

**Monographic November 2005:
Growth and Productivity**

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1.- U.S.A.

It is a well-known fact that a comparative analysis in terms of levels and even rates of growth in output and productivity on an international scale is made difficult by various factors. These include the differences in how the variables in question are measured (output, employment, hours worked); the different categorisation of components considered (for example, software expenditure, which is treated as investment in the US, but is intermediate consumption for the best part of OECD countries); the differences caused by using one deflator/exchange rate or another; or the effect of the economic cycle which is often asynchronous among the countries that to be compared¹.

However, at least two aspects appear to coincide: in the first place, the US advantage in terms of output and productivity with respect to Japan and the European Union; in the second place, the convergence observed in productivity since the end of World War II up to the 1990s has changed over the last decade, widening the gap in favour of the United States.

Reinforced Leadership

Table 1 shows how Japan closed the gap with the US considerably between 1960 and 1990. Despite creating less employment, productivity growth in Japan easily trebled that of the US over the same period. Similarly, EU member states doubled the average growth rate in productivity in the US over these three decades, despite the fact that a

lack of sustained growth in employment limited convergence in terms of output.

Table 1: Economic Growth and its Origins in the Main OECD Regions (average annual growth rates)

	1961 - 1990	1991 - 1995	1996 - 2000	2001 - 2004
ECONOMIC GROWTH				
US	3.5	2.4	4.1	2.5
EMU	3.6	1.5	2.6	1.3
JP	6.2	1.5	1.4	1.0
EMPLOYMENT RATE				
US	1.9	1.0	2.1	0.0
EMU	0.4	-0.2	1.5	0.8
JP	1.0	0.8	0.0	-0.5
LABOUR PRODUCTIVITY (per worker)				
US	1.6	1.4	2.0	2.5
EMU	3.2	1.7	1.1	0.5
JP	5.2	0.7	1.4	1.5

Source: own elaboration with data from the European Commission and FRED II

The scenario at the beginning of the 1990s has undergone a radical transformation. Japan, in the midst of an endless deflationary crisis, saw GDP growth drop to a fifth of that recorded over the three previous 10-year periods, stagnation in employment and only marginal rises in productivity.

Labour reform has triggered sound job creation in the European Union over the last decade, but productivity has grown increasingly less², thus causing GDP growth to slowdown.

¹ See a detailed description of these difficulties and their implications in a recent study carried out by the Bank for International Settlements (BIS), Basel (2005); "Revisiting recent productivity developments across OECD countries", WP n° 182.

² It is worth remembering that productivity per worker is being used in this comparison; part of the poor progress (in some cases a significant part) made by this variable in the EU in recent years, is due to the decrease in the number of hours worked.

In contrast, the United States has enjoyed an unmistakable upturn in productivity growth, which has enabled the country to lead economic growth figures in recent years, even when the so-called “jobless recovery” saw a two-year net loss in employment following the end of the recession in 2001.

As a result of this change in tendency, the differences in income per capita in 2003 between the United States, Japan and the European Union, together with the origins of these differences, are summarised in Table 2.

Table 2: Differences in Income per Capita among the main OECD Regions

	GDP p/c	Emp. p/c	Prod. p/h	Hours worked
US	100	100	100	100
EMU	70	90	89	87
JP	74	107	69	100

Source: own elaboration with data from the BIS

While the US income per capita-gap with respect to Japan and Europe is similar, its fundamentals are completely different.

As regards Japan, it is merely a matter of efficiency, as the employment rate and number of hours worked are similar and even favour Japan in terms of employees.

As far as the European Union is concerned, the 30 points that separate GDP per capita are almost evenly distributed among the three components. In fact, less hours are worked per employee, which in some European countries, with France leading the way, hides greater productivity per hour than in the United

States³. There has been a long-winded debate over the causes for the fewer hours worked. Some are of the opinion that it is due to individuals themselves choosing to work less (giving priority to recreation), while others believe it is the undesired result of a lack of job creation together with excessive taxes that discourage workers from doing more hours. In reality, it is more than likely a combination of both factors.

How and Why Productivity Rises

The aforementioned upturn in labour productivity growth in the United States is one of the economic phenomena that to cause the most debate in recent years.

The fact that the US has inverted the previous “catching up” process on behalf of the rest of the OECD to further widen the gap with the best part of developed nations confirms, for some, the superiority of the US model and, for many more, the need to study the fundamentals of this improvement and the possibility of extending it to the rest of countries.

According to the report from the BIS (Basel) quoted earlier in this article, productivity growth per hour in the United States has accelerated by 1.3% over the past decade, with respect to the period dating from 1986-1995. Meanwhile, productivity growth has slowed down by 1.2% in the Euro-zone and by 1.5% in Japan. Only the Scandinavian countries in Europe plus Australia, Switzerland and Ireland (in the OECD) have managed to raise productivity growth over the last

³ According to almost all measurements which, in any case, we must recognise rarely coincide across studies.

decade, but much less than in the United States⁴.

Table 3: Labour Productivity Pattern and Breakdown (average annual growth rates – productivity and hours; contribution to productivity growth – TFP and K/L)

	1966-1975	1976-1985	1986-1995	1996-2004
Labour Productivity	1.6	1.2	1.3	2.6
Output per hour	2.5	1.3	1.2	2.8
Hours per worker	-0.9	-0.1	0.1	-0.2
TFP	44%	75%	85%	73%
K/L	56%	25%	15%	27%

Source: own elaboration with data from BIS

Note: TFP = Total Factor Productivity

K/L = Capital Intensification

The first thing we observe in Table 3 is that the improvement in productivity is real and not due to an increase in the number of hours worked, which have prolonged the secular downward trend in the last decade, albeit only slightly.

In the second place, the increase in labour productivity is almost 75% due to improved efficiency in the use of inputs (measured by the increase in total factor productivity), with the rest corresponding to an increase in physical capital per worker.

In other words, technical progress is at the core of the acceleration (as was the case in the two previous decades and in contrast to the period dating from 1966-1975) in productivity growth. This

⁴ Data refers to the business sector and is adjusted to take into account the economic cycle. While actual values differ (on occasions considerably), the same trends are observed in other estimates.

is excellent news in terms of sustaining the trend. If the main cause of the growth in productivity were capital intensification, sustaining the trend would be much more troublesome. It would demand high rates of continuous investment, which moreover would not be compatible with the long term outlook for stability in the capital-output and capital return ratios⁵.

The conclusion we can draw from this is that productivity growth is improving in the United States. Various reasons have been quoted in order to explain this, but their absolute and relative validity is very difficult to calculate in practice:

1.- The most common reason is the boom in **Information and Communication Technologies (ICTs)**, which has been clearly led by the United States over the past 15 years. The ICT revolution's contribution to productivity is at least three-fold: firstly, through technological progress in producing sectors themselves; secondly, through the capital intensification in the economy as whole that accompanies this transformation; thirdly, through technical progress spilling over into other sectors that use ICTs, thereby raising their productivity.

In fact, the main differences between the productivity growth recorded in the US and that observed in other large OECD countries do not lie in productive sectors, but rather in ICT-using sectors. However, there is a direct relationship between the amount of investment in ICTs and the how widespread they are in the economy, which would give the United States a decisive advantage on the one hand, but would also leave significant room for progress in a large part of the European Union, for

⁵ See BIS (2005), p. 17 and ss.

example. Some studies estimate the difference in annual productivity growth stemming from investment in ICTs between the United States and the European Union at 1%.

Those who support this explanation believe it is no coincidence that outside the United States, the most favourable pattern in productivity in over the last decade has been observed in Scandinavian countries, which also spend considerable amounts on ICTs, above the average for the OECD.

While few authors deny the significant role of ICTs in the acceleration of US productivity growth, many consider that they are not entirely responsible and that there must be additional explanations.

2.- **Structural reform** has increased the flexibility of factor and product markets, facilitated the creation of new businesses and their management, even in difficult times (through bankruptcy legislation that is more favourable than in other developed nations) and reduced non-wage labour costs⁶.

3.- The incredibly advanced **capital-risk market** in the US allows new projects (not necessarily related to ICTs) to put into practice at a much higher rate than in Europe or Japan.

4.- An adequate **managerial executive incentive system** for businesses has promoted the creation of instruments that are necessary to reduce costs and increase efficiency by means of incorporating new technology, but also through managerial improvements of a technical

⁶ There could be some doubt over this last point, in light of the recent implications for businesses of retirement and health schemes that partially replace the greater coverage of public schemes in other developed countries.

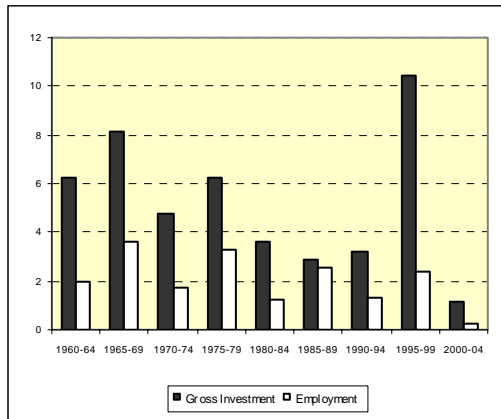
nature that are not necessarily new, but which were not so widespread in the past⁷.

5.- **Qualified labour.** While it is not easy to sustain that the average US worker is more qualified than the average European or Japanese employee, those who support this theory point out that it is the reason behind the United Kingdom's total failure to increase productivity growth despite carrying out similar reforms to those implemented in the US and also considerable investment in ICTs.

6.- **Extraordinary investment.** While it is true that the second half of the 1990s witnessed a boom in investment in the United States and was also the period to record the largest capital intensification since World War II (Figure 1), it does not appear to be the main reason behind the upturn in labour productivity. Firstly, because we have verified that the increase is much more the result of an improvement in total factor productivity than an increase in capital per worker. Secondly, because the poor investment rates observed over the past five years have not affected the excellent results in terms of productivity.

⁷ Martin Feldstein, who believes this idea to be the key to ICTs becoming more widespread, admits that new variable compensation structures have encouraged cases of dishonesty and fraud that do not reduce the overall positive impact of the change.

Figure 1: Non-residential Investment and Employment (average annual growth rates)



Source: own elaboration with data from FRED II

Generally speaking, the impact of the ICT revolution on the gap in favour of the United States in terms of both economic and productivity growth over the past decade is undeniable. The diffusion of these technologies in other countries should, a priori, lead to a considerable improvement in the near future. However, incorporating the other factors briefly outlined above may not be easy and, if their supporters are right, this would be a handicap for the potential improvement.

Another "Jobless Recovery"

More than a few comments have been made⁸ in the OCEI's economic environment reports on the so-called "jobless recovery" (and even the "jobloss recovery"), that followed the recession in 2001. The level of employment at the end of the recession was only recovered in April 2004, while the level prior to the crisis was reached in January this year.

Now is not the time to re-analyse how valid the proposed explanations for this phenomenon are (this will be tackled in

⁸ See the reports for September 2003 and 2004 in particular.

the future) and after three years, it is no longer convenient to talk of a recovery, but rather an expansive phase of the cycle.

However, it seems logical to provide a comparison of what has happened during the period following the recession that ended in November 2001 in relation to previous periods in our analysis of economic growth and productivity this month. This comparison can be found in Table 5 at the end of this report.

In the first place, it can be appreciated that despite the extraordinarily expansive nature of macroeconomic policy and the depreciation of the dollar with respect to the best part of the country's trading partners, the current expansion in the US is still somewhat weaker than the average over the four previous expansions.

In line with the observations made in previous sections of this report, productivity per hour worked has risen by 1.38% more than the average over the four previous expansions, while productivity per worker has made somewhat less progress. As a result, the recovery observed in the number of hours worked (barely an annual 0.7%) is less than a quarter of the average.

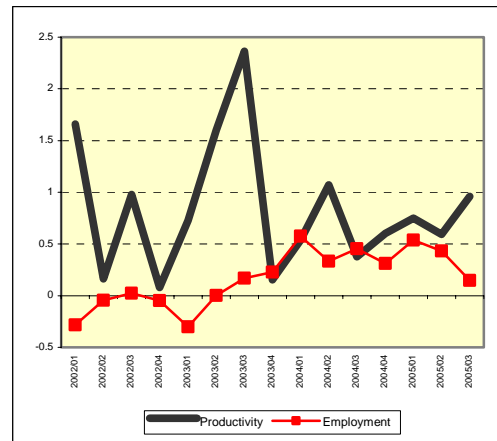
There can be no doubt that the relatively speaking more efficient use of labour resources has coincided with less staff being hired during the expansive phase. After 10 quarters in this situation, the decrease in unemployment was the lowest of the five phases under study, with the exception of the period of growth at the beginning of the 1970s⁹. In terms of

⁹ The reason for this was the effect of the oil shock in 1973 being felt at the end of that period. The lowest unemployment rate during that period was 0.9 percentage points less than

the citizen participation rate, the result was also the worst, except for the “jobless recovery” at the beginning of the 1990s, and the same can be said for the recovery in productive capacity utilisation. Data referring to job creation and hours worked are by far the least favourable of all the periods under consideration.

The following elements are behind this unusually low resource mobilisation: less economic growth in relative terms, the brevity and half-hearted nature of the previous recession (which led to a smaller decrease in capacity and employment than was normal in previous crises) and the high degree of economic and geopolitical uncertainty in recent years. However, we continue to reject the analysts’ attempts to justify the worst employment data as natural consequence of improvements in productivity. No clear negative correlation can be found between the two variables (see Figure 2) and it is even positive if we exclude the astonishing productivity data halfway through 2003 and in the last quarter, with a decrease in job creation that can be directly attributed to Hurricane Katrina, which will presumably be offset in future quarters. In short, as economic history itself illustrates, productivity and employment are not incompatible when it comes to generating economic growth.

Figure 2: Productivity per Hour and Non-farm Employment (quarterly growth rate)



Source: own elaboration with data from FRED II

Vicente J. Pallardó.
Valencia, November 18 2005

the rate at the end of the 10-month period considered here in order to make the study of the five expansions uniform.

2.- Euro-zone

Structure of Economic Growth

Marked Decrease in Growth in the Euro-zone

If we compare the economic growth in the Euro-zone in the 1960s to the current scenario, a significant decrease can be clearly appreciated. The growth rates of 5.3% observed in the 1960s fell to 2-2.5% in the 1980/90s to later drop further in the 2000s to an average of 1.5%.

Table 1: Real Euro-zone GDP Growth Pattern

Year	GDP Growth
1960-70	5.3
1971-80	3.2
1981-90	2.4
1991-00	2.1
2001-06	1.5

Source: Eurostat

Table 2: GDP Growth Pattern by Euro-zone Member State

Country	2001-06
BEL	1.7
GER	0.8
GRE	3.8
SPA	2.6
FRA	1.7
IRL	5.2
ITA	1.1
LUX	3.2
HOL	0.9
AUS	1.5
POR	0.8
FIN	2.6
EUR	1.5

Source: Eurostat

*Data for 2005 and 2006 are estimates

The significant decrease in economic growth in the Euro-zone has not been shared equally across Euro-zone member states. In fact, in some countries growth has accelerated, as is the case of Ireland and Luxembourg.

A Reflection of the Decrease in Potential Economic Growth in the Euro-zone

On estimating potential growth, either by means of the Hodrick-Prescott filter of the GDP growth series under study or an econometric estimate of a production function, a significant decrease is observed since the 1960s. Potential growth has dropped from 2.5% in the 1990s to 1.5% (according to the CDC estimate for the 2000-2004 period) or 2% (according to the ECB).¹⁰

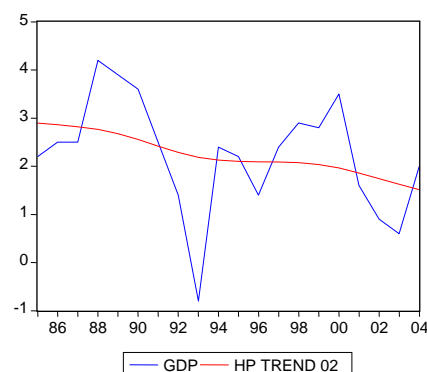
By sector of the economy, services have recorded the highest growth rates over the period dating from 2001 to 2004.

Table 3: Growth by Sector

Sector	2001-04
Agriculture	0.6
Manufacturing	1.0
Construction	0.7
Trade, Tourism & Transport	1.6
Finance & Real Estate	1.9
Public Sector, Education & Health	1.6
TOTAL	1.4

Source: ECB

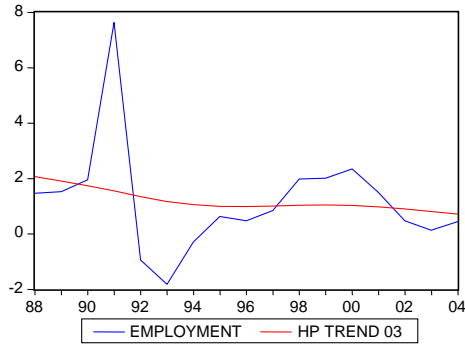
Figure 3: Estimate of Potential GDP Growth by Applying the Hodrick-Prescott Filter



Source: own estimation with data from Eurostat

¹⁰ CDC Flash 2005-133 "Low potential growth in the Euro zone: What challenges for economic policies? S. Broyer, L. Maillard

Figure 4: Employment Growth Trend: Hodrick-Prescott Filter



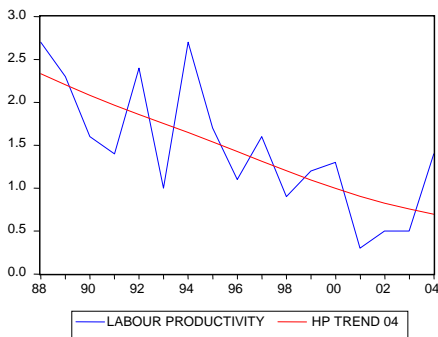
Source: own estimate with data from the OECD

Figure 5: Labour Force Growth Trend: Hodrick-Prescott Filter



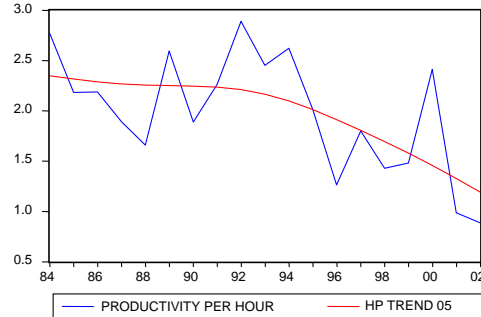
Source: own estimate with data from the OECD

Figure 6: Productivity per Worker Growth Trend: Hodrick-Prescott Filter



Source: own estimate with data from Eurostat

Figure 7: Growth Trend in Productivity per Hour: Hodrick-Prescott Filter



Source: own estimate with data from the OECD

We can deduce from these graphs that the potential growth rate has dropped due to a slowdown in both employment and the labour force as well as the slump in productivity growth, both per worker and per hour.

The following conclusions can be drawn from the estimate of potential growth and its components (growth in the labour force and total net capital and Total Factor Productivity (TFP)) carried out by IXIS-CDC:

- a) All components saw their contribution drop, particularly TFP.
- b) The contribution of the labour force was minimal (0.1%) over the period 1994-04, while TFP (0.9%) and capital (0.8%) contributed the most.

Table 4: Potential GDP and Components

Periods	Pot GDP	LF	Capital	TFP
1974-83	3.3	0.5	1.2	1.7
1984-93	2.7	0.4	0.9	1.6
1994-04	1.8	0.1	0.8	0.9

Source: CDC-IXIS

Productivity growth in the Euro-zone stands at 1%, while the labour force will drop by 0.25% over the next four years.

This means that potential growth over the next four years will be 1%, while for the next ten years it will drop to 0.7%.¹¹

The effects of less potential growth are as follows:

- a) Lower real interest rates, as they should converge with potential growth in a balanced situation.
- b) Greater difficulty to sustain public finances and particularly state pensions.

Comparative Analysis of Productivity by Country

Measuring the level of productivity homogeneously to make data comparable across countries entails numerous difficulties.

If productivity per worker is used to measure productivity, the greater or lesser presence of part-time contracts or differences in the number of hours that full-time employees work, distorts the comparative analysis in question.

Moreover, other factors such as the size of the underground economy, different methods for estimating GDP in the National Accounts (software is considered investment in the United States, but intermediate consumption in the Euro-zone) and the use of different deflators, also distort the cross-country comparison. As a result, if European GDP were measured by using the parameters employed in the United States, it would be an annual 0.5% higher.

Hence, the best way to compare productivity across countries and avoid heterogeneity is not to use levels of absolute productivity or growth rates,

but rather the changes in the rate of growth/productivity acceleration.¹²

Following this, it is clear that productivity in the Euro-zone stopped converging with the United States in the 1990s and that productivity growth in the US has outpaced that of Europe, thus hindering the progress towards the convergence of the European standard of living.

Table 5: Productivity in PPP (USA=100)

	1995	2003
GDP PER CAPITA	72	70
LABOUR PRODUCTIVITY	84	77
PRODUCTIVITY PER HOUR	95	89

Source: Eurostat, European Commission

In fact, a comparison of absolute productivity values reveals that the Euro-zone is behind the United States, especially in terms of labour, with a 23% gap.

If we compare growth rates in labour productivity, the US indicator once again surpasses the Euro-zone by 1.6%. While the contribution of capital to productivity growth was similar, the contribution of labour (-0.5%) and TFP (0.6%) are much lower in the Euro-zone. This explains that the productivity gap is not only due to the number of hours worked, but also to technical advances (TFP).

If we wished to compare the change in productivity growth or the acceleration between both regions, we would reach the same conclusion. The US would record a 1.3% increase compared to an identically sized decrease on behalf of the Euro-zone (1986-2004).

¹¹ CDC Flash 230-2005. "Potential growth, real interest rates and exchange rate. P. Artus.

¹² BIS WP 182. "Revisiting recent productivity developments across OECD countries. L. Skoczyles, B. Tissot.

The superiority of US productivity can not even be attributed to the different structures across market sectors. If we simulate that both economies had the same market sector structure, productivity growth in Europe would still be lower.¹³

Table 6: Productivity Growth Pattern (1996-2004)

	EUR	EEUU
GDP/PERSON	0.9	2.5
HOURS WORKED CONTR.	-0.5	-0.1
GDP PER HOUR	1.4	2.7
CAPITAL CONTR.	0.8	0.7
TFP PER HOUR	0.6	2

Source: Bank for International Settlements (BIS)

Reasons Inherent in the Slowdown in Productivity Growth

The previous section disclosed that total factor productivity, together with hours worked, has weakened productivity growth in the Euro-zone, particularly in comparison to the United States.

In order to analyse TFP in greater depth, we must ascertain the scope of this concept. TFP is, in reality, the residual left in the estimation of the production function and, therefore, it represents the contribution to economic growth that cannot be attributed to an increase in employment or total capital. It captures technical and organisation progress and, hence, the quality of capital and labour, knowledge, concurrence, institutions, externalities, economies of scale, etc...

Expenditure on Research and Development:

Corporate spending on R+D, the number of researchers in the private

¹³ Employment in Europe 2003. European Commission.

sector and the level of competition among businesses are all closely related. The reason is that a low level of competition implies large profits and, therefore, companies are discouraged from developing new products. Econometrically speaking, the relationship between R+D expenditure and the number of researchers and the level of competition (the more competition, the higher the level) is direct.¹⁴

R+D expenditure as a percentage of GDP has remained constant at 1.9% in the Euro-zone over the past 10 years, 40% less than in the United States. Finland devoted 3.43% of GDP to R+D expenditure in 2002, compared to Spain (0.99%) and Portugal (0.8%).

Private companies were responsible for most of the spending on R+D (63%), while only 11.6% of government spending was channelled to defence, compared to 52% in the United States.

Table 7: R+D Expenditure (% of GDP)

	EUR	USA
1994	1.83	2.4
1995	1.83	2.49
1996	1.81	2.53
1997	1.82	2.56
1998	1.82	2.59
1999	1.87	2.63
2000	1.89	2.7
2001	1.92	2.71
2002	1.92	2.65
2003	1.9	2.59

Source: Eurostat

¹⁴ CDC Flash 157-2005 "Competition in the product market, research derive and productivity gains." P. Artus

Table 8: Number of Researchers per 10,000 jobs

	EURO-ZONE	USA
1997	26.6	70.9
1998	26.4	74.1
1999	28.9	76.1
2000	28.9	75.8
2001	29.8	
2002	30.4	

Source: OECD

Table 9: Patents Registered per Million Inhabitants

	EUR	USA
1991	48.06	203.4
1992	46.54	205.63
1993	44.13	206.94
1994	42.88	215.75
1995	42.41	212.25
1996	44.11	230.55
1997	45.64	230.81
1998	58.88	297.29
1999	60.15	307.9
2000	64.06	300.51
2001	68.85	306.56
2002	69.07	301.41

Source: United States Patent and Trademarks Office (USPTO)

As far as the number of researchers and patents is concerned, there is a huge difference between the United States and the Euro-zone, despite the latter having improved considerably. The US figures are 2.6 and 4.3% times higher respectively. More specifically, patent applications in the United States double the number in the Euro-zone.

It is undoubtedly important for innovation and technology to receive the support of institutions. Countries are poor due not to a lack of human or physical capital, but to technological differences and the lack of institutional quality. Apart from public and university support, the developing the financial system, and in particular venture capital, plays a vital role in R+D.

Capital-risk investments have grown spectacularly in terms of contributions to GDP over the past 10 years. Early-stage investments have trebled, while developing investments have doubled. Nevertheless, despite this boom, figures still fall short of capital-risk investment in the United States, which are two and three times higher.

Table 10: Balance of Computer Services and Products (billions of euros)

	EURO	USA
1995	-0.1	1.6
1996	0	1.9
1997	0.2	2.3
1998	0.2	2.4
1999	2.3	3.5
2000	2.8	3.7
2001	4.7	3.9
2002	6.4	4.1
2003	8.7	3.4

Source: Eurostat

Table 11: Balance of Licences and Royalties (billions of euros)

	EURO-ZONE	USA
1995	-6.3	17.9
1996	-7.7	19.4
1997	-8.3	21.2
1998	-9.9	21.8
1999	-10.6	24.9
2000	-10.8	29
2001	-13.3	27
2002	-12.8	26.4
2003	-13.1	24.9

Source: Eurostat

As regards the balance of computer services and products on the one hand and the balance of licences and royalties on the other, the results are totally different.

The balance of computer services and products displays a clear surplus and a considerable improvement since 1995. However, licences and royalties present a deficit that has doubled over the past eight years, compared to surplus in the

US that doubles the deficit figure in the Euro-zone.

Spending on Education and Professional Training:

Government spending on education, (such as direct expenditure, subsidies and loans) as a percentage of GDP amounts to 5.07%, similar to the figure in the United States. However, if we take into account total expenditure on education, on behalf of both the public and private sector (measured per student in terms of PPP) the figure for the US practically doubles that of the Euro-zone.

While spending per secondary school student is more or less equal, in primary and university education US spending more than doubles that in the Euro-zone.

On the other hand, apart from the importance of education, the effort in terms of ongoing professional training is decisive when it comes to improving productivity and avoiding a substantial depreciation of human capital. The percentage of the population of a working age that receives ongoing professional training in the Euro-zone stands at 7%, with marked differences across countries. While in Finland and the Netherlands, percentages are very high (25.3% and 16.5% respectively) in Greece it is very low (2.7%).

Another way of measuring how qualified workers are is to determine the number degree and post-graduate degree holders as a percentage of the population aged between 25 and 34. In the USA, the figure is 30%, compared to 14% in Germany and 18% in France.

Table 12: Government Spending on Education over GDP

BEL	6.26
GER	4.78
GRE	3.96
SPA	4.44
FRA	5.81
IRL	4.32
ITA	4.75
LUX	3.99
HOL	5.08
AUS	5.67
POR	5.83
FIN	6.39
EURO	5.07
USA	5.35

Source: Eurostat

Table 13: Total Spending on Education per Student in 2002 (PPP)

	EURO	USA
PRIMARY	4427.7	7154.1
SECONDARY	6290.3	8085.9
UNIVERSITY	8018.0	18260.1

Source: UOE data collection

Use of New Technologies

New technologies have revolutionised economic transactions, making them faster and much less expensive.

The number of mobile phone contracts has multiplied by twenty-fold over the past eight years in the Euro-zone. Practically all companies in the region now have access to the internet and more than half have a broad band connection.

Despite the increase in the use of the internet, only 2.2% of total sales are made on the World Wide Web, although the figure has trebled in two years.

On the other hand, spending on computer technology in the United States almost doubles that in the Euro-zone.

New Technologies barely spread across Productive Framework, particularly outside industry

Bart van Ark (2003) demonstrated that the productivity of new technology industries (ICT) had accelerated noticeably both in Europe and the United States over the period dating from 1995-2000. In Europe, businesses that provide new ICT services have the edge. However, while productivity growth among industrial sectors that use new technologies remained more or less stable, in the United States it trebled.

This means that, despite offering better telecommunication and computer services than in the United States, Europe has been unable to gain advantages stemming from the spreading of new technologies across all the sectors in the economy.

Consequently, better ongoing professional training for workers and greater mobility on behalf of those with the highest qualifications, would favour the arrival of new technologies to all sectors of the economy as a whole, thus raising productivity.

Table 14: Productivity by Sector

	EURO	USA
Technology Production	8.1	10.1
Technology Services	3.1	1.8
Technology Users	1.5	4.7
Technology User Services	1.9	5.4
TOTAL	1.1	2.5

Source: Van Ark

Economy Biased Towards Low Productivity Sectors (trade, construction and consumption)

The poor growth in productivity is also sector-related. Employment is growing strongly in construction and consumption sectors, where unqualified

labour is high, thus reducing overall productivity growth.

If these new jobs were to shift from the low productivity sectors to high productivity sectors, the potential growth of the economy would be boosted.

In this sense, a 1% increase in employment in the aforementioned sectors holds back productivity growth by 0.4%.¹⁵

Lisbon Agenda and Potential Growth

The Lisbon Agenda set the objective of increasing potential growth by nearly one point to 2.1% by 2010, by means of R+D, employment and structural reform.

R+D expenditure is intended to reach 3% of GDP by 2010, with 75% to come from the private sector, and which will enable potential growth to increase by 0.25%. New networks will be created to this end, along with research projects with free choice of objectives and coordination with national policy on research.

In addition to this, the increase in the working age employment rate towards 70% will imply a 0.7% boost to GDP growth.

Valencia, November 21, 2005
Nicolás Jannone

¹⁵ Goldman Sachs. Global Economic Paper 121 "The Lisbon Strategy and Future of European Growth".

3.- Spain

Economic Climate: GDP Growth Increases Smoothly

GDP grew by 0.8% in the third quarter, taking the annual growth rate to 3.5%, up by one tenth on the previous quarter and two percentage points higher than the average for the Euro-zone.

However, experts are concerned about the sustainability of this growth trend. Growth is being boosted by domestic demand and in particular private consumption and residential investment. But a slowdown of sorts in the contribution of domestic demand can be appreciated, which is probably related to the negative outlook due to the foreseeable increase in interest rates. This situation is beginning to be captured by confidence indicators. Furthermore, the weakness of the external sector and modest progress in productivity due, among other aspects, to the minimal effort in R+D are casting doubt over future growth in the Spanish economy.

As regards the factors responsible for this growth on the demand side, final household consumption has levelled out over 2005, recording an annual growth rate of 4.4% in the third quarter, although it still outpaces growth in disposable income.

Fixed investment suffered a slight setback with an annual growth rate of 7.4% in the third quarter, two decimal points less than the increase observed in the previous quarter. This was due to less growth in investment in equipment (machinery and transport material).

The external sector has reduced its negative contribution to GDP growth, following a two-tenth increase in exports with respect to the previous

quarter and an annual growth rate of 1.2%. In addition to this, imports rose by 7.7% (compared to the 8.5% rise in the second quarter), probably due to the slowdown in domestic demand.

On the supply side, the strong growth in construction figured prominently, together with the weak growth in industry, while growth in the services sector (including market services) remained stable. It is nevertheless worth underlining the buoyancy of industries related to tourism and ICTs.

Employment and Productivity: Contribution to Growth

The annual increase in GDP registered in the third quarter of 2005 was based on the 3.2% increase in the number of full-time jobs and a 0.3% rise in productivity.

Table 1: GDP Growth and its Sources (Annual Growth Rate)

	2003				2004				2005		
	I	II	III	IV	I	II	III	IV	I	II	III
[1]	2.9	3.1	3.0	3.0	3.0	3.0	3.1	3.2	3.3	3.4	3.5
[2]	2.3	2.3	2.8	2.8	2.7	2.2	2.6	2.8	3.0	3.2	3.2
[3]	0.6	0.8	0.2	0.2	0.3	0.8	0.5	0.4	0.3	0.2	0.3

Source: National Institute of Statistics

Notes:

[1] GDP growth

[2] Increase in employment

[3] Increase in labour productivity

The minimal contribution of labour productivity (Table 1) is characteristic of the growth trend over recent years (see "Economic Growth Determinants: Weak Progress in Productivity"). The minimal rises in productivity cast doubt over the sustainability of growth in the long term. Provisional data related to R+D expenditure (an important determinant of increases in productivity) for 2004 was released recently, which suggests a significant increase in this type of activity, both in terms of number (businesses

undertaking R+D projects have increased by 22%) and size (R+D expenditure has increased by 9%, to 1.07% of GDP). However, the amount of time and money devoted to R+D in Spain remains well below the level of other developed nations.

Spain Continues to Lose Price Competitiveness

The annual inflation rate dropped to 3.5% in October, two tenths less than in September. This was mainly due to the decrease in the price of oil and, albeit to a lesser extent, to the decrease in the price of package holidays and telephone equipment. The increase in the price of clothing and university fees restrained the slowdown in inflation.

Despite the decrease in headline inflation, core inflation (which excludes fresh food or energy product prices) rose to 2.6% in September. This displays a certain amount of latent inflationary tension in the Spanish economy. In addition to this, the annual inflation rate according to the Harmonised Index of Consumer Prices stood at 3.5% in October, one percentage point above the average for the Euro-zone, thereby further deteriorating the competitiveness of the Spanish economy.

The general index of producer prices grew by 4.9% over the past year, mainly on the back of the energy sector and consumer non-durable goods, which outpaced growth in the price of intermediate goods.

Foreign Trade

The trade deficit continues to grow. The import/export ratio over the first nine months of the year was a scarce 66.5%. The current account deficit has reached all-time highs, significantly

raising the country's borrowing needs in comparison to the rest of the world and now stand at close to 7% of GDP.

The shortage of savings in the economy can be mainly explained by the fall in private savings due to households saving less and the high investment rate in the economy.

Interest Rates

The European Central Bank will more than likely begin to steadily toughen up its monetary policy from December 1 onwards. This turnaround is related to a series of factors: the high inflation rate in the EMU, which easily surpassed the 2% target rate, the strong growth in the monetary mass with a marked rise in private sector loans, the overall improvement in economic growth data in Euro-zone member states as well as the depreciation of the euro.

The turnaround in monetary policy could hold back economic growth in Spain in the short term, in light of the high level of household borrowing that could curb spending, thus weakening the main source of growth in recent years.

Economic Growth Determinants: Poor Progress in Productivity

Since halfway through the 1990s, the Spanish economy has **maintained sound economic growth and created employment** in comparison to the EU-15 countries. The growth gap has widened over the past two years (2003 and 2004), taking GDP per capita in Spain to 84.5% of the figure in the EU in 2004.

At present, growth is being sustained by the marked buoyancy of domestic demand, especially private consumption and residential investment. In this scenario, **foreign trade is taking**

some of the intensity out of growth.

The growth pattern based on the strength of domestic demand has been favoured by the creation of the EMU. It has resulted in greater macroeconomic stability and highly favourable financial conditions with low real interest rates and loans for longer periods of time. Thus, investment in construction in general and residential investment in particular has risen strongly, reducing the household savings rate and increasing their level of indebtedness.

As far as foreign trade is concerned, the market share of exports of goods and services has increased despite the loss of competitiveness. Consequently the high and increasing foreign trade deficit can only be due to strong growth in imports, bolstered by the increase in domestic spending. Imports as a percentage of GDP have increase from 31% in 1999 to 36% in 2004.

Economic Growth Determinants

On analysing the factors that contribute to economic growth in detail, a change in the growth pattern shared by the majority of EU economies can be appreciated since halfway through the 1980s, although the change has been much larger in Spain, which contrasts with the situation in the United States and Scandinavian countries. Spanish growth is sustained by marked increases in employment, which has resulted in **intensive use of employment** (instead of the alternative of growth based on an increase in employment and a more efficient use of it – thus also increasing productivity), with a **smaller contribution of the increase in labour productivity**. As a result, the Spanish economy's relative productivity has decreased with respect to the EU

and in particular when compared to the United States.

Growth in GDP per capita can be broken down into the sum of increases in GDP per worker and growth in employment per capita. Likewise, growth in employment per capita can be broken down into the sum of the increases in the employment rate and workers per capita. The productivity trend is a vital factor in order to sustain long term economic growth, as growth in employment per capita has demographical, technical and socio-cultural limits as a source of growth. Besides, increases in employment per capita ultimately depend on progress in productivity.

Table 2: Breakdown of Average Annual Growth

	GDP per capita	GDP per worker	Employment Rate	Workers per capita
1960-1970	5.6	6.1	0.0	-0.5
1976-1986	0.9	2.8	-1.7	-0.1
1987-1992	3.2	1.2	0.5	1.5
1993-1998	3.0	1.2	0.7	1
1999-2004	2.1	0.7	0.4	1.1
1960-2004	3.3	3.2	-0.2	0.3

Own elaboration based on "Situación España BBVA" July 2005

Table 2 above reveals that progress in productivity was the main growth factor over the period 1960-2004 as a whole, with an average annual growth rate of 3.2%, compared to the 0.1% rise in employment per capita. However, a substantial change can be appreciated from 1986 onwards, with a slowdown in productivity and strong rises in employment per capita. This pattern has become more pronounced over the past few years.

Table 3 also shows how significant changes in the growth pattern in the Spanish economy can be appreciated from 1986 onwards and highlights important differences with respect to EMU member states. Growth in GDP per capita in Spain has outpaced that of the Euro-zone countries, whereas productivity¹⁶ has stagnated, particularly since the second half of the 1990s as a result of the slowdown in the economy's productivity.

As regards the factors related to labour market dynamics, in the first place the growth gap of workers per capita is greater between 1986 and 1994 as a result of sustained increases in the population of a working age and the progressive incorporation of women into the labour market. Since halfway through the 1990s, the gap narrowed due to the abrupt drop in the number of births since the beginning of the 1980s, although immigration maintained a certain amount of growth, particularly from 1997 onwards. In the second place, the employment rate has grown uninterrupted at a high rate than in Europe, except over the period from 1992 to 1994, due to the serious economic crisis.

Table 3: Growth Gap between Spain and the Euro-Zone

	1971-2003	1971-1985	1986-1994	1994-2003
GDP per capita	0.4	-0.2	1.0	0.8
Productivity	0.5	1.2	0.0	-0.2
Employment Rate	-0.2	-1.3	0.6	1.0
Workers per capita	0.1	-0.1	0.5	0.1

Source: OECD Economic Studies. Spain. April 2005, page 24

¹⁶ See BIS Working papers No 182, pp 4-7 for an interesting discussion on the difficulty of comparing productivity data due to measurement problems.

The significant increase in employment over the last two decades (Tables 2 & 3) was aided by successive reforms in the labour market since 1984, which helped to make the labour market more flexible by introducing temporary contracts as well as moderating (real) wages since halfway through the 1990s. Trade Unions relaxed their demands for wage increases, bringing them in line with the expected inflation rate. Immigration has been another key factor in real wage moderation, particularly since 1997, when this phenomenon significantly increased the labour supply (mainly of workers with low reserve wages). Marked job creation has fuelled the strong growth in domestic demand.

This pattern of growth, based on marked increases in employment together with modest improvements in productivity has become more pronounced since halfway through the 1990s, making the case of Spain even more unique if possible, as Table 4 displays.

Table 4: Employment Growth and Labour Productivity (1995-2003)

		EMPLOYMENT GROWTH		
		Below average	Close to average	Above average
GROWTH IN LABOUR PRODUCTIVITY	Below average		Italia	Spain
	Close to average	Germany Japan	Belgium UK Denmark France	Netherlands
	Above average	Greece Portugal Austria	USA Sweden	Ireland Finland Luxembourg

Formally, GDP per capita may be broken down as follows:

$$\frac{\text{GDP}}{N} = \frac{\text{GDP}}{\text{Hrs. worked}} \times \frac{\text{Hrs. worked}}{\text{Workers}} \times \frac{\text{Workers}}{N}$$

Hence, GDP per capita depends on:

- Productivity per hour worked
- How much people work
- How many people work

Table 5: GDP per capita and its Sources (in PPP)

Year	GDP per capita		GDP per hour worked		Average hrs worked		Employment Rate		GDP Per worker	
	1995	2003	1995	2003	1995	2003	1995	2003	1995	2003
USA	100	100	100	100	100	100	100	100	100	100
Euro-zone	72	70	95	89	88	87	86	91	84	77
Germany	77	70	97	90	84	81	95	96	81	73
France	75	74	108	107	86	82	81	84	93	88
Spain	57	62	83	75	94	97	73	85	78	73
Japan	81	74	71	69	101	100	113	107	72	69
UK	72	77	81	83	94	95	95	97	76	79

Source: own elaboration based on BIS Working Paper No. 182 (2005)

Less employment per capita and lower labour productivity are behind Spain's deficit in terms of GDP per capita, not fewer hours worked, as can be appreciated in Table 5 above. The average number of hours worked in Spain easily exceeds that in the majority of European countries and is practically identical to that of the United States and Japan.

The Role of Productivity

Tables 4 & 5 reveal that productivity has progressed less in Spain in recent years than in EMU countries and the United States and that the level of productivity is also lower with respect to both the foregoing economic regions.

As previously indicated, growth in productivity is a vital factor when it comes to achieving sustained growth in income per capita in a country. The situation in the Spanish economy could be the result of:

1. Less specialisation in goods and services with a high technological content in Spain and greater specialisation in traditional sectors

(which, moreover, results in being more exposed to competition from countries where costs are relatively low).

2. Factors that have intensified the use of employment as a provider of growth.

- Labour reforms in the 1990s which increased the flexibility of the labour market (without reducing redundancy costs in permanent contracts), by introducing new types of temporary contracts.
- Increases in labour supply stemming from:
 - a. A marked rise in the unemployment rate in 1992-93
 - b. Women entering the labour market
 - c. The arrival of immigrants, particularly from 1997 onwards

Consequently, real wages grew more slowly than productivity, thereby keeping Unit Labour Costs in check and allowing businesses to maintain their profit margins.

Therefore, the main challenge faced by Spanish economic growth is to combine larger increases in productivity with rapid growth in employment. Table 4 shows that other countries have accomplished this since halfway through the 1990s.

Productivity Growth Determinants

Table 6: Annual Growth Rate Trends 1996-2004 (%)

	Output per hour worked	Contribution to capital accumulation	TFP (per hour worked)
Germany	1.6	0.6	1
USA	2.7	0.7	2
Spain	0.6	0.5	0.1
France	2.1	1	1.1
Japan	2	1.9	0.1
UK	1.6	0.6	1
Euro-zone	1.4	0.8	0.6
OECD, exc.	1.7	1	0.7
USA			
OECD	2	0.8	1.2

Source: BIS Working Paper N° 182 (2005)

According to the neo-classical growth model, the evolution of productivity depends on the accumulation of capital and increases in Total Factor Productivity or technical progress. As can be appreciated in Table 6, labour productivity has increased remarkably in the United States since halfway through the 1990s. This process is the result of rapid technical progress, while the accumulation of capital has made less of a contribution. In contrast, Euro-zone countries, and in particular Spain, the moderate increases in labour productivity are mainly derived from the accumulation of capital, whereas the contribution of technical progress has been minimal.

Why has Growth in Productivity Slowed Down in Spain?

Weak growth in labour productivity is related to the strong increase in job creation, but is mainly due to the accumulation of physical capital and the slowdown in technical progress (see Table 6). In the first place, the nature of the labour market itself has limited growth in productivity. There has been a significant increase in the employment of workers with low productivity in recent years (young

people, immigrants, long-term unemployed). In addition to this, the marked increase in job creation has occurred through temporary and precarious contracts consolidating a dual labour market which probably does not help to improve productivity. On the one hand, permanent workers enjoy highly stable working conditions, which could hinder productivity by failing to encourage effort and improvements in training. On the other hand, temporary work accelerates job creation, but slows down productivity growth. Businesses do not invest in the training of these workers and, besides, their lack of future prospects more than likely affects their productivity negatively.

Other peculiarities in Spain's labour market have also played a part in the slowdown in productivity growth. On the one hand, the system of collective "intermediate" negotiation – rather than to that carried out by individual businesses - could limit increases in productivity, as it tends to reduce wage differences among businesses with different profits, thus making it impossible to link productivity growth to wage growth. On the other hand, a significant amount of resources from active policies have been channelled towards subsidising contracting temporary workers with a limited effect on productivity. This reduces the quantity of resources available for training those who, while unemployed, could improve their current level of professional training, which could result in future increases in productivity when they get a new job.

The following section reviews the main determinants of productivity growth in Spain, in line with the neo-classical growth model.

A. Physical Capital Stock and Accumulation of Capital

Physical capital stock has systematically increased in Spain since 1986, outpacing the EU. Foreign investment played a crucial role over the first few years and is seemingly doing so once again.

The capital labour ratio (**K/L**) has experienced slightly stronger growth than in the EU since 1986 due to large staff reductions following the recession in the period from 1992 to 1994.

The ratio in the EU has outpaced that in Spain since 1987.

Infrastructure has grown in Spain, substantially reducing the gap with respect to the EU. This is mainly due to public-sector investment, which has curtailed in an attempt to control the public-sector deficit.

Savings, the foundation of investment, have generally speaking been insufficient to finance investment. The household savings rate decreased from 14.5% of disposable income in 1995 to 10.4% in 2004. This savings rate is lower than that observed in other EMU countries, such as Germany, France or Italy. On the other hand, the public sector has increased its savings, maintaining the overall savings rate stable at around 22-23% of GDP (higher than the savings rates in the main EMU countries).

B. Technical Progress

b.1 Labour qualification – level of education

As far as **labour qualification** is concerned, businesses invest little money in professional training. In addition to this, the dual structural of the labour market reduces training incentives. Temporary workers lack

professional prospects, while permanent workers have little incentive to improve their level of qualifications.

On the other hand, **education** helps to increase and improve human capital, by raising current productivity and helps workers to obtain new qualifications that will enable productivity to increase in the future.

The level of education in Spain is below the average for the OECD and Spanish education is relatively low quality. Professional training lacks support and is underdeveloped. Expenditure per student is low, particularly where university studies are concerned and the ratio of students per teacher is also high. Various studies have nevertheless concluded that the important issue is not so much how much money is spent, but rather how the money is spent, which is also more than likely another pending issue in Spain.

The high proportion of degree-holders in low-qualified jobs is an extra problem when it comes to making significant progress in productivity.

b.2. R+D Expenditure (technological development)

Technological capital has improved considerably in recent decades, but is still well below-average for Europe. In 2003, **expenditure on R+D as a percentage of GDP** amounted to 1.05% in Spain, well short of the 2% average for the EU15 and 3% in the United States. In addition to this, the number of patents per capita is well below the average for the OECD.

The list below includes some of the factors that could help to explain Spain's shortfall in R+D expenditure:

1. **Human Capital deficiencies** stemming from a lack of scientific and technical personnel. Moreover,

not much is done to recover-maintain human capital trained abroad.

2. **Unfavourable global economic framework** which originated with high levels of protectionism in the 1960s and later on with competition restrictions in certain sectors, thus hindering the creation of suitable incentives for carrying out R+D activities in order to improve the country's competitive position. It is also worth mentioning how prominently companies with foreign capital have figured in the industrial sector in recent decades; companies which are technologically speaking, closely linked to their head offices.
2. **Industrial policy** for a long time simply encouraged short term increases in output. Incorporated (foreign direct investment, equipment imports) and unincorporated (licences for use of patents, technical aid...) technology imports are promoted. Technological policy has since been weak.

Another significant feature is that Spanish enterprises (**corporate spending on R+D**) have invested less in R+D (in relation to OECD countries) than the rest of agents that undertake R+D activities (public-sector, higher education). The minimal relationship between research and the private company is also negatively striking (Spain is significantly weak in terms of applying research to industry), along with the lack of a relationship between the university (which accounts for significant percentage of research) and businesses.

Aspects that explain the lack of effort on behalf of private companies to invest in R+D include the following:

1. Businesses are small, with Small and Medium-sized Enterprises predominating. This is a problem due to the sizeable amounts of money that must be spent on research.
2. Tourism and other low competitive sectors where R+D seemingly plays a less significant role are relatively speaking of great importance in Spain's productive framework.
3. Spain is lacks an enterprising mentality. R+D activities are highly uncertain in terms of obtaining innovations. Moreover, benefits, when achieved, are usually in the long term.

On the other hand, the lack of investment in R+D and the high degree of dependence on government initiatives in this area, creates a dilemma in that greater political decentralisations leads to greater decentralisation of R+D investment. On the one hand, the size of the investments that are necessary could be a problem when it comes to financing some projects in a decentralised manner. On the other hand, R+D investments could double up. Finally, possible complementarities between different regions may not be taken advantage of.

Finally, **R+D is highly concentrated** in a small number of sectors. Approximately 50% can be found in electronic equipment, chemical products, motor vehicles and other transport equipment.

The lack of R+D creates problems for the economy. Firstly, it

generates a foreign imbalance in this sector (technological deficit). Secondly, it negatively affects competitiveness. A lack of technology makes it difficult to specialise in sectors that make more use of technological knowledge. As a result, the lack of domestic investment in R+D means pioneer technological innovations are applied later than elsewhere. Furthermore, spreading technological innovations that have not been “internally created” is a much slower process (than in the countries where the innovation was created), due to the presence of learning costs and difficulties to transmit certain skills.

b.3. Information and Communication Technologies (ICTs)

Spain lags well behind the EU15. Nevertheless, the influence of ICTs on the Spanish economy is increasing gradually, albeit moderately. Table 7 shows how expenditure on ICTs is lower in the EU than in the US, particularly where information technologies are concerned, reflecting the smaller size of the ICT producing sector and the smaller amount of money spent by both households and the public sector on this type of technology.

Table 7: ICT Spending (%)

	2004		
	Spain	EU	USA
[1]	5.2	6.3	7.7
[2]	1.7	3.0	4.6
[3]	3.5	3.3	3.2

Source: Bank of Spain

[1] ICT Spending/GDP

[2] Information technology spending/GDP

[3] Telecommunications spending/GDP

ICT expenditure has a three-fold effect on growth in product and labour

productivity. Firstly, technological progress in the manufacturing of ICT goods enables capital goods to be produced at a lower cost, thus raising total factor productivity in the ICT producing sector. Secondly, capital intensification in the economy as a whole results in increases in productivity. In the third place, spillover effects lead to improvements in total factor productivity in other sectors.

The contribution of ICTs to annual GDP growth in 2001 was estimated at:

- 1.45 percentage points for the US [out of 4.0]
- 0.49 percentage points for the EU [out of 2.5]
- 0.39 percentage points for Spain [out of 4,0]

In Conclusion: Sustainability of the Current Growth Pattern

In recent years, the Spanish economy has registered strong growth and job creation (above those of the EU), but with low labour productivity growth, bolstered by the marked increase in domestic demand.

However, high economic growth rates have hidden the not so favourable trend in other variables that are an obstacle for the sustainability of the current growth pattern.

In the first place, **the level and growth of productivity** are quite low and must be improved. In the second place, the economy's **price-competitiveness** is deteriorating as a result of the inflation gap with respect to EMU nations (especially when measured by the CPI). Inflation leads to lower real interest rates (below the level of EMU countries), boosting domestic demand. In the third place, the negative effect of rising prices on competitiveness is dealt with differently depending on whether the sector is

protected (services) or exposed (industry) to international competition. In the latter, profit margins are reduced in order to offset the relative increases in unit labour costs. In the services sector, on the other hand, businesses pass on increases in cost to their prices, thus creating a situation of dual inflation which creates inflationary tension in the economy as a whole.

In the fourth place, Spain must **increase the degree of competence in productive sectors of the economy** in order to decrease inflation and increase productivity. In the fifth place, the constant deterioration of the external sector is due to a surge in imports which stems from an upturn in domestic demand. This has brought about a marked increase in borrowing requirements in relation to the rest of the world. In the sixth place, the rapid increase in **private borrowing (particularly on behalf of households) and the drop in the savings rate** compromises the sustainability of investment and, therefore, of productivity, especially in light of the interest rate rises that are expected. Furthermore, these two factors together with the **constant increase in housing prices** create a risk for the financial situation of households and the sustainability of private spending and residential investment, which to a great extent are current the two main driving forces behind Spanish economic growth.

The above aspects will propose a problem for the sustainability of the current growth model. This situation is even worse if we take into account the structural deficit in the economy in **technological activity and R+D spending, human capital and in information and communication technologies.**

Silviano Esteve Pérez
Valencia, November 28 2005

4.- Germany

German Economic Growth Structure

Germany's Real GDP Growth Rate

Table 1: Real GDP Growth Rate

Year	Germany	France	Japan	USA	OECD
1991	5.1	1.0	3.4	-0.2	1.3
1995	1.8	1.8	1.9	2.5	2.5
1996	0.8	1.0	3.4	3.7	3.1
1997	1.5	1.9	1.9	4.5	3.6
1998	1.7	3.6	-1.1	4.2	2.7
1999	1.9	3.2	0.1	4.4	3.3
2000	3.1	4.2	2.8	3.7	3.9
2001	1.0	2.1	0.4	0.8	1.1
2002	0.1	1.1	-0.3	1.9	1.6
2003	-0.1	0.5	2.5	3.0	2.2
2004	1.2	2.1	4.0	4.4	3.6

Source: OECD

Analysts across the board believe that the pattern followed by German GDP since 1991 can be attributed to the economic reunification of East and West Germany that was carried out during that period. Despite lacking prior data to endorse the above affirmation, it is very striking that real GDP in Germany fell from 5.1% in 1991 to 1.8% in 1995, as a result of the recession in the early 90s, and that a similar figure has not been recorded since then. In fact, the average growth rate since 1995 according to our data stands at 1.3%, well below the figures that were the envy of Europe before the reunification. The gap between Germany's growth rate and that of the rest of countries in the sample is significant. One example of this is that in 2004, France's growth figure practically doubled that of Germany, the US and Japan registered figures four times higher and the OECD

average was three times the German score.

German Productivity

The reason for the slump in the GDP growth rate in Germany can be found mainly in the pattern of labour productivity, which suffered a significant decline in the 1990s, even though a timid recovery is observed in the last few years of the sample. Note that German labour productivity registered the highest scores at the beginning of the period under study, but this situation has since been inverted. In fact, the relative situation has deteriorated, due to both the decline in German productivity and also the improvement in productivity observed in the rest of the countries in the sample, particularly the United States.

Table 2: Labour Productivity Growth (per employee) in the Private Sector

Year	Germany	France	Japan	USA	OECD
1994	2.8	2.1	1.1	1.3	1.9
1995	1.6	1.1	1.7	0.3	0.9
1996	1.1	0.6	2.9	2.0	1.9
1997	1.6	1.5	0.9	2.3	2.0
1998	0.8	2.2	-0.8	2.1	1.4
1999	0.8	1.2	0.6	2.8	2.0
2000	1.0	1.5	3.2	2.3	2.5
2001	0.3	0.2	0.8	1.0	0.7
2002	0.7	0.4	0.9	3.7	2.1
2003	0.9	0.8	2.9	3.4	2.2
2004	1.0	2.8	4.0	3.7	3.0

Source: OECD

The seriousness of the productivity situation in Germany can be clearly appreciated in the following table where Germany displays the largest increase in the productivity gap of all the countries under study with respect

to the United States, in terms of both GDP per capita and also in terms of productivity per employee and per hour worked. The table also confirms that the gap shrinks for productivity per hour worked and not per employee. This ratifies the well-known fact that Europeans have a stronger recreational culture than the United States.

Table 3: Levels of Productivity

	GDP per capita		Labour Productivity			
			Per employee		Per hour	
	1995	2003	1995	2003	1995	2003
USA	100	100	100	100	100	100
Germany	77	70	81	73	97	90
France	75	74	93	88	108	107
Japan	81	74	72	69	71	69

Source: OECD and Skoczylas & Tissot (2005)

The table below, taken from Skoczylas and Tissot (2005) confirms the foregoing conclusions with information since the 1960s. It is striking that while Germany led world productivity in the 60s, the country has fallen behind the rest of countries in the sample since the 1990s. In addition to this, these figures illustrate how perhaps 50% of the decrease occurred in the 70s and 80s, following the end of the German economic miracle, which puts the repercussions of the reunification in this area into perspective.

Table 4: Productivity in the Private Sector

Year	Germany	France	Japan	USA	OECD
GDP per capita					
66-75	3.8	4.4	7.1	1.6	2.8
76-85	2.0	2.7	2.7	1.2	2.0
86-95	2.0	2.1	2.2	1.3	1.7
96-04	1.0	1.2	1.7	2.6	1.9
GDP per hour worked					
66-75	5.1	4.5	5.4	2.5	3.7
76-85	2.6	3.7	2.8	1.3	2.3
86-95	2.7	2.6	3.2	1.2	2.0
96-04	1.6	2.0	2.1	2.8	2.1
GDP per unit of capital					
66-75	-1.7	-0.8	-3.6	-1.0	-1.5
76-85	-0.6	-3.1	-2.2	0.2	-0.5
86-95	0.1	-1.8	-2.4	0.8	-0.2
96-04	-0.2	-0.5	-2.0	0.8	-0.2

Source: OECD and Skoczylas & Tissot (2005)

German Growth Sources

Economic growth is normally analysed by establishing the contributions made by the various productive factors. Although a thorough analysis of this nature is beyond our limitations, we will attempt to approach it by studying how the factors have progressed, through indirect information. In the first place, the employment rate in Germany suffered a marked decrease from 95.8% in 1991 to 90.4% in 2003. This decrease is unequalled by the countries in the sample and is probably due to the presence of two large pockets of unproductive employment in East Germany, which were absorbed by the unified Germany. This pattern is even more striking if we take into account that it occurs at the same time as the fall in productivity mentioned previously.

Table 5: Employment Rate

Year	Germany	France	Japan	USA	OECD
1991	95.8	91.0	97.9	93.2	
1992	93.6	90.1	97.8	92.5	
1993	92.3	88.9	97.5	93.1	
1994	91.8	88.3	97.1	93.9	92.3
1995	92.0	88.9	96.9	94.4	92.7
1996	91.3	88.4	96.6	94.6	92.8
1997	90.3	88.5	96.6	95.1	93.0
1998	90.9	88.9	95.9	95.5	93.1
1999	91.6	89.5	95.3	95.8	93.3
2000	92.3	90.9	95.3	96.0	93.7
2001	92.2	91.6	95.0	95.3	93.5
2002	91.3	91.1	94.6	94.2	93.0
2003	90.4	90.6	94.7	94.0	92.9

Source: OECD

As far as capital is concerned, the investment rate displays a similar pattern, although in this case data confirm that this trend began before the reunification. Once again, none of the countries in the sample have performed as badly, including Japan, which suffered a serious depression in the 1990s.

Table 6: Fixed Investment in Relation to GDP

Year	Germany	France	Japan	USA
1970	27.44	20.61	29.97	14.49
1975	22.98	20.30	28.05	13.83
1980	23.61	19.51	27.27	15.45
1985	20.66	17.84	25.40	16.32
1990	22.00	20.72	30.07	15.12
1995	21.57	18.49	26.85	16.45
2000	21.67	20.21	26.34	19.91
2003	18.84	19.42	24.58	18.62

Source: OECD

Our readers are already aware of Germany's high savings rate. According to our data, the figure was 11.1% in

2004, the highest of all the countries in the sample. Moreover, it is striking to see that both Germany and France display patterns that are completely contrary to that observed in the United States and Japan. On the other hand, the trend has been upward in recent years, following a slight drop in the 1990s. Nevertheless, Germany's high savings rate exceeds the borrowing requirements of German investment, as shown by the investment rates above, so these funds are channelled to financing foreign projects. Consequently, the high savings rate in Germany is more of a handicap for growth than a boost and therefore implies restraint in domestic demand which could sustain higher rates of economic growth.

Table 7: Savings Rate

Year	Germany	France	Japan	USA
1990	13.9	7.8	13.9	7.0
1995	11.2	11.2	11.9	4.6
1996	10.8	10.0	9.8	4.0
1997	10.4	11.3	10.0	3.6
1998	10.3	10.8	11.0	4.3
1999	9.8	10.4	10.7	2.4
2000	9.7	10.9	9.5	2.3
2001	10.2	11.5	6.6	1.8
2002	10.5	12.1	6.4	2.0
2003	10.7	11.1	6.3	1.4
2004	11.1	10.2	5.1	0.8

Source: OECD

In addition to this, the residual that is not explained by economic growth, which is normally attributed to technical progress, also fails to show a favourable pattern, although comparatively speaking, the situation is not so costly for the German economy. In this sense, OECD data reveals that TFP growth in Germany averaged

0.98% between 1990 and 2002, only slightly behind the United States and France and ahead of Japan. However, the pattern is worrying in that since 1995 this variable has fallen considerably, to the point that the above average covers up the recent negative figures.

Table 8: TFP Growth Rate

Year	Germany	France	Japan	USA
1990		0.7	3.8	0.7
1991		0.2	1.5	0.3
1992	1.6	0.9	0.0	2.3
1993	0.0	-0.2	1.0	0.1
1994	1.7	1.5	0.3	1.4
1995	1.5	1.4	1.3	-0.1
1996	1.0	0.0	1.5	1.7
1997	1.0	1.2	0.8	1.1
1998	0.6	2.1	-1.1	1.0
1999	0.7	1.1	0.6	1.3
2000	1.4	3.0	1.4	1.2
2001	0.4	0.9	0.4	0.7
2002	0.3	1.8	0.5	2.0
Average	0.98	1.11	0.7	1.01

Source: OECD

Fixed Investment

Some important variables within fixed investment display figures that are not as negative as those indicated above. Firstly, aggregate spending on R+D remains higher than the average for the OECD over the entire period under study and very near that registered by the United States towards the end of the period, even after the upturn in the latter due to new technologies.

Secondly, the share of telecommunications in German non-residential investment is higher than in France and Japan over the entire sample period and is only bettered by

the United States, following the latter's strong investment in this area during the 1990s.

Table 9: Aggregate Spending on R+D as a % of GDP

Year	Germany	France	Japan	USA	OECD
1981	2.43	1.93	2.11	2.34	1.95
1985	2.68	2.22	2.54	2.76	2.26
1991	2.53	2.37	2.75	2.72	2.23
1995	2.26	2.31	2.69	2.51	2.10
1996	2.26	2.30	2.77	2.55	2.13
1997	2.29	2.22	2.83	2.58	2.15
1998	2.31	2.17	2.94	2.60	2.17
1999	2.44	2.18	2.94	2.65	2.20
2000		2.18	2.98	2.72	2.25
2001	2.49	2.20	3.09	2.82	2.33
2002	2.50			2.82	

Source: OECD

Table 10: Share of ICTs in Non-Residential Investment

Year	Germany	France	Japan	USA
1990	13.9	7.8	8.0	24.6
1991	13.7	7.5	8.5	26.3
1992	13.2	7.6	8.6	27.7
1993	13.3	8.1	8.9	26.8
1994	13.2	8.6	9.0	26.3
1995	13.3	9.0	10.3	27.3
1996	14.2	9.8	12.5	27.9
1997	14.7	11.0	12.3	28.8
1998	15.3	11.9	12.6	28.9
1999	16.5	12.2	13.8	31.3
2000	17.4	12.8	14.4	33.4
2001	17.8	13.2	14.2	32.1
2002	16.5	13.7	13.1	32.6

Source: OECD

Investment in knowledge as a percentage of GDP is also favourable in Germany. Between 1992 and 2000, this

variable's share of GDP has risen by more than 25%, more than all the countries under study, even reducing the gap in favour of the United States at the beginning of the period. In 2000, only the latter registers a higher percentage than Germany, in contrast to the situation in 1992.

Table 11: Investment in Knowledge as a % of GDP

Year	Germany	France	Japan	USA
1992	3.8	3.8	4.0	5.7
1993	3.8	3.9	3.9	5.6
1994	3.7	3.9	4.0	5.5
1995	3.7	4.0	4.1	5.7
1996	3.8	4.0	4.2	5.9
1997	3.9	4.1	4.4	6.1
1998	4.2	4.2	4.5	6.1
1999	4.4	4.3	4.6	6.2
2000	4.8	4.6	4.7	6.8

Source: OECD

Finally, the share of high-tech exports in total exports of manufactured goods is minimal, although tending upwards. In any case, in Germany this could be more due to a very high denominator rather than a relatively low numerator.

Table 12: Share of High-tech Exports in Total Exports of Manufactured Goods

Year	Germany	France	Japan	USA	OECD
1990	13.9	16.3	30.4	33.8	
1991	15.0	18.3	30.6	34.0	
1992	14.8	18.3	30.1	33.8	20.5
1993	15.3	18.8	30.5	32.7	21.0
1994	15.4	18.8	31.2	32.9	21.2
1995	15.2	19.4	31.9	32.6	21.3
1996	15.3	20.2	31.1	33.8	21.7
1997	16.5	21.7	31.2	35.0	23.0
1998	17.3	23.2	30.7	36.8	24.0
1999	18.7	24.0	31.3	38.3	25.2
2000	20.2	25.6	33.0	38.4	26.9
2001	20.6	25.5	30.8	37.9	26.4
2002	19.3	24.1	29.1	36.4	25.4

Source: OECD

Education Expenditure and Level

On the education front, comparative data do not favour Germany: since 1995, when expenditure figures per level and student were in line with the rest of countries in the sample, Germany has lost ground in this area, as can be appreciated in the following table, particularly where education up to secondary schooling is concerned.

Table 13: Education Expenditure Per Level and Student

	1995		2003	
	Prim & Sec Education	Higher Education	Prim & Sec Education	Higher Education
Germany	5820	9698	6055	10504
France	5938	7801	6783	8837
Japan	5134	9691	6179	11164
USA	7034	20207	8144	22234

Source: OECD

This has resulted in the percentages of students with university studies barely increasing between 1991 and 2002,

whereas this variable has increased in the rest of countries in the sample. What makes it worse is that in the first year of the period under consideration, the value of this ratio for Germany was generally speaking lower than that observed in the rest of countries.

Table 14: Percentage of the Population Aged 25-34 with University Studies

Year	Germany	France	Japan	USA
1991	19.6	20.1		30.2
1992	18.8	21.6		30.2
1993		23.1		
1994	18.7	24.3		32.0
1995	20.8	25.4		33.6
1996	20.3	26.0		35.2
1997	21.0	27.8	45.2	35.7
1998	21.5	29.6	45.4	36.2
1999	21.5	30.9	45.1	37.4
2000	22.3	32.4	47.2	38.1
2001	21.8	34.2	47.7	39.1
2002	21.7	36.1	50.3	39.3

Source: OECD

Table 15: Percentage of the Population Aged 25-64 with University Studies

Year	Germany	France	Japan	USA
1991	20.5	15.2		30.1
1992	20.1	16.0		30.2
1993		17.1		
1994	20.4	17.8		32.2
1995	22.2	18.6		33.3
1996	21.8	19.2		33.9
1997	22.6	20.0	30.4	34.1
1998	23.0	20.6	30.4	34.9
1999	22.9	21.5	31.6	35.8
2000	23.5	22.0	33.4	36.5
2001	23.2	23.0	33.8	37.3
2002	23.4	24.0	36.3	38.1

Source: OECD

References:

Skoczylas, L. & B. Tissot (2005): "Revisiting Recent Productivity Developments across OECD Countries". BIS Working Papers, N° 182.

Antonio Cutanda
Valencia, November 17 2005

5.- France

French Economic Growth Structure

France's Real GDP Growth Rate

The French economy, like the Germany economy, is seen to be relatively weak in terms of growth, although in this case we cannot fall back on external circumstances to explain this, as would be the case with the reunification of Germany. Following minimal growth at the beginning of the 1990s, due to the recession during those years, the crisis in France lasted until 1997. Following this, the French economy registered growth rates as high as 4.2% in 2000 before immediately going back into recession, from which the economy is currently recovering. The average growth rate over the entire period in France was 1.95%, higher than the 1.64% rate recorded by Germany, but well short of the 3% growth rate observed in the United States.

According to analysts, the average growth rate is bordering the limit (of 2% approximately) that would enable job creation to reduce the unemployment rate.

Table 1: Real GDP Growth Rate

Year	Germany	France	Japan	USA	OECD
1991	5.1	1.0	3.4	-0.2	1.3
1995	1.8	1.8	1.9	2.5	2.5
1996	0.8	1.0	3.4	3.7	3.1
1997	1.5	1.9	1.9	4.5	3.6
1998	1.7	3.6	-1.1	4.2	2.7
1999	1.9	3.2	0.1	4.4	3.3
2000	3.1	4.2	2.8	3.7	3.9
2001	1.0	2.1	0.4	0.8	1.1
2002	0.1	1.1	-0.3	1.9	1.6
2003	-0.1	0.5	2.5	3.0	2.2
2004	1.2	2.1	4.0	4.4	3.6

Source: OECD

French Progress in Productivity

In keeping with the progress of the growth rate, labour productivity per

employee in France also displays what could be described as intermediate results, with 2.8% in 2004, which was lower than the scores registered by Japan and the US. Notwithstanding, France has just recovered from a productivity crisis at the beginning of this century.

Table 2: Labour Productivity (per employee) in the Private Sector

Year	Germany	France	Japan	USA	OECD
1994	2.8	2.1	1.1	1.3	1.9
1995	1.6	1.1	1.7	0.3	0.9
1996	1.1	0.6	2.9	2.0	1.9
1997	1.6	1.5	0.9	2.3	2.0
1998	0.8	2.2	-0.8	2.1	1.4
1999	0.8	1.2	0.6	2.8	2.0
2000	1.0	1.5	3.2	2.3	2.5
2001	0.3	0.2	0.8	1.0	0.7
2002	0.7	0.4	0.9	3.7	2.1
2003	0.9	0.8	2.9	3.4	2.2
2004	1.0	2.8	4.0	3.7	3.0

Source: OECD

French productivity has fallen, as is the case in Germany and Japan, when compared to the United States. This is due to the spectacular growth in that country since the 1990s, although the decrease in France is lower, as can be appreciated in the table below. Surprisingly, France is the only country that displays higher labour productivity per hour scores than the US and, moreover, has barely lost ground with respect to the United States over the period under consideration. Such a high figure explains why France decided to shorten the legal working week. At the same time, this demonstrated that applying this measure has no consequences in terms of productivity.

Table 3: Productivity

	GDP per capita		Labour Productivity			
			Per employee		Per hour	
	1995	2003	1995	2003	1995	2003
USA	100	100	100	100	100	100
Germany	77	70	81	73	97	90
France	75	74	93	88	108	107
Japan	81	74	72	69	71	69

Source: OECD and Skoczylas & Tissot (2005)

The following data taken from Skoczylas & Tissot (2005) confirm our foregoing conclusions. Productivity in France was been at the top end of the sample up to 1995, whatever estimation method is used, except when GDP is measured by unit of capital. From this year onwards productivity went into a crisis which is even observed in the data in the table in terms of GDP per hour worked.

Table 4: Productivity in the Private Sector

Year	Germany	France	Japan	USA	OECD
GDP per capita					
66-75	3.8	4.4	7.1	1.6	2.8
76-85	2.0	2.7	2.7	1.2	2.0
86-95	2.0	2.1	2.2	1.3	1.7
96-04	1.0	1.2	1.7	2.6	1.9
GDP per hour worked					
66-75	5.1	4.5	5.4	2.5	3.7
76-85	2.6	3.7	2.8	1.3	2.3
86-95	2.7	2.6	3.2	1.2	2.0
96-04	1.6	2.0	2.1	2.8	2.1
GDP per unit of capital					
66-75	-1.7	-0.8	-3.6	-1.0	-1.5
76-85	-0.6	-3.1	-2.2	0.2	-0.5
86-95	0.1	-1.8	-2.4	0.8	-0.2
96-04	-0.2	-0.5	-2.0	0.8	-0.2

Source: OECD and Skoczylas & Tissot (2005)

Growth Sources in France

As regards the sources of growth in France, and more specifically the contribution of labour, the table below shows how France traditionally has a

very low employment rate, which stood at only 91% in 1991. Furthermore, the employment rate dropped from that year up until 1996, after which time a recovery is observed until 2001 when the last economic crisis sparked another decrease to 90.6% in 2003. Employment debility in the 90s occurred at the same time as the decrease in productivity during those years, as was the case in Germany, which goes against the norm in this field.

Table 5: Employment Rate

Year	Germany	France	Japan	USA	OECD
1991	95.8	91.0	97.9	93.2	
1992	93.6	90.1	97.8	92.5	
1993	92.3	88.9	97.5	93.1	
1994	91.8	88.3	97.1	93.9	92.3
1995	92.0	88.9	96.9	94.4	92.7
1996	91.3	88.4	96.6	94.6	92.8
1997	90.3	88.5	96.6	95.1	93.0
1998	90.9	88.9	95.9	95.5	93.1
1999	91.6	89.5	95.3	95.8	93.3
2000	92.3	90.9	95.3	96.0	93.7
2001	92.2	91.6	95.0	95.3	93.5
2002	91.3	91.1	94.6	94.2	93.0
2003	90.4	90.6	94.7	94.0	92.9

Source: OECD

Capital has probably not contributed much either, especially considering the low investment rate in relation to GDP that France traditionally registers. This weakness allowed the United States, which also has a traditionally low investment rate, to practically draw level with France in 2003.

Table 6: Fixed Investment Rate in relation to GDP

Year	Germany	France	Japan	USA
1970	27.44	20.61	29.97	14.49
1975	22.98	20.30	28.05	13.83
1980	23.61	19.51	27.27	15.45
1985	20.66	17.84	25.40	16.32
1990	22.00	20.72	30.07	15.12
1995	21.57	18.49	26.85	16.45
2000	21.67	20.21	26.34	19.91
2003	18.84	19.42	24.58	18.62

Source: OECD

As is the case in Germany, the high savings rate in France is striking, especially considering the minimal rate of investment. Furthermore, the trend has been clearly upward since halfway through the 1990s. As was the case then, the saving surplus in the domestic market must have been channelled to funding investment projects abroad.

Table 7: Saving Rate

Year	Germany	France	Japan	USA
1990	13.9	7.8	13.9	7.0
1995	11.2	11.2	11.9	4.6
1996	10.8	10.0	9.8	4.0
1997	10.4	11.3	10.0	3.6
1998	10.3	10.8	11.0	4.3
1999	9.8	10.4	10.7	2.4
2000	9.7	10.9	9.5	2.3
2001	10.2	11.5	6.6	1.8
2002	10.5	12.1	6.4	2.0
2003	10.7	11.1	6.3	1.4
2004	11.1	10.2	5.1	0.8

Source: OECD

As far as technical progress is concerned, France displays the best results of the sample under study, registering even higher scores than the United States. In addition to this, we must take into account that France gains this advantage towards the end of the period under consideration and not at the beginning.

Table 8: Total Factor Productivity Growth Rate

Year	Germany	France	Japan	USA
1990		0.7	3.8	0.7
1991		0.2	1.5	0.3
1992	1.6	0.9	0.0	2.3
1993	0.0	-0.2	1.0	0.1
1994	1.7	1.5	0.3	1.4
1995	1.5	1.4	1.3	-0.1
1996	1.0	0.0	1.5	1.7
1997	1.0	1.2	0.8	1.1
1998	0.6	2.1	-1.1	1.0
1999	0.7	1.1	0.6	1.3
2000	1.4	3.0	1.4	1.2
2001	0.4	0.9	0.4	0.7
2002	0.3	1.8	0.5	2.0
Average	0.98	1.11	0.7	1.01

Source: OECD

Investment in Research and Development

France is in line with the average for OECD countries when it comes to investing in R+D (see Table 9). From our point of view, this is not satisfactory considering how developed the French economy is. Hence, this is one area the country can focus on in order to boost the growth rate.

Investment in telecommunications is not acceptable either, for the same reason as R+D investment. It is true that this item registered an increase in the 90s, but the level reached at the end of the decade remains well short of scores recorded by other countries such as Germany (see Table 10).

Table 9: Aggregate Spending on R+D

Year	Germany	France	Japan	USA	OECD
1981	2.43	1.93	2.11	2.34	1.95
1985	2.68	2.22	2.54	2.76	2.26
1991	2.53	2.37	2.75	2.72	2.23
1995	2.26	2.31	2.69	2.51	2.10
1996	2.26	2.30	2.77	2.55	2.13
1997	2.29	2.22	2.83	2.58	2.15
1998	2.31	2.17	2.94	2.60	2.17
1999	2.44	2.18	2.94	2.65	2.20
2000		2.18	2.98	2.72	2.25
2001	2.49	2.20	3.09	2.82	2.33
2002	2.50			2.82	

Source: OECD

Table 10: ICT Share of Non-residential Investment

Year	Germany	France	Japan	USA
1990	13.9	7.8	8.0	24.6
1991	13.7	7.5	8.5	26.3
1992	13.2	7.6	8.6	27.7
1993	13.3	8.1	8.9	26.8
1994	13.2	8.6	9.0	26.3
1995	13.3	9.0	10.3	27.3
1996	14.2	9.8	12.5	27.9
1997	14.7	11.0	12.3	28.8
1998	15.3	11.9	12.6	28.9
1999	16.5	12.2	13.8	31.3
2000	17.4	12.8	14.4	33.4
2001	17.8	13.2	14.2	32.1
2002	16.5	13.7	13.1	32.6

Source: OECD

Notwithstanding, the percentage of GDP that represents investment in knowledge (the sum of expenditure on R+D, both public and private higher education and software), is similar to that recorded by the rest of countries in the sample, although it seems to be tending downward somewhat in relative terms, which is worrying.

Table 11: Investment in Knowledge as a % of GDP

Year	Germany	France	Japan	USA
1992	3.8	3.8	4.0	5.7
1993	3.8	3.9	3.9	5.6
1994	3.7	3.9	4.0	5.5
1995	3.7	4.0	4.1	5.7
1996	3.8	4.0	4.2	5.9
1997	3.9	4.1	4.4	6.1
1998	4.2	4.2	4.5	6.1
1999	4.4	4.3	4.6	6.2
2000	4.8	4.6	4.7	6.8

Source: OECD

Table 12: High-Tech Export Share of Total Exports of Manufactured Goods

Year	Germany	France	Japan	USA	OECD
1990	13.9	16.3	30.4	33.8	
1991	15.0	18.3	30.6	34.0	
1992	14.8	18.3	30.1	33.8	20.5
1993	15.3	18.8	30.5	32.7	21.0
1994	15.4	18.8	31.2	32.9	21.2
1995	15.2	19.4	31.9	32.6	21.3
1996	15.3	20.2	31.1	33.8	21.7
1997	16.5	21.7	31.2	35.0	23.0
1998	17.3	23.2	30.7	36.8	24.0
1999	18.7	24.0	31.3	38.3	25.2
2000	20.2	25.6	33.0	38.4	26.9
2001	20.6	25.5	30.8	37.9	26.4
2002	19.3	24.1	29.1	36.4	25.4

Source: OECD

The share of high-tech exports in relation to total exports in France is slightly below average for the OECD. While in Germany, the fact that total exports are high could explain this, in France this is not the case. The small size of the export sector indicates that the high-tech sector particularly and new technologies in general are matters that remain to be solved by the French economy and which should dedicated much more attention than is currently the case.

Spending on Education and the Level of Education

As far as education expenditure is concerned, France only scores less per

student than the United States up to secondary education, but is the country that spends the least on higher education of all those included in the sample. France should certainly increase the amount spent on this level of education.

Table 13: Education Expenditure by Level and per Student

Level	1995		2003	
	Secondary	Higher	Secondary	Higher
Germany	5820	9698	6055	10504
France	5938	7801	6783	8837
Japan	5134	9691	6179	11164
USA	7034	20207	8144	22234

Source: OECD

In relation to the fraction of the population with university qualifications, figures are acceptable for the age group ranking from 25-34 years. Moreover, France has gained some ground with respect to the United States. Nevertheless, the percentage drops noticeably when the age bracket ranges from 25-64, which reflects the lack of effort made in this area in the past.

Table 14: Fraction of the Population Aged 25-34 with University Qualifications

Year	Germany	France	Japan	USA
1991	19.6	20.1		30.2
1992	18.8	21.6		30.2
1993		23.1		
1994	18.7	24.3		32.0
1995	20.8	25.4		33.6
1996	20.3	26.0		35.2
1997	21.0	27.8	45.2	35.7
1998	21.5	29.6	45.4	36.2
1999	21.5	30.9	45.1	37.4
2000	22.3	32.4	47.2	38.1
2001	21.8	34.2	47.7	39.1
2002	21.7	36.1	50.3	39.3

Source: OECD

Table 15: Fraction of the Population Aged 25-64 with University Qualifications

Year	Germany	France	Japan	USA
1991	20.5	15.2		30.1
1992	20.1	16.0		30.2
1993		17.1		
1994	20.4	17.8		32.2
1995	22.2	18.6		33.3
1996	21.8	19.2		33.9
1997	22.6	20.0	30.4	34.1
1998	23.0	20.6	30.4	34.9
1999	22.9	21.5	31.6	35.8
2000	23.5	22.0	33.4	36.5
2001	23.2	23.0	33.8	37.3
2002	23.4	24.0	36.3	38.1

Source: OECD

References:

Skoczylas, L. and B. Tissot (2005): "Revisiting Recent Productivity Developments across OECD Countries". BIS Working Papers, N° 182.

Antonio Cutanda
Valencia, November 17 2005

6.- Italy

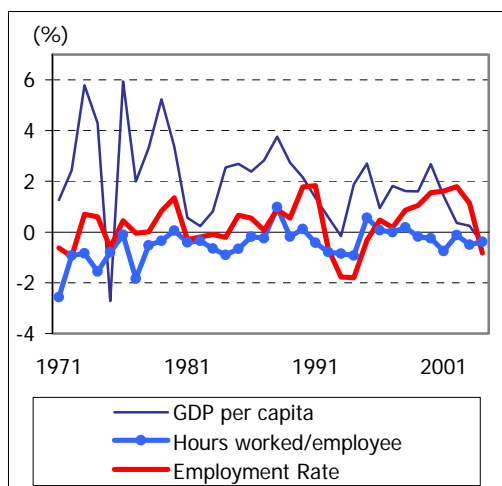
Growth and Productivity

The monographic article which follows aims to study the structure of economic growth in Italy. Growth may be due to either an increase in employment, where a higher employment rate would produce increases in output and higher levels of GDP or an increase in labour productivity, where technological progress and the education and training of employees would be at the heart of Italy's growth.

Economic Growth Factors

Figure 1 shows two variables that could explain GDP growth per capita: the average number of hours worked per employee and the employment rate. As usual, albeit with some variations, these series are pro-cyclical with respect to GDP per capita. Both variables fluctuate around zero and are not volatile.

Figure 1: Average Hours Worked by Employee and Employment Rate, 1971-2004

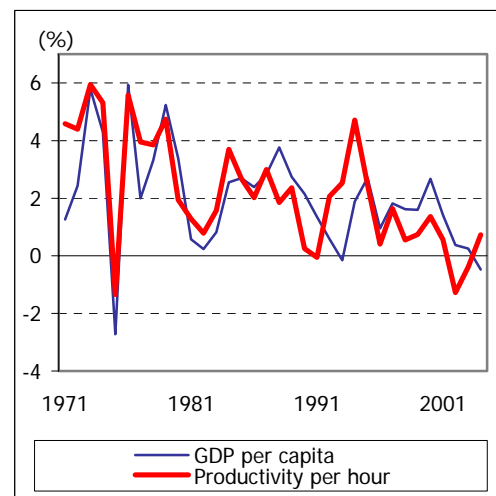


Source: OECD and own elaboration

Due to the fact that we are talking about growth rates, if we take the two explanatory variables as a whole, they display a very similar score to growth in

GDP per capita. This means that these two variables are to a great extent unable to explain the changes in GDP per capita growth, in light of its volatility. Consequently, only one variable remains: productivity per hour worked (Figure 2).

Figure 2: Productivity per Hour 1971-2004



Source: OECD and own elaboration

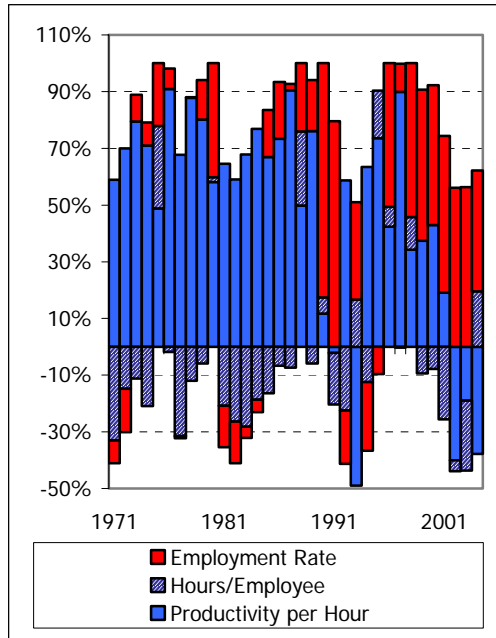
Apart from the odd isolated period, productivity per hour displays an almost identical pattern to GDP per capita in Italy. Therefore, variations therein over time mainly depend on the performance of productivity.

Contribution of Factors

Figure 3 illustrates the contribution¹⁷ of each of the growth factors in GDP per capita, which sheds some light on their importance over a sufficiently long period of time.

¹⁷ The growth rate of each factor in relation to GDP per capita has been chosen to estimate each contribution.

Figure 3: Contribution of GDP per Capita Factors to Growth, 1971-2004



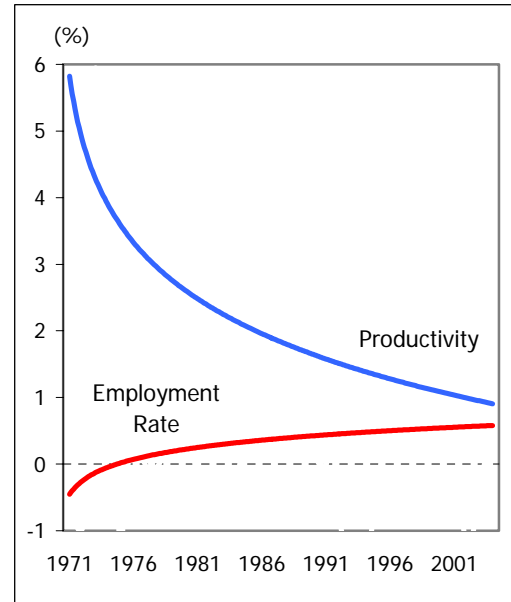
Source: OECD and own elaboration

In the graph we can appreciate how productivity is the factor that most contributes to growth in GDP per capita. However, there are some periods in which the employment rate appears to figure more prominently (1990-1991 and 1998-2004). Is this the consequence of a drop in productivity or does job creation result in productivity contributing a smaller percentage to growth?

Thirty Years Earlier: the Constant Degradation of Productivity

Between 1971 and 2004, productivity displays a trend that could be described as extremely worrying with respect to the future (Figure 4).

Figure 4: Productivity and Employment Rate Growth Trends¹⁸, 1971-2004



Source: OECD and own elaboration

Productivity growth outpaces the employment rate, but the gap is becoming increasingly narrower between the two series. On the one hand, the increase in productivity is slowing down and on the other hand, the employment rate is accelerating. At the beginning of the period, the difference between one and another was huge. At the end of the period, the two variables are practically converging.

The fact is that (without taking into account the recent mass legalisation of immigrants) in forthcoming years the stagnation in population growth and the continuous loss of competitiveness on behalf of Italian companies could result in practically zero growth in the explanatory variables. In order to improve competitiveness, more must be spent on private investment and on education, measures which would boost productivity. This is even more the

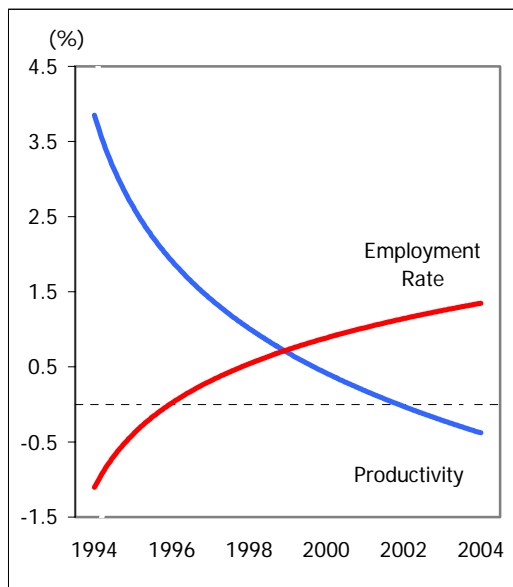
¹⁸ Trend lines created from logarithmic regressions

case, in view of the current debility of investment, which is a consequence of insufficient domestic demand and a spin-off of the overinvestment in the past¹⁹.

Recent Years: Legalising Immigrant Workers

Let us now observe the progress in productivity and the employment rate in more recent times: 1994-2004 (Figure 5).

Figure 5: Productivity and Employment Rate Growth Trends⁸, 1994-2004



Source: OECD and own elaboration

Productivity has clearly grown less and less over the period 1994-2004. In fact, in the last two years, the slowdown in growth has become a decrease.

Meanwhile, exactly the opposite occurs with the employment rate. Between 2001 and 2003, almost 766,000 jobs were created, but GDP only grew by an annual 0.4% on average. This was due, among other things, to the fact that almost 48% of the new jobs were

illegal until the workers were legalised. Figure 1 shows that in the years up to the end of the legalisation process which began in 2001, the employment rate registered its highest scores of the entire period (except for 1991 and 1992).

In addition to this, the government implanted a measure in 2000 that consisted in a €400 subvention for companies that hired workers under the age of 25. This measure was a considerable incentive for job creation, although the quality of this employment is another story.

All of this means that the apparently favourable performance of the labour market in recent years is to a great extent due to two factors: the emergence of numerous immigrants who were already working and the creation of many more flexible labour contracts²⁰, which implied questionable labour quality and a decrease in productivity.

The employment rate was consolidated between 1994 and 2004 as the most important growth factor in the Italian economy. This is the result on the one hand of a strong increase in legal workers and on the other hand, sliding productivity, offset by a higher employment rate.

Training and Employment

The labour market in Italy is known for registering lower unemployment among people with up to secondary education in relation to those with higher education. This means there is a shortage of qualified jobs for the number of jobseekers. This idea is directly related to the lack of private

¹⁹ In 2002, the Tremonti-bis Law came into force, which implanted tax benefits for companies that sparked overinvestment.

²⁰ The Treu Package (1997), subventions for contracts with workers aged under 25 (2000) and the Biagi reform (2003) created numerous precarious jobs.

investment and development in Italian companies, which is clearly reflected by the lack of new licences and patents in science and technology, a probable origin of low productivity.

Furthermore, in light of the difficulty when it comes to finding a job that is in accordance with one's academic qualifications, it is striking that spending on university education has remained stable as a percentage of GDP. Even more so in view of the growing number of university students in recent years.

Spending on Innovation and Communication Technologies

Despite the alarming situation in terms of productivity, the graph on page one of this report shows how much is spent on Information and Communication Technologies is. ICT spending practically mirrors the pattern followed by productivity, but is always below it. It is obvious that Italy needs to spend more on ICTs in order to boost growth in labour productivity, either by means of increasing R+D or by importing technology.

Final Considerations

In view of the complex demographic situation which is getting worse, the only thing Italy can do is to considerable increase productivity, with aim of controlling the problems of loss of labour efficiency and weak business competitiveness when faced with international competition. Legalising immigrants, subventions for companies contracting young people, greater labour flexibility and raising the legal age of retirement might be socio-economically appropriate or necessary; but the real problem in Italy, population aside, is the lack of business competitiveness.

In this scenario, more support of R+D investment (particularly in ICTs) and of the creation of qualified jobs. Obviously, Italy should implant sweeping economic reforms, far from the typical convenience of some politicians.

With April's elections just around the corner, it is not exactly the best moment to make decisions which, in the long term, imply an increase in companies' competitiveness or boost growth in investment...in short, rescue the Italian economy from stagnancy.

Andreu Iranzo
November 18 2005

7.- United Kingdom

Monographic Article on Productivity

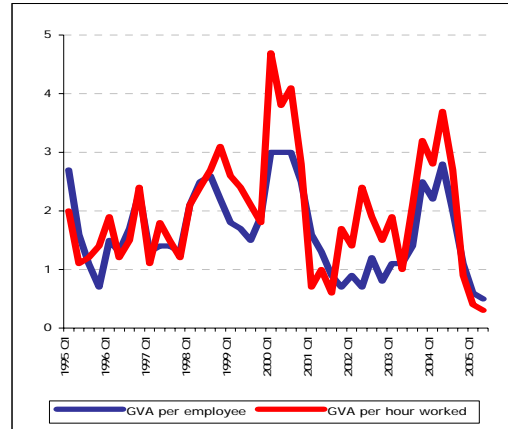
When it comes to analysing the productivity of an economy it is important to separate the various statistical sources used. It is common practice to begin an analysis of productivity with national data to later use statistics from international organisms in order to carry out a cross-country comparison. In the case of the United Kingdom, we will begin with the productivity measures compiled by the Office of National Statistics and later we will use the OECD data base on productivity (made available to the public in October) to carry out international comparisons²¹.

National Data: Current Scenario

The British Office of National Statistics compiles three measures of productivity on a quarterly basis: output per worker, output per hour worked and output per job. Output is measured by GVA at basic prices. Output per job is used to measure cross-sector productivity, particularly in industrial sectors.

The slowdown in output growth in 2005 explains the weak growth in productivity (GVA per employee) over the first six months of the year. Productivity only grew by 0.5% in the second quarter of the year with respect to the same quarter the previous year, down by 0.1 percentage points on the figure observed in the first quarter of 2005. This is the lowest annual growth rate in productivity since 1991.

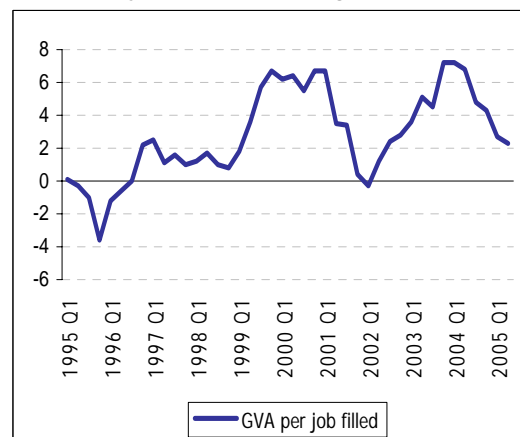
Figure 1: Labour Productivity Growth Rate



Source: National Statistics

The annual growth rate in output per hour worked, the other measurement of productivity, displays a similar pattern to that of output per employee. The annual growth rate in the second quarter of 2005 was 0.3% in comparison to the same quarter the previous year, one decimal point less than the rate observed in the first quarter of 2005.

Figure 2: Annual Growth Rate in Labour Productivity in Manufacturing



Source: National Statistics

The third way of measuring productivity – output per job filled – in the manufacturing sector, grew by 2.3% in the second quarter of 2005 in comparison to the same quarter in 2004, four decimal points less than the

²¹ The OECD productivity base may be consulted at: www.oecd.org/productivity

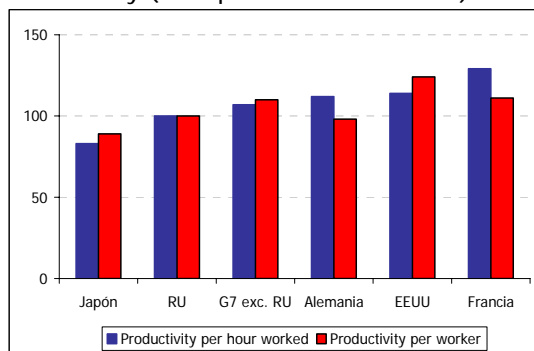
growth rate observed in the first quarter.

International Comparison

The ONS has uses OECD data to carry out international comparisons of productivity. The main difference between government measurements and those used in international comparisons is output. While the ONS uses GVA, the OECD uses GDP. In recent years, improvements in statistical series on an international scale have enabled greater agreement between national productivity measurements and those employed in international comparisons.

In 1991 the United Kingdom was the country with the lowest GDP per worker in the G7. In fact, it was 23% below the average. Over the period dating from 1991-2004, growth in GDP per employee in the UK has outpaced the G7 average, permitting a gradual reduction in the productivity gap with respect to other wealthy nations. In 2004, GDP per employee in the UK was 9% below the average for the G7 and had already surpassed Japan by 11% and Germany by 3%. As regards France and the United States, GDP per employee in the UK was 11% and 24% lower respectively in 2004.

Figure 3: International Comparison of Productivity (GDP per worker: UK=100)



Source: National Statistics, OECD

The alternative way of measuring productivity, GDP per hour worked, confirms the relatively low productivity in the United Kingdom. Only Japan recorded a lower ratio of GDP per hour worked than the UK between 1991 and 2004, while Germany the US and France all recorded higher scores. In 2004, France remained the top-ranked country of the G7, 24% ahead of the UK in terms of GDP per hour worked. Once again, it is important to underline the fact that the UK has converged with respect to the G7 average, which was 18% higher in 1991, but was only 6% higher in 2004.

Table 1 illustrates the trend in GDP per capita and its components. The largest contribution to growth in the British economy between 1970 and 2004 was made by labour productivity (GDP per hour worked). In the periods dating from 1970-85 and 1990-95 productivity growth outpaced that of GDP per capita due to a decrease in the employment rate, similar to that observed in other European countries such as France or Spain. Between 2000 and 2004, the labour market has been highly favourable, reflected by the significant growth in the working age employment rate. However, the main contribution to growth in GDP per capita once again came from productivity, which outstripped other European economies such as France, but was lower than in the United States.

Apart from the measurement of labour productivity, other alternative measures can be included, such as output per unit of capital or Total Factor Productivity (TFP). Capital input productivity depends on two components, TFP and the amount of work per unit of capital. The less hours of work available per unit of capital, the lower capital productivity is. Since

halfway through the 1980s, the cost of capital utilisation has decreased more quickly than labour costs, which has in turn decreased the ratio of output per unit of capital and thus capital productivity in most countries, including the UK. Growth in TFP (as a gauge of technical progress) has gradually slowed down in most OECD countries over the past three decades, with the exception of the US, and the UK has not escaped this situation. The average annual growth rate of TFP has dropped from between 1.7%-2.1% over the period from 1976 to 1985 to between 0.7% and 0.8% over the period dating from 2000 to 2004.

Table 1: Growth in GDP per Capita, Hours Worked, Employment Rate and Productivity (average annual % change)

GDP per capita				
1970-85	1.84	2.16	2.09	2.91
1985-90	3.01	2.29	2.62	4.40
1990-95	1.34	1.18	0.57	1.30
1995-00	2.80	2.91	2.25	3.75
2000-04	2.03	1.58	1.16	2.59
Hours of work				
1970-85	-0.84	-0.48	-1.29	-0.94
1985-90	-0.40	-0.14	-0.13	-0.34
1990-95	-0.36	0.20	-0.25	-0.11
1995-00	-0.18	0.21	-0.60	-0.01
2000-04	-0.47	-0.80	-0.93	-0.22
Employment Rate				
1970-85	-0.09	1.06	-0.29	-1.72
1985-90	1.50	1.11	0.32	2.94
1990-95	-1.10	-0.15	-0.60	-0.84
1995-00	0.90	0.56	1.11	4.03
2000-04	0.55	-0.50	0.17	2.56
GDP per hour worked				
1970-85	2.80	1.58	3.72	5.71
1985-90	1.90	1.30	2.42	1.76
1990-95	2.84	1.13	1.42	2.27
1995-00	2.07	2.12	1.73	-0.27
2000-04	1.95	2.92	1.92	0.25

Source: own elaboration with data from Groningen Growth & Development Database

Table 2: Alternative Measurements of Productivity in the Private Productive Sector (average annual growth rate)

Output per worker			
1966-75	3.3	1.6	3.4
1976-85	2.4	1.2	2.5
1986-95	1.6	1.3	2.0
1996-04	1.6	2.6	0.9
Output per hour worked			
1966-75	3.3	2.5	4.5
1976-85	3.1	1.3	3.3
1986-95	1.7	1.2	2.6
1996-04	1.8	2.8	1.4
Output per unit of capital			
1966-75	-0.4	-1.0	-2.1
1976-85	0.5	0.2	-1.2
1986-95	0.0	0.8	-0.7
1996-04	-1.0	0.8	-0.6
Total Factor Productivity			
1966-75	2.0	0.7	1.1
1976-85	1.7	0.9	1.0
1986-95	1.0	1.1	0.9
1996-04	0.7	1.9	0.3
Total Factor Productivity (hours worked)			
1966-75	1.9	1.2	1.7
1976-85	2.1	0.9	1.4
1986-95	1.1	1.0	1.2

Source: OECD

Improving the productivity of businesses, productive sectors and the economy in general contributes to economic growth. Since the beginning of the 1990s, information and communication technologies (ICTs) have grown and spread, figuring prominently when it comes to understanding why labour productivity in the US has accelerated and why it has slumped markedly in EU countries. In order to understand the impact of ICTs on productivity, we must take into account that this can happen in two different ways. Firstly, ICT production sectors have a direct effect on the level and growth of output and productivity. Secondly, the use of ICTs on behalf of businesses also helps to improve their

efficiency, which results in higher levels and growth in productivity.

Rapid growth in both production and investment in ICT sectors figured prominently in productivity growth in the UK in the 1990s. The ICT contribution to GVA in 2003 amounted to £70 billion out of a total of £920 billion (7.6%). The contribution of the telecommunications sector (within ICTs) to GVA rose from £15 billion in 1992 to £24 billion in 2003. GVA in the ICT sector grew by 112% between 1992 and 2003, in comparison to overall economic growth over the same period, which stood at 64%.

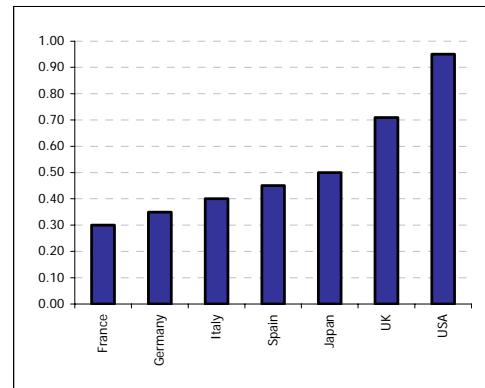
Investment in ICTs over the last decade has contributed 0.76 percentage points per annum (pppa) to growth in productivity. A cross-sector breakdown reveals that many industries have benefited from investment in ICTs. The sector that has profited the most from ICTs was transport and telecommunications (2.53pppa). Manufacturing contributed on average 0.54pppa to labour productivity, banking and insurance 1.2pppa and wholesale and retail sales 0.52pppa. These four sectors account for more than 60% of GDP.

Table 3: ICT Share of Total Employment

	1995	2003
"Strong" definition		
United Kingdom	2.92	3.30
USA	3.29	3.82
EU-15	2.61	3.06
"Weak" definition		
United Kingdom	27.77	27.70
USA	21.22	20.29
EU-15 (4)	19.79	22.38

Source: OECD

Figure 4: Annual % Contribution of Investment in ICT Capital to GDP Growth (1995-2002)



Source: OECD

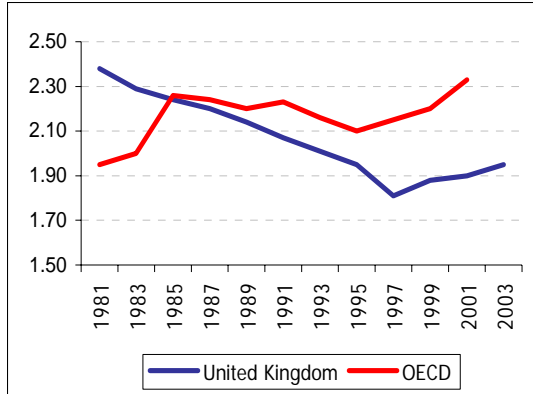
Table 4: ICT Contribution to Growth in Labour Productivity by Sector in percentage points per year (1992-2001)

Transport and telecommunications	2.53
Financial intermediation	1.20
Electricity, gas and water supply	0.92
Total	0.76
Manufacturing	0.54
Wholesale and retail sales	0.52
Other services	0.49
Public sector	0.42
Agriculture, stockbreeding and fisheries	0.15
Education, health and social services	0.11
Construction	0.06
Mining and quarrying	-0.04

Source: OECD

Expenditure on R+D as a percentage of GDP in the UK is mediocre. In this aspect, the UK was ranked sixth in the G7 in 2003. The Blair government aims to increase R+D spending from 1.9% of GDP in 2005 to 2.5% of GDP in 2014. One of the main deficiencies is the lack of R+D spending on behalf of private businesses, when this type of investment has demonstrated to be the most effective way of increasing productivity. Government spending on R+D is also low, while university spending is in line with the rest of G7 countries.

Figure 5: Expenditure on R+D as a Percentage of GDP



Source: OECD

The number of people employed in R+D-related jobs is also relatively low in the United Kingdom and employers frequently complain about the difficulties they encounter when seeking qualified candidates for their laboratories. This problem appears to have spread to other types of jobs, due to the serious mismatch between the type of qualifications demanded and those currently available in the country.

The number of patents registered per million inhabitants, as an indicator of R+D results, also falls short of the average for the OECD.

On the positive side, the currently favourable economic climate (macroeconomic stability) together with the reputation of scientific institutions in the United Kingdom has improved R+D results since the end of the 1990s.

Francisco Requena Silvente
Valencia, November 17 2005

8.- Japan

Growth and Productivity

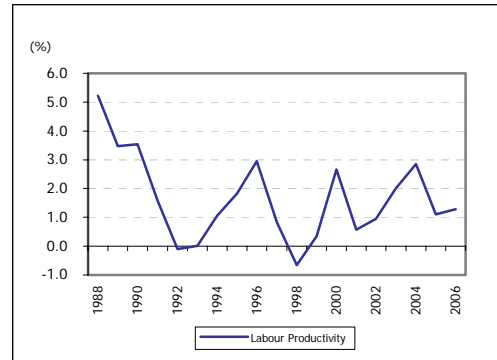
The White Book published on an annual basis by the Japanese Government is one of most reliable sources of information on the current state of the country's economy. In the 2005 edition published in July, particular emphasis was placed on productivity problems stemming from a decrease in the population caused by ageing. Labour productivity is a key factor when it comes to discerning how well a country works economically speaking.

In reference to the current economic scenario, the book detects the end of the sluggishness that began in the 90s, due to two aspects that are boosting the economic recovery:

- The elimination of the "three excesses" in the business sector referring to: the labour force, productive capacity and borrowing.
- The decrease in the number of bad loans.

As Hiroko Ohta²² put it, on eliminating these excesses, more human resources, capital and productive services are available and can be used more efficiently and profitably. These resources are passed on to more profitable sectors with the aim of constructing the foundations of sustainable growth. Figure 1 shows the growth in labour productivity in the business sector. The OECD forecasts a slight improvement next year with respect to this year.

Figure 1: Labour Productivity in the Business Sector



Source: OECD

Japan's population is forecast to begin decreasing from 2007 onwards, when the country will reach a record 127.7 million inhabitants. Furthermore, due to the retirement of the best part of the post-war baby boom, the labour force will witness a considerable decrease. This group accounts for approximately 5.3% of the population and their wages for 16% of the country total. As a result, businesses that were having trouble to compete with other Asian countries such as China, will be able to reduce significant labour costs.

In Figure 2 we can see how the weight of labour costs over total costs in recent years has remained practically unchanged, although it is expected to decrease soon, as indicated above.

Figure 2: Labour Costs over Total Costs

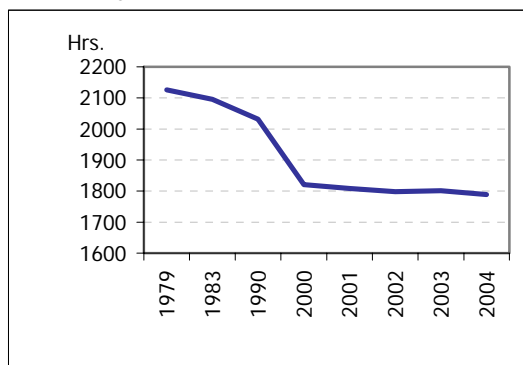


Source: OECD Productivity database, 21 September 2005

²² Chief of Cabinet Coordination in charge of compiling the White Book

Likewise, the average number hours worked per annum displays a trend without significant changes (Figure 3). In certain countries, the degree of productivity is inversely proportional to the number of hours worked. However, if we compare Figures 1 and 3, this relationship does not seem to be the case in Japan.

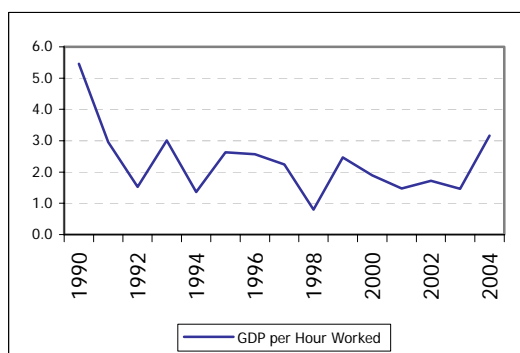
Figure 3: Annual Average of Hours Worked per Employee



Source: OECD Employment Outlook, 2005

However, and despite all these figures reflecting certain sluggishness in terms of productivity, Figure 4 offers a hint of a recovery. GDP per hour worked seems to be recovering and setting a favourable trend.

Figure 4: Annual GDP Growth per Hour Worked



Source: OECD Productivity Database

The labour force, which currently stands at 66 million, will shrink by some 10 million people in only 15 years. Parallel to this, in productivity in Japan has been decreasing in recent

years²³. According to Ohta, this pattern (contrary to that observed in the US) is mainly due to two factors: lagging technological innovation and a lack of efficiency in distributing resources.

In order to buck this trend, the White Book recommends a series of changes in labour practices, education reform, technology development and deregulation. The book also considers the reform of the government itself as indispensable in order to improve efficiency. The latter will undoubtedly involve privatising some social services and transferring competences from the central government to local governments.

M^a Luisa Martí Selva
Rosa Puertas Medina
Valencia, November 18 2005.

²³ Productivity in Japan in 2004 was 30% lower than in the USA

9.- China

Productivity and Growth

The Chinese economy has undergone gradual reform since 1978, with commodity, financial, technological and labour services markets emerging one after another. China has moved on from a system in which the economy was planned and concentrated to a preliminary socialist market economy. The most significant change is that the role of market regulation of the economy has been reinforced.

The development strategy and the profound transformation the country has undergone must be studied in three separate stages²⁴. The agricultural reform from 1979-1985 enabled productive resources in agriculture to be channelled to urban areas with more growth prospects. This period was immediately replaced by a phase of significant development in rural industry and companies located in coastal cities between the beginning of the 1980s and halfway through the 1990s. This second stage primarily favoured the opening up of the economy to foreign trade and capital. Finally, the objective throughout the current stage has concentrated on creating an optimal institutional framework in order to approach a market economy, which requires significant restructuring within the public sector and development in the private sector.

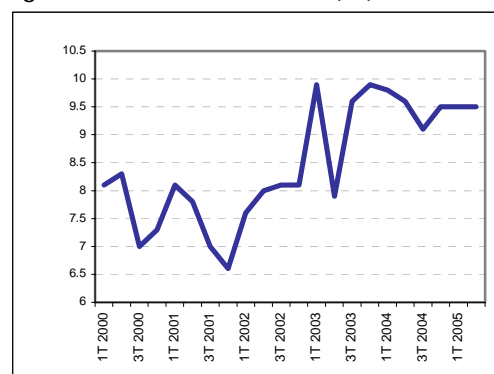
The rapid growth of the economy (which can be observed in Figure 1 in the GDP growth pattern) has been

based to a great extent on the ebbs and flows of foreign trade, foreign investment and growth in industrial output. Moreover, the least influential factors included active financial policy, prudent monetary policy and growth in domestic demand. The figures speak for themselves:

- The Chinese economy has managed to grow four-fold in only 15 years and in 2004 represented approximately 13.2% of world GDP (measured in keeping with purchasing power parity criterion).
- Foreign trade increased from 20.6 billion dollars to 1.15 trillion dollars between 1978 and 2004.
- Foreign direct investment rose from an annual average of 1.8 billion dollars in the period from 1979-1983 to 60.63 billion dollars in 2004.
- Currency reserves, which amounted to 167 million dollars in 1978, multiplied to 609.9 million dollars in 2004.

Consequently, one can say that China is enjoying long lasting growth.

Figure 1: GDP Growth Rate (%)



Source: National Bureau of Statistics

At present, companies not run by the State account for 75% of industrial output, more than half of GDP and nearly 60% of employment outside the

²⁴ Stern, N. (2001): "Twenty Years of Reform: Achievements, Challenges and the New Agenda", Conference in la Quinghua University (Peking, China), June.

agricultural sector. This was unthinkable when the reform began. The main deficiencies of this scenario are, notwithstanding, of a structural nature, which affect growth stability.

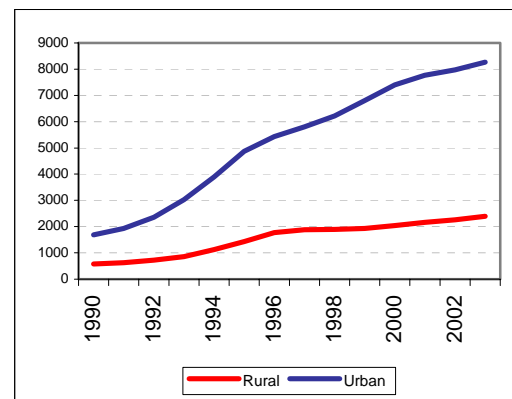
At the same time, the process of deregulation and growth has favoured the entry in China of capitals from world super powers, becoming the second largest receiver of foreign investment in the world, behind the United States. The factors that have brought about this new scenario lie in the rapid economic growth, low labour costs, banking reform and the fact that the economy has progressively opened up to new geographical regions and markets.

It is important to take into account that growth in China has not been evenly distributed, thus aggravating the historical East/West and countryside/city divide²⁵. From a geographical point of view, the creation of Special Economic Zones concentrated on the coast together with the coastal allocation of the main urban areas (Peking, Shanghai and Tianjin) has further deteriorated the imbalance. The extraordinary growth recorded in the Special Economic Zones has resulted in the best part of the improvements that have been made through the reform being concentrated in these regions. Meanwhile, remote and backward inland regions have not participated in the same manner. At the same time, this inequality has given rise to a disorderly floating rural exodus towards the large cities where people hope to find a better paid job that will enable them to integrate into the new style of life in reformist China.

²⁵ Cacho L (2004): "Panorama económico en China" Boletín Económico ICE. Nº 2806

This migratory process has seen the degree of urbanisation soar to 41.8%, compared to 1978 when the figure stood at 17.9%. The urban population rose from 170 million inhabitants in 1978 to 540 million in 2004. The urban population boom has demanded significant changes in Chinese cities. In 2004, the water supply rate rose to 88.8%, gas to 81.6%, public green areas increased to 7.4m² per inhabitant and the surface area for housing per person rose to 24.9m². This process is improving people's standard of living.

Figure 2: Level of Consumption of Chinese Inhabitants (yuans)



Source: www.china.com

As far as income is concerned, the gap between the rural and urban population is substantial. In Shanghai for example, income per capita is around \$5,000, whereas a large proportion of the country earns less than \$750 per annum. The lack of incentives in rural areas, the low prices of agricultural products, the increase in the price of production factors used in agriculture and the tax rise have sparked the exodus from rural areas to large cities on the prosperous coast. In order to fight the imbalance between the countryside and the cities, the government is promoting numerous rural projects which will intensify over the period 2006-2010 to improve faro

worker output and their standard of living.

In 2004, GDP per capital in terms of purchasing power parity stood at \$5,530, whereas in the United States the figure was \$40,000 and in Japan \$30,000.

Apart from growing at an extraordinary rate, the Chinese economy has undergone a profound structural transformation. If we look at the composition of GNP at constant prices, we can see how industry's share has increased entirely to the detriment of agriculture, as the relative share of services has remained unchanged.

This trend continues in the present, as quarterly GDP growth by sector (see Table 1) reveals the secondary sector to be the most buoyant in terms of growth, followed by services and finally by the primary sector.

Table 1: Cross-sector GDP Growth in 2005

	Quarter 1	Quarter 2	Quarter
Primary	4.6%	5%	5%
Secondary	11.3%	11.2%	11.1%
Services	7.6%	7.8%	8.1%

Source: National Bureau of Statistics

Improvements in the Standard and Quality of Living

Human development indicators (poverty, consumption per inhabitant, employment) have improved substantially since the 1970s.

Life expectancy at birth has been rising steadily with the reform. While in 1960 it was 47 years, in 1993 it rose to 69 and it currently stands at 71.6.

As regards poverty, the total number of poor people has dropped remarkably. The decrease in poverty has been proportionally speaking larger in Chinese cities than in the countryside.

However, the term "poverty" is relative as the latest report published by auditors Ernst & Young revealed the existence of 400 million people (more than 30% of the population) surviving on less than two dollars a day.

Nevertheless, social inequality remains an outstanding task. Only 0.16% of the population control 65% of the country's liquid assets, which is the highest concentration of wealth in Asia as a whole. The government is taking steps but without much success to date:

- Abolishing farm tax has not stopped the income gap between cities and the countryside from widening²⁶.
- At present, only those who earn more than 800 yuan a month are obliged to pay income tax. The government is considering raising this threshold to 1,600 yuan (150 euros).
- The government is also considering the possibility of taxing high consumption and inheritances.

People's Daily On-line reported a comparative analysis on the number of hours worked by inhabitants of the capital city and their private life over the period dating from 1986 to 2005 from which the following conclusions were drawn:

- The working day has been extended to nine hours and 50 minutes
- Life is faster with less time for sleep per day
- Socialisation of household chores has increased
- People have more leisure time

In short, relatively large changes have occurred in the Chinese way of life and

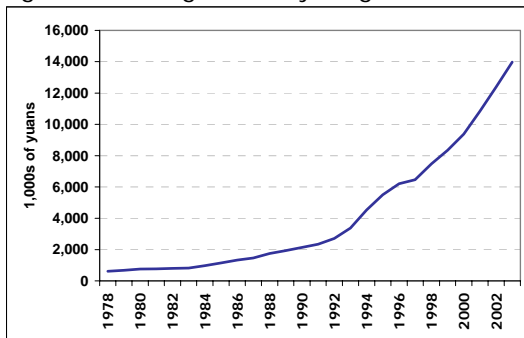
²⁶ The proportion was 2.9 to 1 in 2001, 3.1 to 1 in 2002 and 3.2 to 1 in 2003 and 2004.

will continue to do so as the country falls into line with western customs.

As far as consumption is concerned, various indicators show how expenditure per inhabitant in this area more than doubled between 1978 and 1992 and has continued growing since then. The improvement in provision of consumer durable goods has been particularly striking. The improvement in consumption per inhabitant was led by two main factors:

1. The decrease in the accumulation rate (investment/GDP), which still remains high in western terms.
2. The sizeable increase in income per inhabitant.

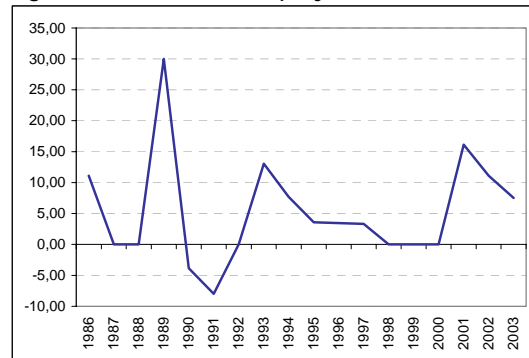
Figure 3: Average Monthly Wage



Source: 2001 Year Book and OECD

In employment, everything appears to indicate that job creation was greater during the period of reform than in the previous period. The number of workers grew at an average annual rate of 2% between 1958 and 1978, but this percentage rose to 3% between 1978 and 1988. The latest available information shows how labour supply and demand grew by 7.8% and 9.4% respectively between the second and third quarter of 2005.

Figure 4: Annual Unemployment Rate



Source: Asian Development Bank

M^a Luisa Martí Selva
Rosa Puertas Medina
Valencia, November 18 2005

10.- Argentina

Monographic Article: Economic Growth

Abrupt Cycles with Very Negative Effects on the Long Term Growth Rate

We will begin this monographic article by reviewing the long term growth trends in Argentina in comparison to other geographical regions from the 1980s to the present day.

Figure 5 below reveals that in contrast to the rest of the world and other South American countries, the 1980s were lost years Argentina. The country recovered in the 1990s, comfortably outpacing the average growth rate for the continent and the world. The country not only grew vigorously during this period, but also displayed relatively little volatility. However, this cycle of growth collapsed once again at the beginning of new millennium and on this occasion the collapse was much more violent (the economy slumped by nearly 11% in 2002). The fabulous boom in terms of GDP which began in 2003 is no more than a recovery or upward section of the same rollercoaster.

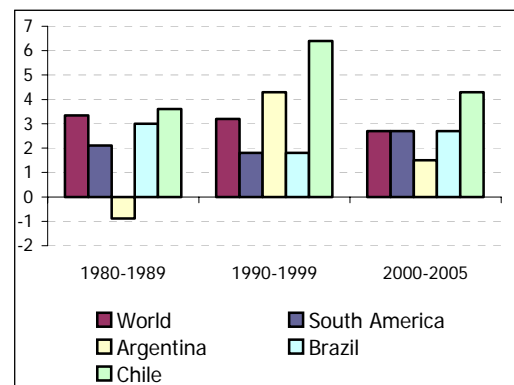
In short, the first point worth mentioning is the high degree of volatility in Argentinian long term growth (see Figures 1 and 2). The country has registered marked economic cycles since 1980, in the midst of a disappointing long term growth trend: an annual average of barely 1.7%²⁷ since 1980. Moreover, Figure 2 suggests that cyclical

fluctuations have increased in both speed and intensity over time.

Breakdown of Growth in Argentina since the 1980s

In this section we will break down the growth in Argentina into the sources related to the accumulation of physical capital, the expansion of the labour force and one residual (Solow's residual), which reflects how efficiently the factors work together to produce²⁸. The increase in production, which is attributed to technological progress in the broadest sense of the term, is also known as Total Factor Productivity (TFP hereafter). TFP is a vital source of growth from a long term perspective, as the main way to achieve sustained GDP growth for the economy's aggregate production function is by means of technical progress.

Figure 1: Economic Growth in the World, Argentina, Brazil and Chile: 1980-2005*



Source: IMF and own elaboration

*Forecast

This breakdown allows us to identify the growth trend in the Argentinian economy over the period under

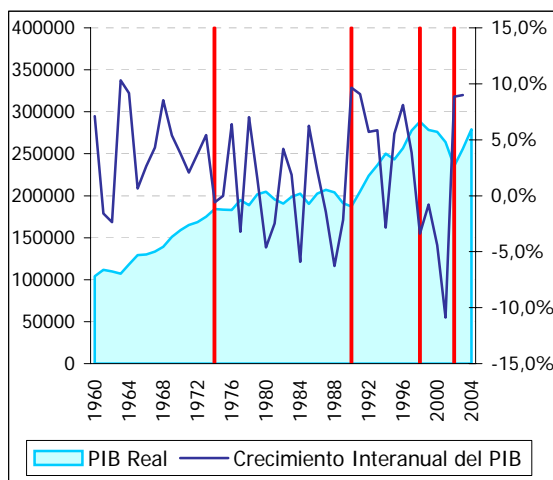
²⁷ Between 1980 and 2004, the world economy grew at an average rate of 3.5%, advanced countries at 2.9% and South America at 2.1%. Chile and Brazil grew at rates of 5% and 2.7% respectively.

²⁸ Work is carried out under the assumption that the economy has a Cobb-Douglas-type aggregate production function. $Y=AK^\alpha L^{(1-\alpha)}$. The computations of the National Directorate of Macroeconomic Policy Coordination provide labour share of 0.538 and consequently, a capital share of 0.462.

consideration, which dates from 1960 to 2004. During this period, growth was mainly the result of a large contribution on behalf of TFP, while the capital and labour factors recorded only moderate growth. TFP accounts for 54% of this extensive GDP growth trend, which makes it an important element when it comes to analysing the possibility of the country accomplishing sustained economic growth.

However, the economy has witnessed marked cycles, each one different to the next, as mentioned earlier. It is therefore interesting to divide the sample in order to compare the various growth trends. In fact, we have decided to separate five clearly different periods in terms of GDP growth (see Figure 1).

Figure 2: Real GDP



Source: MECON and own elaboration

Tables 1 and 2 display the results of the growth account in the different periods:

- 1960-1974: In this period, the Argentinian economy registered balanced growth. Growth was characterised by a balanced contribution from physical capital and TFP.
- 1975-1990: The growth rate throughout this period was very

low (0.2%), resulting in very negative results in terms of TFP, which cancelled out the positive contribution on behalf of capital and labour.

Table 1: Average Annual Growth Rates

Period	GDP	Capital	Labour
1960-1974	4.2	3.3	1.8
1975-1990	0.2	1.6	1.4
1991-1998	5.6	1.5	1.6
1999-2002	-4.9	0.1	-0.5
2003-2004	8.9	0.5	7.4

Table 2: Growth Accounts

Breakdown of GDP Growth				
Period	GDP	Capital	Labour	TFP
1960-1974	4.2	1.5	0.9	1.6
1975-1990	0.2	0.8	0.7	-1.4
1991-1998	5.6	0.8	0.7	3.9
1999-2002	-4.9	-0.2	0.1	-4.9
2003-2004	8.9	0.2	3.8	4.5

Source: MECON and own elaboration

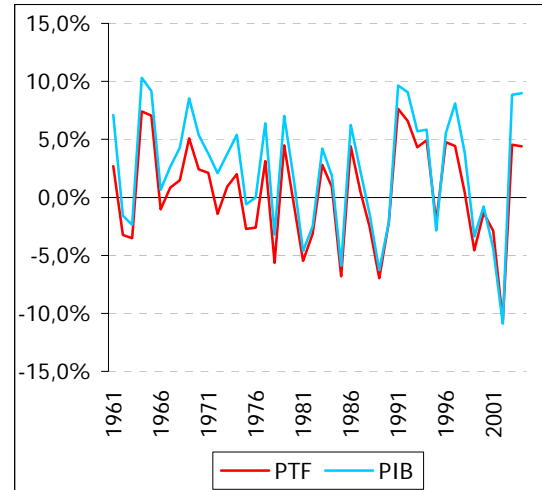
- 1991-1999: The third period began with the implementation of convertibility and ended with the crisis. The growth pattern throughout this boom was completely different to the previous period of growth. Between 1960 and 1974, it is difficult to tell whether the accumulation of physical capital or TFP led growth, whereas during this period, the latter was clearly the driving force behind growth, accounting for nearly 70% of the increase in GDP. This suggests that growth

increased on the back of macroeconomic policies and conditions that boosted the overall productivity of the economy.

- 1999-2002: This period saw the previous boom with high GDP growth rates and TFP collapse. GDP dropped to an annual average of 4.9% alongside a similar-sized fall in TFP; the convertibility model had reached the end of its tether.
- 2003-2004: The fifth and last period in our sample covers only the last two years. In light of the limitations of studying such a brief space of time and the prudence required when analysing results, we can see how once again the growth model is changing. While growth is once again based on an improvement in productivity, labour is playing a very important role to the detriment of capital.

One conclusion that can be immediately drawn from this analysis is the high degree of correlation between GDP and TFP (Figure 4). There are several hypotheses for this. Firstly, the presence of marked rigidities in the factor market which make it impossible to adjust the use of factors to GDP growth. In the second place, agents may adjust to the volatility of the cycle, which would mean taking the decision not to hire more personnel or acquire more equipment during times of bonanza, discounting a posterior slump. Finally, it could be a combination of both, among others.

Figure 3: GDP and TFP. Annual Growth Rates



Source: MECON

Productivity

Another view of growth relations provides the following equation:

$$\frac{GDP}{Pop} = \frac{GDP}{HrsWork} \times \frac{HrsWork}{Labour} \times \frac{Labour}{Pop}$$

As a result of the lack of historical data concerning hours worked, this breakdown can only be carried out for 2003 and 2004. The results are presented in Table 3. We can see how the degree of labour utilisation was the main real GDP growth determinant in 2003. However, the situation changed in 2004 in favour of job creation.

Table 3: Breakdown of Real GDP per Capita (Annual Growth Rates in %)

	Y - N	Y - H	H - L	L - N
2003	7.8	1.5	6.0	0.3
2004	7.9	1.2	1.1	5.6

Source: MECON and own elaboration

Productivity grew in both years, but always in second place and far behind first.

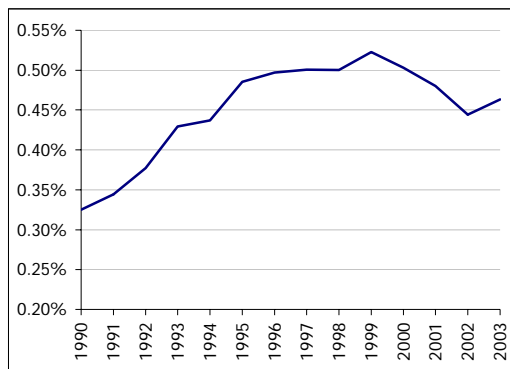
R+D Crisis

Furthermore, the future does not bode well for an improvement in the efficiency of the economy. The last economic crisis dragged Argentinian science down with it, but as opposed to the macroeconomic situation, the panorama remains gloomy for research.

En 2003 investment in science and technology in Argentina amounted to only 0.46% of GDP, well below the level observed in developed nations, but also below the average for South America. Brazil invested 1.38% of GDP in the same year.

However, despite the low level of investment, there are an increasing number of researchers in the Argentinian scientific and technological system.

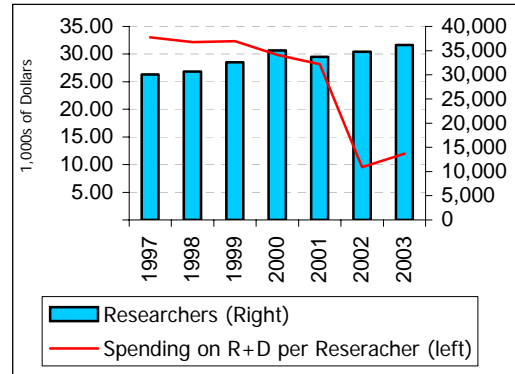
Figure 4: R+D Expenditure*/GDP



Source: RICYT

* Scientific and technological activities include R+D, researcher training and scientific and technological services.

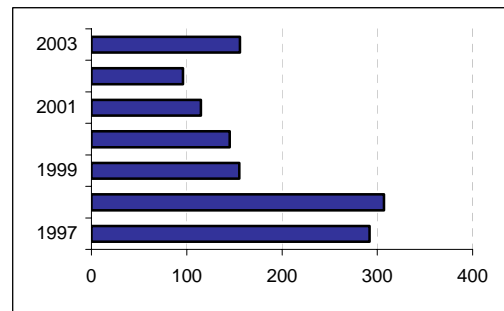
Figure 5: Researchers



Fuente: RICYT

The contrary pattern displayed by these two variables has resulted in a steady increase in borrowing requirements. In this scenario of a decreasing ratio of R+D expenditure per researcher, not enough incentives are being created to develop scientific or academic careers that are the backbone of technological development.

Figure 6: Patents Awarded to Residents



Source: RICYT

As far as the private sector is concerned, Argentinian businesses are not generally speaking very innovative. Private investment in science and technology amounts to a mere 26.5% of the figure for the country as a whole.

The country's economic policy should take into account the need for its economy to be efficient and competitive. In light of the profitability of R+D, this should lead the government to implement suitable scientific policies that promote an

innovative culture, as well as generating confidence among agents and sound institutional framework that encourages companies to invest in physical capital.

Julia Torrecabota Gordero
Valencia, November 21 2005

11.- Brazil

Monographic Article: Economic Growth

GDP per capita in Brazil has been very volatile since 1962, according to official data (see graph on page 1 of this report). However, since the crisis in the 1980s, Brazil has been trying to recover, but does not seem able to get back on its feet. If data is analysed by period, the effect can be more clearly appreciated: in the periods 1981-1985 and 1986-1990, the growth rate was negative. The country registered the most growth over the period 1991-1995, with a rate of 1.45%. The following five-year period also displays a positive growth rate, albeit lower (0.72%). Over the last four years, despite 2004 being unusually favourable for the Brazilian economy, the growth rate has averaged 0.7%. These growth rates are quite low for a developing nation.

Table 1: Change in GDP per Capita

Period	1981-1985	1986-1990	1991-1995	1996-2000	2001-2004
GDP/capita	-0.77	-0.15	1.45	0.72	0.7

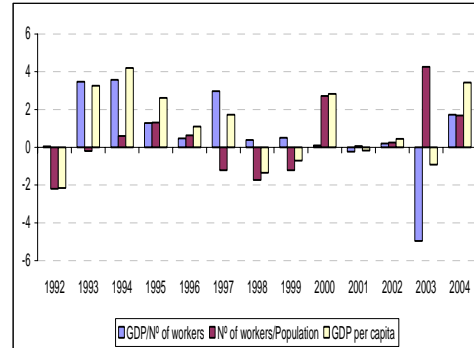
Source: Central Bank of Brazil

Why does Brazil Find it So Difficult to Grow?

As regards the **economic environment**, we can analyse what has happened in Brazil over the past few years.

A breakdown of GDP into the increase in employment and productivity of the labour factor since 1992 reveals that productivity boosted the country's economic growth up to 1999. However, in recent years the increase in the labour force has most bolstered GDP growth.

Figure 1: Breakdown of GDP Growth

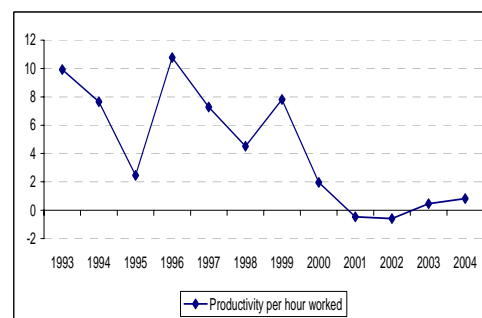


Source: own elaboration with data from the Central Bank of Brazil and IBGE

In order to find out what has happened with labour productivity, we can use the industrial sector as a model, not only because it represents approximately 38% of GDP in Brazil, but also because this sector best reflects the changes that have occurred in productivity.

So, on taking into account the increase in industrial output per hour worked in this sector, a considerable decrease is observed from 1999 onwards.

Figure 2: Industrial Output per Hour Worked



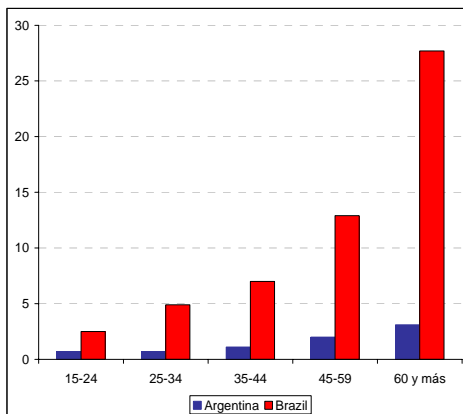
Source: own elaboration with data from IBGE and the NCI

There are several endogenous and exogenous reasons that could cause a decrease in a country's productivity. Education (a country with unskilled labour is less productive) and investment in equipment and machinery are among the endogenous

causes. We will now proceed to analyse both briefly in order to discern what has occurred in recent years with productivity:

1. Education

Figure 3: Illiterate Urban Population in 2002



Source: own elaboration with data from CEPAL

In 2002, the illiteracy rate in Brazil stood at 9.1% of the total urban population. If we compare this rate to that in Argentina (1.5%), we can see the enormous effort that Brazil must make in education in order to increase its productivity.

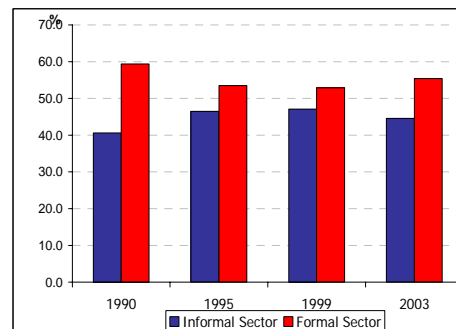
However, if we breakdown the data by age group we can see how the problem of illiteracy is mitigating over time. The illiteracy rate of the population aged between 15 and 24 years is ten times lower than that observed for over 60-year-olds. This clearly demonstrates that Brazil is making an effort to improve education, although it remains below the average of its South American counterparts. Education expenditure in Brazil accounts for 4.2% of GDP, whereas the average for South America is 4.5% of GDP.

Current investment in education has medium to long term effects. When it comes to measuring current labour productivity, we must look at past investments. Hence, we can see that

the group of people aged 35-39 that should supposedly be the most productive (due to experience) is actually the group with the highest rate of illiteracy.

If we add the lack of stability of the labour market to the low level of education, the result is a not very productive labour force. In Brazil almost half the workers in Brazil are employed in the informal sector of the economy.

Figure 4: Percentage of Workers in the Formal and Informal Sector



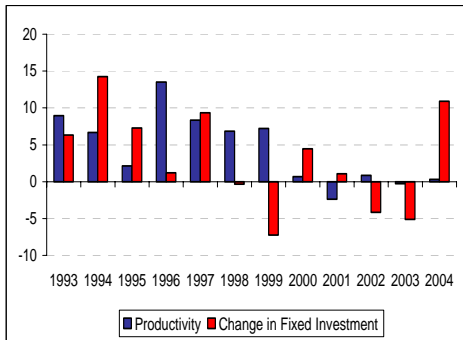
Source: International Labour Organisation

The low level of qualifications of Brazilian labour explains the low level of productivity, but not the decrease that has occurred since 1999, as workers can be said to have always been little qualified. In addition to this, if the level of education (while still poor) has increased over the years, this should favour an increase in productivity.

2. Investment in fixed capital

However, there is another factor that does have a short term influence on productivity, which is investment in equipment. In the graph below we can see the relationship between the fall in productivity and the decrease in fixed investment. Investment began to fall from 1998 onwards and productivity has followed suit.

Figure 5: Productivity and Fixed Investment



Source: IBGE and CNI

This could be one of the reasons behind the drop in productivity. We must take into account that the Brazilian government has preferred in recent years to maintain a stable macroeconomic environment (with inflation under control, increase in employment, curbing foreign loans) rather than increase productivity. However, it is also worth highlighting the 10.9% increase in fixed investment in 2004, which is also expected to be favourable in 2005.

3. Research and Development

Another aspect that is directly related to the decrease in productivity is the decrease in investment in R+D expenditure since the 1990s.

As we can see in Tables 3 and 4, investment in research projects as a percentage of GDP was higher at the beginning of the 1990s than it is currently.

Table 2: Science and Technology Expenditure/GDP (%) in the early 90s

1991	1992	1993	1994	1995
1.81%	1.64%	1.79%	1.68%	1.40%

Source: Ricyt

Table 3: Science and Technology Expenditure/GDP (%) in recent years

2000	2001	2002	2003
1.43%	1.46%	1.44%	1.38%

Source: Ricyt

It is possible that the decrease in investment in R+D expenditure has also contributed to the decrease in productivity.

In structural terms, we should analyse another issue that affects the best part of South American countries and Brazil in particular: unequal income distribution.

The latest UN report on Human Development ranks Brazil the eighth country in the world with the most inequalities, behind Namibia, Lesotho, Botswana, Sierra Leone, Central African Republic, Suaziland and Guatemala in that order. In other words, with the exception of Guatemala, Brazil is only preceded by African nations.

In order to get an idea of the situation, the Brazil's Gini Index²⁹ stands at 59.1%, well above India with 32.5%, which has displayed severe inequalities on many occasions.

In Brazil, the richest 10% of the population receives 48% of the country's income. However, 22% of the population are below the poverty threshold (less than two dollars a day).

Two types of problems emerge as a result of these inequalities:

- On the one hand, on a domestic scale the most underprivileged sectors do not feel they are represented by a government that not only appears to allow such inequalities to exist, but also

²⁹ The Gini Index measures unequal income distribution within a country. An index of 0 represents absolute equality, while an index of 100% represents perfect inequality.

allows them to increase over time, as there is not even social mobility over the years. We must also add the continuous corruption scandals among politicians. All of this leads to a high degree of tax evasion. As a result of continuous tax frauds and political instability, public-sector expenditure becomes recessive, making it even more difficult to solve the problem.

- On the other hand, Brazil has a debt problem, both in terms of quantity and also quality. The problem of quality is due to the best part of Brazil's liabilities being in foreign currencies, as mentioned at the beginning of this report.

In the first five months of 2005, Brazil paid out \$28.842bn in interest alone, the equivalent of the budget for health (\$17.777bn) and education (\$11.111bn) together.

Moreover, excessive debt forces Brazil to maintain a high primary surplus, which the Central Bank forecasts will reach 4.25% of GDP this year as reassurance of compliance with its debt obligations. The lack of resource availability together with an unstable social scenario is reflected by low quality public-sector expenditure with little chance of medium and long term investment, as we saw in the previous section.

María García Alcober
Valencia, November 18 2005

12.- México

Mexican Economic Growth Sources

Economic growth is being accompanied by a series of elements that reflect an improvement in wellbeing, such as housing, food, health, education, etc.

Unequal growth across economies and also across the quantity of product per inhabitant is frequently explained by differences in levels of productivity. This can be defined simple as the product resulting from the use of the various production factors.

Locating the sources of economic growth has not been an easy task from a theoretical or empirical perspective, the latter being due to a lack of statistical information, a problem that is considerable worse in developing nations.

One of the indicators that shows whether or not the economy has growth in real terms is GDP per capita, although it does not provide information concerning the type of goods and services produced or how equally the ensuing wealth is distributed.

The difference between GDP per capita in developed and developing nations is frequently huge. Solow (1957) showed with his growth theory that the essential factors are capital, labour and how efficiently they are used.

The sources of growth are basically human capital, productive capital, employment and optimal use of these factors, or Total Factor Productivity (TFP) in other words.

As production factors are finite and normally scarce, there is a limit to their growth and use. Therefore, the only item that we can "stretch" is how these

factors are combined and used, that is, the productivity of these factors.

Productivity increases have allowed humanity to survive since the beginning and grow to the current total of six billion people. Had productivity not risen, the famous Malthus law would have come true, which states that while food output grows arithmetically, the population grows geometrically.

It has been acknowledged that in order to increase economic growth in Mexico, particularly after opening up to foreign trade halfway through the 1980s, it is necessary to raise the level of productivity. Productivity should be the cornerstone of economic growth, thus making it a key indicator when it comes to analysing growth.

Before setting out to analyse the sources of growth in the Mexican economy, we believe it is necessary to have a reference scenario which, albeit briefly, can provide a panorama of how the Mexican economy has grown.

Brief Summary of Growth in Mexico

Economic growth in Mexico can be divided into two periods: before and after the country opened up to foreign trade. Halfway through the 1980s, Mexico began to open its doors to foreign trade, finally becoming one of the most open economies in the world.

The Mexican economy was closed over the period dating from 1940 to 1984, during which time growth was inward and characterised by excessive protectionism, particularly where Mexican industry was concerned, in an attempt to develop it. This led industry to pay less attention to the price and quality of the products that were elaborated, resulting in a loss of

competitiveness on the international stage.

This period can also be split into three mini periods. The first dates from 1940 to 1958 and was characterised by growth with inflation and currency devaluations. The economy grew in real terms at an average annual rate close to 6%. The average annual inflation rate was 10.5%, forcing two devaluations (1948 and 1954) in order to balance the situation.

In light of the fact that the top priority was to protect industry, as mentioned previously, this sector became the main source of economic growth through a policy of import substitution, particularly where consumer goods were concerned. Industry grew at an average annual rate of 6.4%. The second mini period, labelled "stabilising development" covers the period from 1959 to 1970, over which the economy recorded an average annual growth rate of 7%, while the average inflation rate stood at nearly 3%. Industry, which grew by two tenths more than over the previous period, continued to fuel economic growth.

However, during the mini period that began in 1970, the import substitution model is abandoned, the economy continued to grow at an average of 5.7% between 1970 and 1975, but inflation rose to an average annual rate of 12%. At the same time, considerable deficits were observed in both the public sector and also the current account of the balance of payments. As a result, the currency was once again devaluated in 1976 in order to adjust, thus altering the fixed exchange rate in force since 1954 (12.5 pesos to the dollar). A fixed exchange rate and exchange freedom had been the basis of development up to that time. From August 1976 onwards, a controlled

exchange rate floatation system is adopted.

Mexico's foreign debt also began to grow appreciably in the 1970s. Important discoveries of oil fields were also made in the seventies, giving the Mexican government the guarantee it needed to ask for foreign loans. For example, public-sector foreign debt in 1970 amounted to approximately four billion dollars, whereas in 1976 the figure had already risen to nearly 20 billion. Total foreign debt in 1981 had soared to 71 billion dollars.

Oil and financing from international capital markets became the main sources of economic growth, with GDP registering historically high rates of above 8% both in 1980 and 1981. In this last year, oil accounted for 75% of total exports. The economy was oil-dominated.

Table 1: Real GDP Growth (1980-2005)

Year	%	Year	%
1980	9.1	1993	1.9
1981	8.5	1994	4.5
1982	-0.5	1995	-6.2
1983	-3.5	1996	5.1
1984	3.4	1997	6.8
1985	2.2	1998	4.9
1986	-3.1	1999	3.9
1987	1.7	2000	6.6
1988	1.3	2001	-0.2
1989	4.1	2002	0.8
1990	5.2	2003	1.4
1991	4.2	2004	4.4
1992	3.5	2005*	3.0

*Estimate

Source: INEGI

The period that takes us from 1982 up to the present day has been labelled neo-liberal. At the beginning of the period, the imbalances in the Mexican economy provoked a crisis in which the public-sector deficit reached 16% of GDP.

External debt caused a crisis in the country which was one step away from going into default. Growth was noticeably affected, as from this period onwards growth has been insufficient when compared to the growth in the population and employment, among other indicators.

From 1982 onwards, inflation and debt payments saw the country lose its growth trend.

The most significant reform undertaken by Mexico over the last few decades is undoubtedly opening up to foreign trade. The process began clearly in 1985 and in 1986, Mexico joined the General Agreement on Tariffs and Trade (GATT).

Throughout the period from 1987 to 1994, the Mexican economy signed a series of stabilisation pacts, which helped to curb high inflation and an average annual growth rate of 3.3% was observed.

Trade liberalisation and the structural changes that came with it resulted in the entry of foreign capital, particularly short term investment. The current account deficit rose substantially, reaching nearly 30 billion dollars in 1994.

In December 1994, when such a large deficit was no longer possible to finance, the currency was devaluated, leading to a severe crisis that saw GDP plummet by -6.2% the following year. The crisis was overcome by means of reform, most of which was of a financial nature and over the period from 1996 to 2001, GDP registered an average annual growth rate of 5.4%.

Growth has slumped markedly since 2001, partly due to the worldwide economic recession, but mainly due to

Mexico's high degree of dependence on the US economy and the price of oil.

Sources of Growth: IMF Version

An analysis of the sources of growth in Mexico has been carried which, as is the case for other countries, focuses on employment, productive and human capital and how efficiently these variables are used.

Table 2: Sources of Growth in Mexico, 1960-2003 (percentages)

Concept	1960-1979	1980-2003	1996-2003
Real GDP Growth	6.5	2.6	3.5
Potential Growth	6.4	2.7	3.5
Growth Factors			
Capital	6.1	3.4	3.8
Labour	3.6	3.0	2.4
Total Factor	2.1	-0.5	0.7
Productivity (TFP)			
Contribution of factors (points)			
Capital	2.0	1.1	1.2
Labour	2.4	2.0	1.6
TFP	2.1	-0.5	0.7

Source: own elaboration with data from the IMF

According to research published by the International Monetary Fund, the Mexican economy grew at an average annual rate of 6.5% over the period dating from 1960-1979. The capital factor figured prominently throughout this period, registering a 6.5% average annual growth rate and contributing two percentage points to overall growth. The labour factor grew by 3.6% and made a 2.4-percentage point contribution to growth.

Total Factor Productivity (TFP) rose by 2.1%, contributing 2.1 percentage points to growth. As can be observed, despite capital recording higher growth rates during this period, labour was the factor that most contributed to GDP.

The 1980-2003 period witnessed a slump which resulted in growth

dropping to an annual average of 2.6%. Capital once again figured prominently with a 3.4% increase, labour rose by 3%, while TFP dropped by 0.5%. Labour was once more the factor that most contributed to GDP with two percentage points, followed by capital with 1.1 percentage points, while TFP detracted half a percentage point.

It is interesting to observe the figures corresponding to the 1996-2003 period, in light of the fact that, as mentioned previously, in 1995 the country suffered one of the most serious economic crises of the century and probably the third worst in the history of the country, only behind the period in which the Mexican revolution took place at the beginning of the last century and the crisis resulting from the great depression.

Over the period dating from 1996-2003, the economy registered an average annual growth rate of 3.5%. Capital rose by an annual 3.8%, labour by 2.4% and TFP by 0.7%. The largest contribution to growth came from the labour factor with 1.6 percentage points, followed by capital with 1.2 percentage points and TFP with 0.7 percentage points.

In conclusion, over the period from 1960 to 2003, the labour factor most contributed to growth while on the flipside of the coin, the lowest contribution can be attributed to the inefficient use of productive factors, which has resulted in productivity problems, particularly in recent years.

It is also worth highlighting that, despite the minimal contribution of TFP to growth, this indicator recovered slightly over the last period under analysis from 1996 to 2003, which is more than likely the result of the North American Free Trade Agreement

(NAFTA) between Mexico, the United States and Canada, which came into force in 1994.

This leads us to the hypothesis that the reform carried out in Mexico, which has focused on the financial sector, has seen other areas ignored. Consequently, reforms in sectors such as energy, employment, education, pensions etc. remain pending, which has made it impossible for productivity to increase and is also responsible for the constant ups and downs the economy registers in its low growth trend.

According to IMF estimates, if the inertial trend continues (base scenario) and no reform is carried out, potential GDP growth from 2005 to 2009 will average an annual 2.9%, while average GDP growth in real terms will be 3.2%. Capital would contribute 1.1 percentage points, labour 1.5 percentage points and TFP 0.6 percentage points. The inefficient utilisation of production factors would remain the weak point of the Mexican economy.

In the best scenario, which would have a lot to do with accomplishing the application of outstanding structural reforms, real GDP growth would average an annual 4.5% over the same period. Capital, labour and TFP would all contribute an average of 1.5 percentage points on an annual basis. In this scenario we can see how the contribution of the labour factor would remain unchanged with respect to the base scenario at 1.5 percentage points, while the capital factor would increase from 1.1 percentage points and the contribution of TFP would more than double 0.6 to 1.5 percentage points.

Table 3: Estimation of Growth Sources in Mexico 2005-2009: Best and Base Scenarios

Concept	Base	Best
Real GDP Growth (%)	3.2	4.5
Potential Growth (%)	2.9	4.2
Contribution of factors (points)		
Capital	1.1	1.5
Labour	1.5	1.5
TFP	0.6	1.5

Source: own elaboration with data from the IMF

Sources of Growth: OECD Version

The OECD recognises that the Mexican economy improved considerably throughout the 1990s, despite the severe economic crisis in 1995. Later on, as indicated above, a marked decrease in GDP growth is observed from 2001 onwards.

The OECD places special emphasis on productivity as a crucial factor for growth in the economy. The OECD Economic Survey, Mexico 2003 estimates the potential growth rate of the Mexican economy in the vicinity of 4%. The report states that the most dynamic economies base their growth on multi-factor productivity, in which state-of-the-art technology plays a leading role.

GDP growth in OECD member states is to a great extent due to the increase in the labour force and its productivity. In the case of Mexico, the labour force grew by an annual 3% on average throughout the 1990s. These increases were the result of an increase in the number of people of a working age and more women joining the labour market.

However, labour productivity drew to a standstill. The OECD estimates the average annual increase in this variable at 0.5% over the period dating from

1987 to 1994 and at 0.1% over the period from 1994 to 2000.

These figures mean Mexico fell well short of the average for OECD member countries, which registered growth rates ranging from 2% to 4% for this variable. The OECD believes the transition from traditional to modern sectors has not occurred.

In comparison, Mexico's productivity is only one third of the average for the countries that belong to the OECD.

Table 4: Formal Employment 2000-2005

Year*	Total	Permanent	Temporary
2000	12,546,268	11,026,370	1,519,898
2001	12,163,637	10,713,268	1,450,369
2002	12,225,582	10,733,000	1,492,582
2003	12,190,792	10,635,811	1,554,981
2004	12,509,426	10,863,277	1,646,149
2005	13,086,296	11,053,017	2,033,279

*Data as of December 31 each year, except 2005, which correspond to October 15

Source: Secretariat of Labour and Social Welfare, with data from Mexican Institute of Social Security

According to the table above, some 540,028 net jobs were created between 2000 and October 15 2005 (an average of 108,000 per annum) in the formal sector of the economy, of which only 26,647 were permanent (5,329 per year) and 513,381 were temporary (102,600 per year).

Therefore, only 5% of the net jobs created over the period in question were permanent, while the remaining 95% were temporary.

These figures confirm the OECD's opinion, as formal employment was minimal in relation to the figure of more than one million jobs a year that the country requires. Permanent employment remained practically unchanged over the five-year period. This leads us to believe that a large proportion of jobs were created in the

informal sector, which has very low levels of productivity.

The OECD also considers investment in Mexico to be insufficient. Over the five-year period from 1996 to 2001, investment stood at 20%, but according to the OECD should be growing at a rate of between 8% and 12% per year in order to escape underdevelopment.

Similarly, the OECD indicates that on the demand side, growth has been boosted by exports, which account for 30% of GDP.

GDP per Capita

Differences in GDP growth per inhabitant (GDP per capita) is due to differences in productivity.

First of all, there is a large gap between GDP per capita in developing and developed nations. Behind these differences, inequalities in their levels of wellbeing can also be found. Countries that have a higher level of income per capita normally have better economic and social indicators, such as higher life expectancy, higher levels of education and training, easier access to a house, health services etc.

Table 5: Real GDP per Capita Growth (PPP) and Natural Population Growth

Year	PPP	Pop.	Year	PPP	Pop.
1990	3.0	2.4	1998	3.5	1.8
1991	2.2	2.3	1999	2.3	1.7
1992	1.7	2.3	2000	5.2	1.7
1993	0.1	2.2	2001	-1.3	1.6
1994	2.6	2.1	2002	-0.4	1.5
1995	-7.7	2.0	2003	0.3	1.5
1996	3.5	1.9	2004	3.2	1.4
1997	5.2	1.8	2005	1.7	1.4

Source: Fifth Government Report Statistical Appendix

When growth in the population outpaces that of GDP, the benefits of economic growth diminish. In Mexico,

despite registering a low natural rate of population growth (see graph), GDP per capita has grown less than the population in seven of the last 16 years.

Growth in GDP per capita averaged an annual 1.9% over the period dating from 1990 to 2000, while the population increased at an average annual rate of 2.5%. However, population growth (1.48%) doubled growth in GDP per capita (0.7%) over the five-year period that followed (2001 to 2005), as a result of the marked decrease in GDP growth. This leads us to believe there are serious problems where productivity is concerned.

GDP per capita is forecast to end the year at around seven thousand dollars, well below the figure observed in the United States, Mexico's main trading partner, which is four times larger.

In spite of Mexico being the tenth largest economic power in the world in terms of GDP, it is 49th in GDP per capita.

Cross-Sector Productivity

While average productivity in the manufacturing sector grew by an annual 5.9% between 1990 and 2000, growth has since dropped to 3.1%. Moreover, figures observed this year suggest that productivity will not grow at all, following the 0.1% decrease recorded over the first five months of 2005.

Table 6: Cross-Sector Labour Productivity Growth in Mexico

Year	Manuf.	Assembly plants	Const.	Trade
2000	4.9	0.7	0.7	9.3
2001	0.4	-3.1	-0.4	-3.7
2002	4.6	0.6	1.2	0.3
2003	3.1	1.5	0.7	0.8
2004	6.1	n.a.	n.a.	n.a.
2005	-0.1*	n.a.	n.a.	n.a.

*2005 figures cover the period from January to May

Source: Fifth Government Report Statistical Appendix

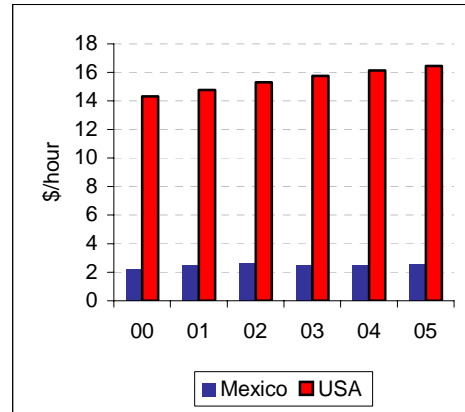
Productivity in cross-border assembly plants displays an annual decrease of 0.7% between 2000 and 2003. In the construction sector, productivity has risen by an annual 0.5% on average, while in trade the growth rate stood at 1.6%.

Productivity in manufacturing, assembly plants, construction and trade has been diminishing in recent years.

It is interesting to compare productivity trends between Mexico and the United States, as the latter accounts for approximately 85% of Mexico's international trade.

As regards wages, which are normally linked to productivity, wages in the Mexican manufacturing industry stood at \$2.13/hour in 1994 (the year before the beginning of the crisis), whereas in the United States the figure was 5.6 times higher at \$12.04/hour. This ratio rose to 6.4 in 2005, indicating the growing lag in Mexican productivity.

Figure 1: Wages in the Manufacturing Industry in Mexico and the US (\$/hour)



2005 figures cover the period from January to May

Source: Fifth Government Report Statistical Appendix

As regards labour in the manufacturing industry, the productivity index in Mexico has grown by 167.6 points since 1993, while it has grown by 181.9 points in the United States, a gap of 14.3 points in terms of comparative growth.

Table 7: Manufacturing Productivity Index in Mexico and the US (1993=100)

Year	Mexico	USA
2000	145.68	144.27
2001	146.82	148.25
2002	153.98	158.81
2003	159.23	167.26
2004	166.88	175.58
2005	167.62	181.91

2005 figures cover the period from January to May.

Source: Fifth Government Report Statistical Appendix

Technology, an Important Source of Growth

Unprecedented technological innovations have been witnessed in recent decades and have altered humanity's way of life. We can therefore affirm now more than ever that science and technology have a unique influence on economic and social activity.

Development in science and technology displays rapid growth and it is spreading very quickly with a very short term but far reaching impact.

The greatest progress in these two fields is observed in developed nations, as these countries invest the most in this area. This has meant that both technological progress and also the products derived from it have not been equally distributed worldwide.

Theoretical research has indicated on multiple occasions that the appropriate application of technical skills in production is one of the main sources of economic growth. Therefore, investment in new technologies and generating new technological skills is necessary to achieve growth.

Mexico still channels little money towards investment in science and technology, despite the government passing BIS Article 9 in September 2004 and including it in the Science and Technology Law. The article states that the Federal Government and each local government, subject to income and expenditure regulations applicable, will attend to the financing of scientific research and technological development. The total resources that the State, Federal and local governments devote to scientific research and technological development should amount to more than 1% of GDP, by means of the support, mechanisms and instruments included in the law.

The United Nations Organisation actually recommended developing nations to increase their expenditure to 1% of GDP at the end of the 1970s. A quarter of a century later, Mexico has accomplished this, but only in the law.

Federal expenditure in Mexico on science and technology in 2004

amounted to 0.38% of GDP, well below the 2% recommended by the OECD or the 1.5% by UNESCO. This percentage is forecast to increase to 0.42% in 2005. The highest level of investment was reached by Mexico in 1998 with 0.46%.

Table 8: Proportion of Expenditure on Science and Technology over GDP

Year	%	Year	%
1990	0.28	2000	0.42
1995	0.35	2001	0.42
1996	0.35	2002	0.40
1997	0.42	2003	0.43
1998	0.46	2004	0.38
1999	0.41	2005	0.42

Source: Fifth Government Report Statistical Appendix

Likewise, the private sector financed approximately a quarter of total investment. In Japan, for example, 70% is financed by the private sector and 30% by the public sector.

Despite the limit of 1% of GDP being included in the law, the forecast for forthcoming years is for around half this amount.

Technological innovation is sustained in various areas as one of the main determinants of productivity and competitiveness. There are also multiple examples of how Mexico has been affected in this field.

According to the World Competitiveness Scoreboard compiled by the International Institute for Management Development (IMD), Mexico dropped from 35th to 41st in the ranking between 1999 and 2002. Meanwhile, Mexico also dropped from 35th to 41st in Growth Competitiveness Rank, elaborated by the World Economic Forum (WEF) over the same period.

However, the lack of economic development in Mexico and the fact that more than half the population

suffers poverty has made it difficult for the country to gain access to the latest technological advances.

The National Survey on Availability and Use of Information Technologies elaborated by INEGI estimated that 59% of households do not have a computer due to a lack of resources and that 49% of the households with a computer do not have an internet connection for the same reason.

Similarly, while in Mexico there are 82 computers per thousand inhabitants, in the United States there are 659 and in Canada 487.

Investment in human capital, investment in research and development and obtaining economies of scale play a crucial role when it comes to increasing factor productivity.

Consequently, developing science and technology should be the objective in order to improve the level of wellbeing of Mexico's inhabitants. The application of this knowledge will be the best way of valuing the wealth of nations in the future that has already begun.

Reforms Pending

A series of reforms have not been finalised in Mexico due to the lack of agreement between the Parliament and the Senate. The most important issues include the labour market, taxes, education, energy, judicial reform, deregulation and pension reform.

The increase in factor productivity must follow the above reforms and the application of state-of-the-art technology rather than competing with low wages.

Mexico is a country with low income per capita, important structural reform pending and is considerably behind in

terms of technology, employment and the fight against poverty.

Héctor Ruiz Ramírez
Toluca, Mexico. November 2005

