual, TFP growth incorporates the effects of changes in the degree of factor utilization, innovation, technological progress and measurement errors, as well. Furthermore, as the present method of calculating labour productivity growth does not take into account changes in the quality of inputs, such as better capital goods or an improvement in the educational attainment and skills of the labour force, such changes are also reflected in TFP

growth. One of the key factors enhancing TPF in recent years has been investment in new ITC capital goods, which have a higher marginal product than many other capital goods. Finally, cyclical factors are also likely to have an impact on TFP growth. In periods of rapid growth, the degree of factor utilization tends to be higher and vice versa.

Table 10 shows the evolution of TFP growth in the EU and the US in the last 27 years (European Commission, 2001,b) As it happened with capital deepening, average TFP growth in the EU has been slightly higher than in the US in the whole period, except in the last 5 years. The average annual growth rate of TFP for the period has been of 1.25% in the EU versus 1.075% in the US. Only in the period 1995 -2001 the US TFP annual growth rate, with 1.5%, was 0.5 percentage points higher than in the EU. Ireland, with 4.0%; Finland, with 3.3%; Greece and Sweden, with 1.9% and Portugal, with 1.8% were the only European countries that had a higher average annual growth than the US in that period.

Table 11 shows the levels of TFP in the different countries of the EU and in the US (UK Treasury, 2002) Being the EU level, in 1999, 100, the US level was 12 percentage points higher. The dispersion in the EU levels was smaller than in capital intensity. Luxembourg, the highest, had a level of 153% and Spain, the lowest, reached 85%. There were only two countries, Luxembourg and the Netherlands, with higher levels than the US.

There is considerably greater variability across EU countries in capital per hour worked and in TFP than in labour productivity. In the case of capital intensity, the large EU countries, except the UK, had capital levels higher than or close to the US. So for these countries the TFP gap with the US is greater than for labour productivity. As a result, the labour productivity gap with the US for EU large countries is largely explained by TFP. TFP levels are considerably closer to the US levels than was the case for labour productivity. The net effect is that the variation amongst EU countries in TFP levels is relatively small.

As a conclusion of this exercise, it can be said that an estimated two thirds of the EU gap with the US GDP per capita levels results from lower levels of labour utilization, while the remainder is due to lower labour productivity in the EU. While part of the lower utilization of labour reflects shorter working hours in the EU and may be considered as a matter of social choice, the much lower participation and employment rates as well as the much higher rate of unemployment, should be a matter of great concern in the EU.

Table 12 shows the evolution of productivity and output growth in the EU, over four decades, and a comparison with the US in the period 1996-2000 (European Commission, 2001a) Both labour productivity and TFP have been declining in the EU over the four decades, although maintaining reasonable rates, and employment has been growing at a very low pace, increasing the rate of unemployment very fast. Therefore, the contributions of increases in labour productivity, albeit falling, have been far more important for economic growth than that of employment. The marked decline in labour productivity growth reflects the combine impact of a diminishing rate of increase in the capital / labour ratio and a declining rate of growth of TFP. The most recent past has been characterized by a divergence in output trends and productivity growth, as strong employment growth has contrasted with a further deceleration of labour productivity growth. Conversely, the US has experienced both a higher job creation and a marked acceleration of productivity growth.

Using standard growth accounting, Graph 4 shows a decomposition of real growth of GDP in the EU into employment growth, capital deepening and TFP growth, with the latter two adding up to labour productivity growth. During the last four decades, GDP growth has been falling, in every decade, from an average of 4.9% in the 1960s to 2.1% in the 1990s. While

a pick-up of output growth is clearly visible since the mid -1990s it remains open whether is going to become a trend reversal. The growth rate figures for 2002 and 2003 does not reflect such a reversal given that the EU is back again to a very low rate of growth, of less than half than the US (European Commission, 2001a)

e) Factors enhancing TFP

The first factor is the quality of the labour force. Graph 5 and table 14 show two different measures of the said quality. The first one analyzes the employment rates by education level. The US has a higher level of employment with below upper secondary education, with upper secondary and with tertiary education than the UE. Only 5 European countries have a higher level of employment than the US with tertiary education: Denmark, Netherlands, Portugal, Austria and Belgium, all of them small countries with large government sector employment, and only 3 have a larger proportion of employment with upper secondary: Denmark, Netherlands and Sweden, again small countries with large services sectors.

Table 14 shows the average years of schooling of the labour force. In 1998, only Germany had more years of schooling than the US, 13.6 versus 12.7. Netherlands and the UK had similar number of years than the US. Nevertheless, when looking at the quality of education using the proxy of performance in reading, scientific and numeric literacy, the US performs below the OECD average except in reading, while some European countries far exceed such an average, such as Finland, Ireland, Netherlands, Sweden and the UK. All of them small countries, except the last one. Of the other large European countries, Germany, Italy and Spain are worse performers than the US and France a better performer, as shown in Graph 6.

The second factor is the amount of investment in R&D. Graph 7 shows total expenditure in R&D

4) Main forces behind the slow relative growth of the EU

What explains the continuous slowdown in productivity growth since the 1970s? The high labour productivity of the 1960's reflected a number of favourable but exceptional factors (Crafts and Tonilo, 1996) (Eichengreen, 1996) Among these factors, the large productivity gap of the European economies with the US induced a large potential for catching up. The productivity gap with the US had widened considerably between the early 1930's and 1950, which was not only due to war but also to the semi-autarkical policies followed in the 1930s. Furthermore, the reconstruction after the Second World War implied the establishment of a modern and highly productive capital stock. Investment ratios in the post-war era were much higher than the per-war ones, and contributed to high productivity and output growth. Moreover, the high trade barriers were lowered and the new international monetary system facilitated the pick-up of international trade. The removal of trade protection within the EU was very important and increased the size of the market, intensified competition, enhanced the exploitation of economies of scale and stimulated growth.

These favourable factors started to vanish after the external oil shock of the early 1970s. Oil prices increased by almost 400%, between 1972 and 1974, in dollar terms and more than 350% in euro terms, while oil imports in the EU amounted to one third of total imports, producing a strong negative external contribution to growth and a sharp deterioration of the terms of trade. Moreover, real stock prices came down and the system of fixed exchange rates proved to be unsustainable (European Commission, 2001a)

The deceleration of economic growth in the 1970s brought with it a strong slowdown in fixed capital formation. It fell by 1.3 percentage points between 1973 and 1975 and stabilized at a level marginally above 3% until 1980 before coming down to 2% in the mid -1980s. Although the increases in the capital stock were higher than trend growth, the latter reached its lower level in 1981 with a lead to the investment cycle, which casts some doubts on the assumed causality from investment to growth. The investment slowdown was also attributable to the subsequent shock to factor prices provoked by the oil price hike. The oil shock was followed by a very large increase in labour costs, which increased the adjusted wage share in GDP by 3 percentage points between 1973 and 1975. This increase in the share was only reverted ten tears later, in 1984, when it returned to the pre-oil shock level. This persistent shift generated an important capital-labour substitution.

Furthermore, the reaction of the monetary authorities to the rapid increase in inflation, provoked by the oil shock, was a strong tightening of monetary policy that helped to contain labour costs but at the expense of a lift in real interest rates, that reflected in a further deceleration of investment, and which lasted until the mid -1980s. At the end of the 1980's, there was another tightening of monetary policy that contributed to a further increase in the long-term real interest rates and in another fall in investment. Real interest rates remained high until 1992. Finally, all along the 1970s and 1980s there was a relaxation of budgetary policies that resulted in a rapid increase of public deficits and in public debt, contributing to maintain the high level of real interest rates. The increase of 5 percentage points of the debt to GDP ratio resulted in an increase of interest rates of between 100 and 150 basis points (Tanzi and Lutz, 1993) (Ford and Laxton, 1995)

Those shocks to factor prices induced substitution effects between capital and labour and helped to explain the fluctuations of the capital stock around trend growth. The important question is whether they also accounted for a decline in the rate of growth of GDP and of the capital stock. Blanchard (1998) and Blanchard and Wolfers (1999) argued that reduced capital profitability through high wages and high real interest rates led to a too large capital stock in comparison with equilibrium employment. Since labour market rigidities prevented wages from adjusting and high budget deficits kept real long-term interest rates high, profitability was restored through a slowdown of capital formation, yielding a new equilibrium with a lower level of employment, capital and economic activity. According to this explanation, the on going relative weakness of investment in the second half of the 1990s should in essence reflect unfavourable conditions of demand rather than adverse conditions of supply. Fitoussi et al. (2000) show a less prominent role plaid by wage developments. They consider that changes in the real interest rates and productivity growth were as important determinants as labour markets and identify a quite close relationship between investment and the employment rate in the EU economies.

A) <u>Sectoral Shifts.</u>

There is an alternative hypothesis, which argues that the 1970s saw the beginning of a period of slow technical progress. The deceleration of productivity growth is related to the structural break in the production mix of the industrial countries. Whereas the shift of production from agriculture towards industry inflated productivity estimates in the 1950s and 1960s, the change from manufacturing towards services could have depressed aggregate productivity growth. Nevertheless, Table 13 reveals that the decline in the relative share of industrial employment, without construction, since the 1970s had no strong impact on apparent labour productivity growth. If employment had been constant in the sectors, aggregate productivity would had even been lower, due to the low level of productivity in the agricultural sector. A constant share of employment in industry would have raised productivity growth only marginally.

B) R & D and Human Capital

There has been a recent and large literature trying to identify the determinants of technical progress following the endogenous growth approach, focusing not only on the vintage effect but on variables and indicators related to R & D and human capital, such as the R & D expenditure, the level of education of the manpower, the number of engineers and scientists and the level of patent activity (Keeley and Quah, 1998) (Cameron, 1998) Their research points to a significant and positive relation between these indicators and productivity growth. There is also evidence of the catching up effect by which countries benefit from R & D produced abroad (Hanel and Niosi) and positive spillovers between firms and industries. Nevertheless, R & D features strong local roots and technology diffusion is fastest at local level and slower across borders. The distinction between public and private R & D shows that an efficient division of labour between basic research, applied research and marketing of research results not in crowding out of private research but in mutually reinforcing and welfare improving (Guellec and Van Pottelsberghe, 2001) Recent empirical evidence reveals that R & D and education have a strong bearing on explaining cross-country differences in productivity growth, especially if it is conducted on a large set of developing countries (Jones, 1995) In the EU, Hers (1998) has reported a strong contribution of human capital to productivity growth in four country members states since 1973 compared with the period 1950 -1973. A recent study by the OECD confirms that the upgrading of human capital may have a notable impact on output. One additional year of schooling would represent on average an increase of GDP per capita by 6% (Bassani and Scarpetta, 2001) and another shows the importance of education and social capital (Temple, 2001)

However, technical progress does not automatically follow from higher investment in R & D and human capital. The adoption of technical progress follows much more complex patterns than previously thought. Engaging economically in R & D depends crucially on individual incentives such as the appropriation of profits, patent legislation, tax incentives, access to skills and knowledge, efficiency of public investment in research, entrepreneurship, venture capital availability and competitive pressures. Therefore, there are important institutional issues that need to be in place to make investment in human capital and research to produce efficient economic results. Human capital and entrepreneurship are distinct concepts following different incentive schemes.

C) Entrepreneurship.

Government policies may have a strong impact on productivity growth given that they set the framework for private economic activity, which might either encourage entrepreneurship and innovation or induce bureaucratic attitudes or obstacles to economic activity (OECD, 2000) The effectiveness of taxation and public spending is an important feature. Taxation has an immediate impact on individual incentives since it might discourage risk-bearing among entrepreneurs. Excessive public spending and debt might crowd-out private spending, especially if spending goes mainly to consumption instead of to investment.

Capital markets are an important determinant of entrepreneurship as well. The bank dominated financial system of the EU has been for a long time regarded as supportive of industrial activity. The emerging of ITC technologies has changed this perception and the UK and US capital markets dominated financial systems have taken a very large advantage over the EU in developing them through venture capital and private equity activities (de la Dehesa, 2002)

A) Transition Effects.

Some recent research argues that aggregate productivity growth declines during the transition phase towards a new technology. Therefore, some productivity slowdowns are heralding a new wave of technical progress and are not the result of structural rigidities or exogenous policy forces (Greenwood, 1999) (Hornstein, 1999) Large-scale technological changes in general purpose technologies, such as the steam engine, electricity and ITC had in common that their diffusion was powerful but slow (David, 1990) New ITC technologies, for instance, make the existing technology and well established forms of work organizations obsolete and, therefore, incumbent industries suffer from a loss of productivity. While losing market shares to new entrants, the incumbent firms will not immediately adjust their factor inputs, given that the change in technology has first to be realized and secondly work practices have to be changed and adjusted. Unless this occurs, the new technology is not optimally used, while the old technology remains in place, generating a lower productivity.

Empirical evidence of these arguments has been only very recent due to the lack of relevant statistical series. Although computers entered economic life in the 1970s, their effect on productivity growth did not appear until the mid-1990s. It has taken more than 20 years for computers to have a significant influence on productivity growth (Oliner and Sichel, 2000) (Jorgensen and Stiroh, 2000) (Wheland, 2000) Stock market prices tend to drop in anticipation of a new technological change, then to increase discounting a large growth of profits in the firms producing these new technologies and later to decline if the new technology takes more time then expected to diffuse throughout the economy (Jovanovic, 2000)

5) Reasons for the recent improvement of EU Growth.

In the second half of the 1990s, the slowdown of economic growth in the EU seems to have reverted, with an average real economic growth of 2.6% per annum, improving the performance of the 1980s, but being overshadowed by the outstanding economic performance of the US. It has been a period of employment-driven growth. The main contribution to output growth was due to labour accumulation as evidenced by employment growth of 1.3% per annum. This left to labour productivity growth another 1.3% contribution, which was much lower than in the previous decade.

Although, in the long run, employment tends to grow in parallel with that of the working age population, in the case of the EU in recent years, it has not been the case. Graph 5 shows that the employment growth in the EU since the mid – 1990s has outpaced the growth of the population at working age. The latter has grown very slowly while participation and employment have increased considerably, based on the large pool of available labour, due to the high level of unemployment. The low participation and employment rates in the first half of the 1990s and their significant increase in the second half are mainly due to cyclical factors, although there has been some help from structural reforms. Over the cycle, participation tends to increase in line with declining rates of unemployment. Unemployed and new entrants into the labour market have an incentive to enter the labour force when they see a real chance of obtaining a job. This has been the case, in the EU, for some groups such as married women, the elderly and adolescents. Structural reforms tending to lowering the reservation wage and reducing the tax wedge and to increase par-time and fixed term contracts have also plaid a significant role.

Some factors helped to increase labour demand. On the one side, continuous wage moderation has contributed to make labour utilisation in the production process more profitable and to induce some labour-capital substitution, reverting the strong capital-labour substitution of the 1970s. Moreover, the secular change in demand towards labour-intensive services may have stimulated employment growth as well as the change in industry structure towards a larger share of regulated industries may have contributed, on average, to less binding labour market regulation and lower wage growth.

On the other side, technical progress and the strong increase in international trade, due to the development of the globalization process, have entailed additional demand for high-skilled labour at the expense of low-skilled labour. Owing to the lags involved in extending the skilled labour stock and in the presence of not fully flexible wage structures, this pattern might have increased employment growth with some delay, eventually, materializing only in the second half of the 1990s.

Nevertheless, output growth driven exclusively by employment creation is unsustainable over the long run because the expected deceleration in the increase of working-age population, excluding immigration, puts a natural brake on employment growth. There is still a considerable margin to increase employment further in the EU, given the still high rate of unemployment, but in the long run, increases in labour productivity will become key to a sustained output growth. Labour productivity growth is often seen as an immediate consequence of rising employment growth in the EU since low-skilled labour entered in employment, due partly to the reduction of social security contributions for unskilled labour, reducing the average productivity growth.

Graph 6 shows that countries with high productivity levels relative to the US tend to have a relatively lower utilization of labour and vice versa. However, the trend line displayed in the graph is not significant at the 5% level. It turns out significant once the extremes of

Luxembourg, on the upper side and Greece and Portugal on the lower side are excluded. Without these observations, the trade-off between labour utilization and labour productivity is steeper, implying that high labour utilization has a less pronounced effect on labour productivity. Furthermore, the example of the US, characterized by a simultaneously strong growth in employment and labour productivity, demonstrate that there is not necessarily such a trade-off and that both can go hand in hand (Gordon, 1995).

6) The "New Economy" and the Example of the US.

The US has enjoyed a remarkable economic performance in the second half of the 1990s. In addition to strong employment creation, labour productivity growth did accelerated considerably to rates higher than in the EU. This example has led some researchers and policy makers to ask whether the EU could eventually benefited of the same experience and to see whether the so called "new economy" could play a similar role in the EU.

The attention about the "new economy" has focused, essentially, on the high investment on ITC. This general-purpose technology has increased the optimism about the possibility of entering a new industrial revolution, which could transform the economic landscape of the developed countries. Recent empirical studies have revealed a sizable impact of ITC investment on productivity growth, calculating that it accounts for up to three-quarters of the estimated one per cent rise in US productivity growth witnessed in the second half of the 1990s (Oliner and Sichel, 2000) (Jorgensen and Stiroh, 2000) The evidence for the EU is decidedly smaller. The European Commission calculations point to a contribution of ITC to economic growth in the EU, in the second half of the 1990s similar to the US in the first half of the 1990s. This gap of half a decade is consistent with the gap in ITC expenditure per capita between the US and the EU (European Commission, 2000)

Nevertheless, while these estimates are encouraging, the evidence is not supporting the main virtue of the general-purpose technology, namely, productivity gains from the application of ITC all over the economy. What is an established fact is that technical progress has caused a huge acceleration of productivity growth in the production of ITC technologies. Graph 7 illustrates, in its left hand side, Moore's Law, which quantifies the technical progress in the ITC sector, and, in the right hand side, demonstrates the economic significance of this technical progress. Prices of processing power have declined noticeably over time giving rise to incentives for ITC capital deepening in the production process. The decomposition of the contribution of ITC to economic growth in the EU, made by Roger (2201) finds evidence for capital deepening effects resulting from declining prices of ITC capital goods, but there is not yet confirmation of significant effects of technological progress outside the ITC sector (McMorrow and Roger, 2201)

Based on the growth accounting exercise in Roger (2201) the impact of ITC on growth in the EU was about one-fourth of a percentage point between 19996 and 2000. McMorrow and Roger (2001) made some simulations on the future impact of ITC on potential growth. Taking a very cautious view on the possible impact on potential growth, they calculate a medium to long-term growth effect of half a percentage point. This compares with a long run effect of one percentage point in the US. The contribution gap between the two is due mainly to the larger costs of capital adjustment and of relative wage rigidity in the EU. Another important

factor is the smaller share of ITC production in the EU relatively to the US, given that the main effect of ITC on aggregate TFP growth is exerted from TFP growth in the ITC sector itself.

Overall, the experience with ITC so far suggests that the emergence and use of new technologies might contribute to an acceleration of labour productivity growth in the EU. Over the medium-term, the increase in productivity in the US gives rise to potential catch-up growth, probably repeating the working of the forces prevalent in the 1950s and 1960s. The crucial question is whether the framework conditions supportive to the take-up of new technologies are in place in the EU economy.