

La necesidad de un Modelo de I+D+I para la Unión Europea

The necessity of a R&D&I model for the European Union¹

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RESUMEN

Con el fin de dejar atrás el proteccionismo, el comercio internacional debe encontrar maneras de aumentar la riqueza de los países mediante una nueva definición tanto de la existencia de ventajas competitivas, cómo de las nuevas formas de distribuir los beneficios. La necesidad de establecer una política comercial estratégica para la Unión Europea implica la redefinición de las políticas de apoyo y financiación de proyectos de I+D+I así cómo el diseño de un modelo de I+D+I para la Unión Europea, que permita ser más competitivos. Este trabajo estudia los mecanismos que permiten la inversión y la estimulación de los proyectos de I+D+I en las condiciones actuales.

Palabras Clave: Unión Europea, I+D+I

ABSTRACT

In order to overpass the protectionism, the international commerce must find ways to increase the wealth of the countries in a new definition of the comparative advantage and how its benefits should be distributed. The necessity of a strategic commercial policy for the European Union implies redefining the supporting policy to the project funding of R&D&I and the design of a R&D&I model for the European Union that permits us to be more competitive. This paper explores the mechanisms that allow investment and that stimulate R&D&I projects in current conditions.

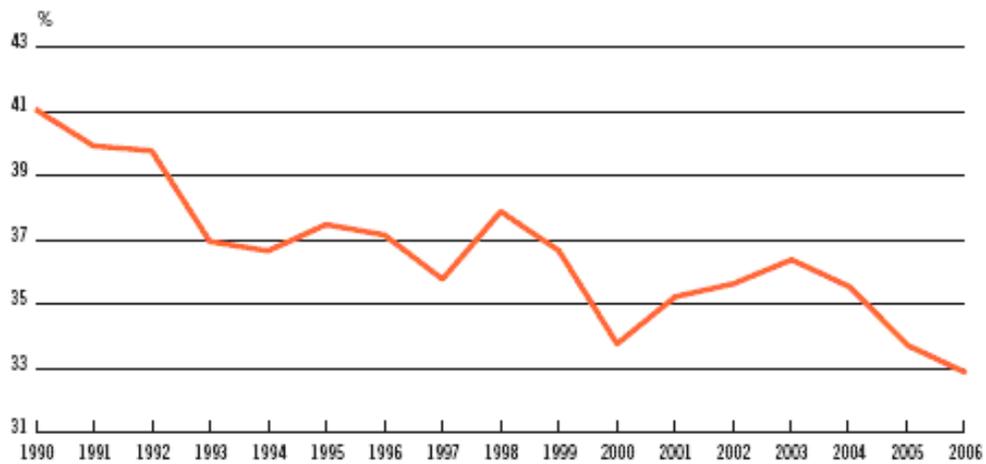
Keywords: European Union, R&D&I

Clasificación JEL: B15

1. STATE OF THE SITUATION

From the World War II international economic relations have rested on two big pillars: multilateralism and regional integration processes. As a consequence of the last one, the economic integration has increased the commercial and financial links in such a way that in the last 20 years commercial flows have tripled and financial flows have been multiplied by nine.

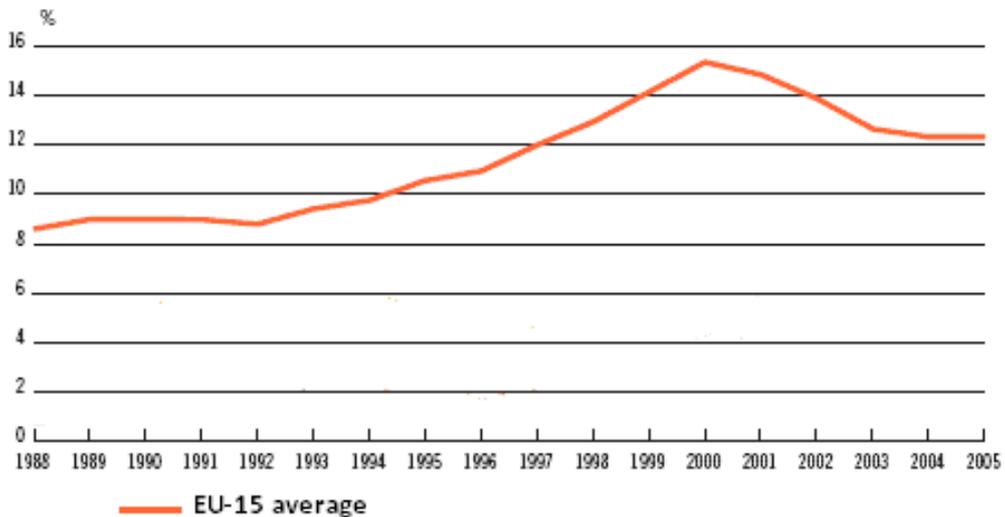
Fig. 1. EU-15 exports share
Source:WTO



However, since a long time, the EU-15 is losing weight in the worldwide exports. EU-15's have passed from a 41% in 1999 to a bit less of 34% in 2000 and, although raised to 36.5% in 2003, it was placed around 33% in 2006 (see figure 1).

Fig. 2. Exports share variation (%)

Exports with a high technological content as a percentage of EU-15 total
Source: OECD

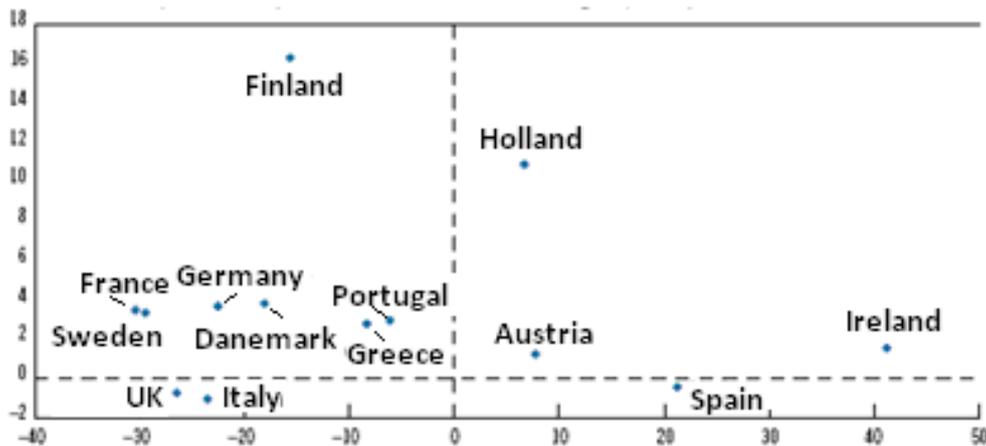


In relation with the composition of EU exports it is possible to observe that in period 1992-2000 an important increasing of the weight of high technology sectors, related to the total of exports, has existed. However, from 2000 it began to go down until arrive to a stable 12% in 2005; this figure is clearly higher to the 8% corresponding to 1985 (see figure 2).

This value is not sufficient and, moreover, it includes important differences among EU States as it is possible to see in the offered figures by WTO and OECD (see figure 3). In the upper right square are placed the countries that have increased their exports share and the technology content inside them (for ex., Ireland, Holland), in the upper left square are the countries have lost share but have increased added value to their exports. In Spain, to be precise, technological content of its exports has stopped but it has won share.

Fig. 3. Increasing the weight of a high technology content exports (%)

Source: OECD WTO



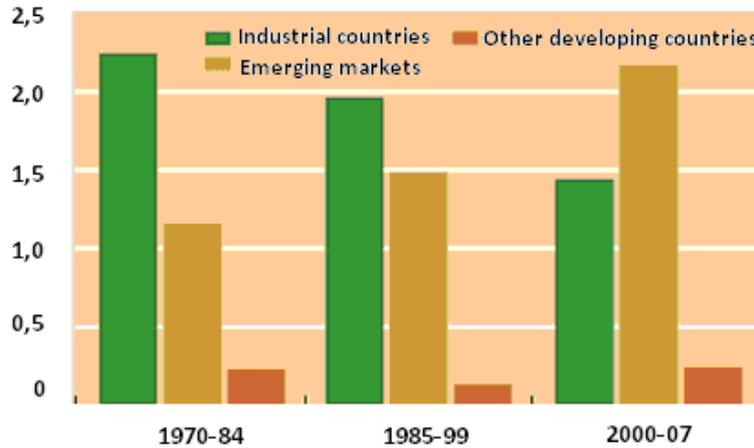
In comparison, USA external deficit was around 6.5% GDP as of 2006 (the highest deficit in the last 50 years). A large group of experts consider this deficit is no longer sustainable and must be adjusted².

A shrinking deficit by the USA implies –among other effects- reducing other countries surplus; it could be in commerce of determined goods, or even in a product basket. So the question is how much should be the adjustment? At theory, an adjustment that places commercial deficit around 2.5% GDP would be enough to guarantee the sustainability. If the adjustment is produced in a gradual way (5-7 years) it would imply dollar depreciation near 10% from present level. This depreciation should be higher with relation to Asian currencies than with relation to Euro.

Fig. 4. Economic growth

(Contribution to global growth, according PPP. Periods averages in percentages).

Source: IMF, World Economic Outlook

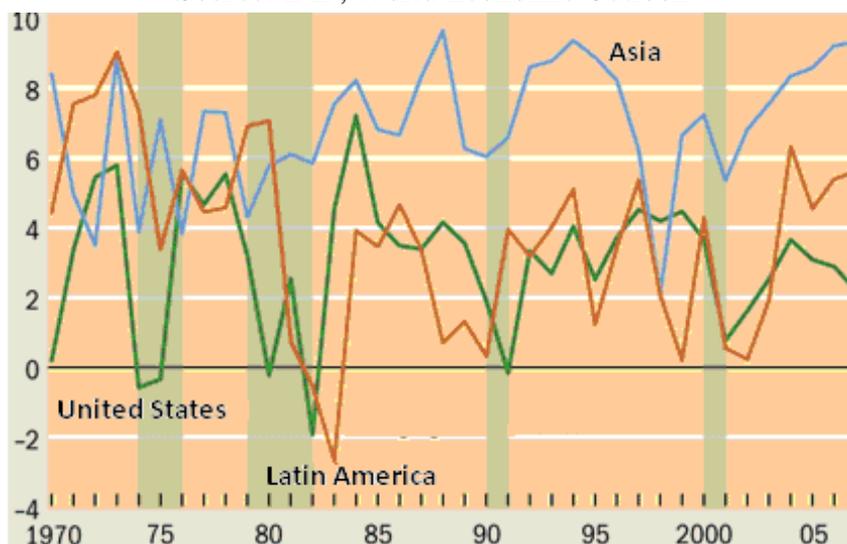


Emerging markets had converted in the world economic growth engines over passing the growth of industrial countries during the period 2000-2007 (see figure 4). As a consequence their real GDP growth rate began in year 2000 a remarkable increasing until year 2006; in the other side, real GDP growth rate of the USA had a descending trend in the same period (see figure 5).

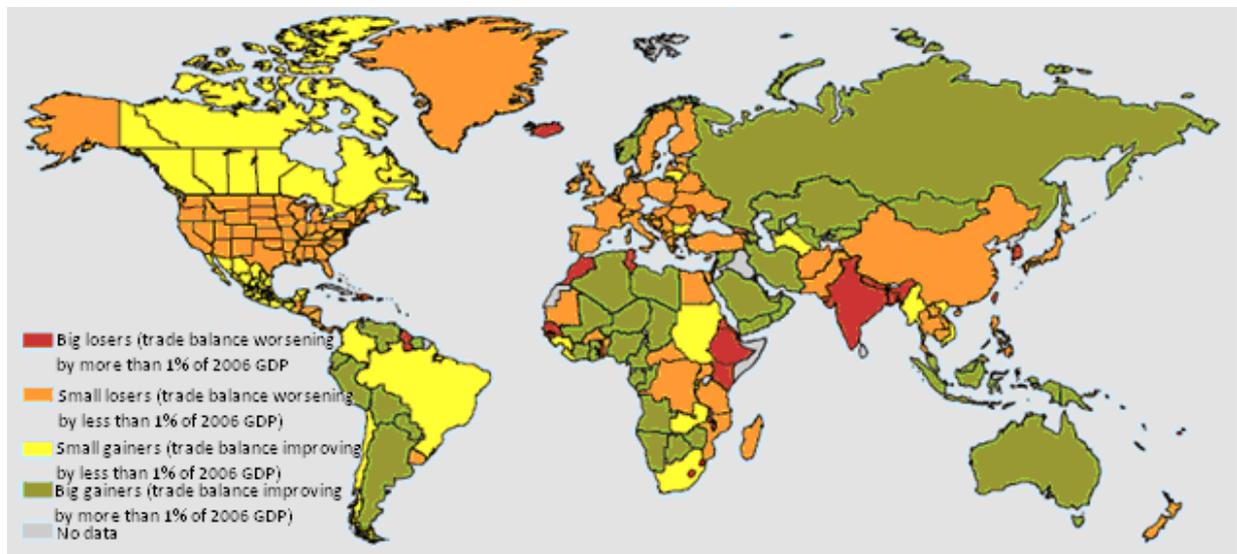
Fig. 5. Emerging markets

(Real GDP Growth, yearly variation %)

Source: IMF, World Economic Outlook



The evolution that has been shown by GDP growth data in year 2004 reveals interesting information. If that information is confirmed with present data, an important change in the behaviour of the emerging economies would be described; in Asia, specially.

Fig. 6. Basic goods impact in the commercial balances in year 2007Source: HELBLING, T. (2008): *IMF F & D.*, March, Vol. 45, Num. 1

2. FRACTURES IN THE REAL SECTOR DUE TO AN INCREASING IN DEMAND OF PRIMARY PRODUCTS AND TO THE FINANCIAL CRISIS

2.1. From 2000 to 2008 (summer)

An analysis on the worldwide market situation until summer of 2008 shows us some positive feedback loops in the worldwide commerce; for example:

Loop 1: Energy necessities and agricultural prices

From 2006 an increasing of international agricultural prices (cereal, for instance) arriving to around 60% in the first six months of 2008. According to International Food Policy Research Institute, one third of that increasing is due to a big demand of bio fuel that has pressured up the prices of some specific agricultural products. As a result of this behaviour a strong cutting of the subsidies to bio-fuel has been put on the table.

If the increasing of the bio fuel demand had followed to the before-summer rhythm, the corn price had increased a 20% in 2010 and a 41% in 2020, while wheat price had increased an 11% in 2010 and a 30% in 2030³.

Loop 2: The commerce bottleneck of specific raw materials and agricultural goods

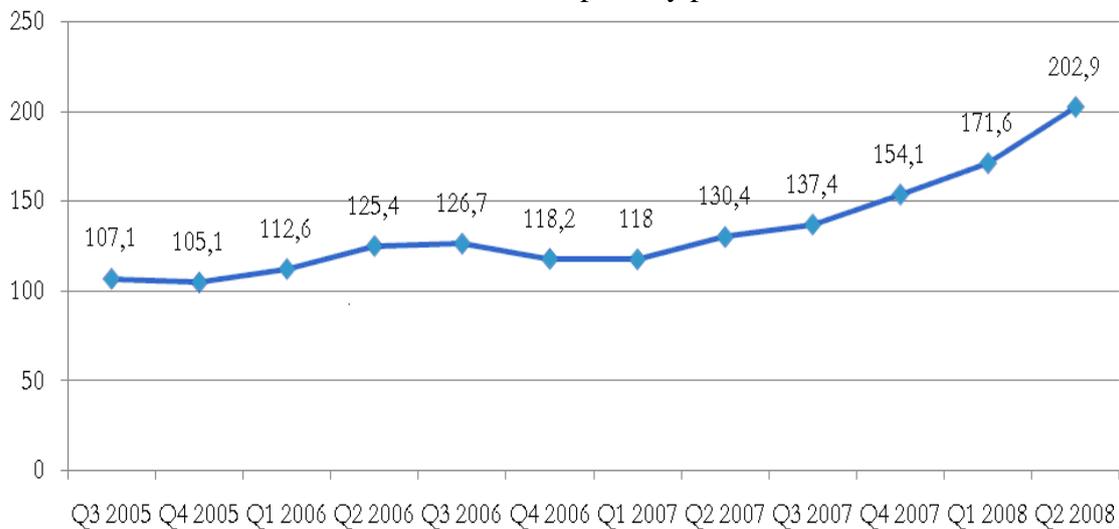
The income growth in emerging economies, China and India especially⁴, has provoked an accelerated growth of the demand: in the middle of 2008 it was increasing at 2% yearly (before was 1.5%) and it was supposed it would arrive to a 2.6% in a decade time if the GDP growth rate had continued like at beginning 2008⁵.

Loop 3: Impact of the rising of international agricultural prices over the development

This point is getting worse when there is a concentration of production. USA produces 40% of corn in the world and it has a share of more than 50% of exports of this product.

Fig. 7. Primary products price index

Source: IMF. 2005= 100 in dollar. IMF Index includes series of prices for 44 no-fuel primary products

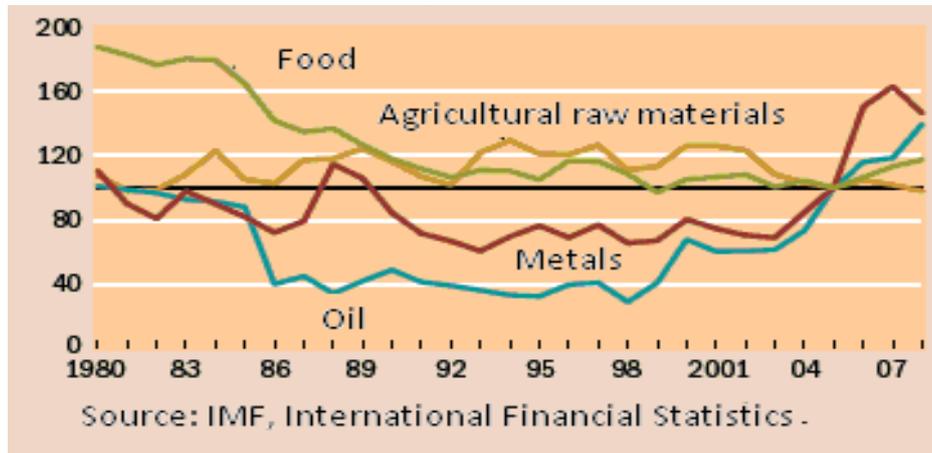
Loop 4: Increasing in cost of transport

The increasing of the oil prices has been propelled by the demand in place of the supply, like in the old times.

Loop 5: Agricultural production costs are getting expensive

The large prices of fertilizer and of the watering systems have impacted on costs.

Fig. 8. Real prices of basic products
Constant prices 2005 = 100



2.2. The last semester of 2008

Financial crisis has done a breaking in real sector and in the previous situation, which has not been evaluated yet and whose effects have appeared in a shady way only. This is because a concentration has been done on the rescue efforts of the financial markets without considering the commerce financing. In one side, financial crisis has done a short circuit in the financial flows of firms and commerce financing. In the other side, it is possible to observe that the aggregate demand is going down due to the GDP growth rate of countries like China is reducing.

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Fig. 9. Freights downfall

Source: Baltic Dry Index as of Dec 12th, 2008

Baltic Exchange Dry Index (BDI) ,
exponential average in red.
200 day exp. avr. green



Chart created with NeoTicker EOD © 1998-2007 TickQuest Inc.

Baltic Exchange Dry Index (BDI)Recent,
exponential average in red.

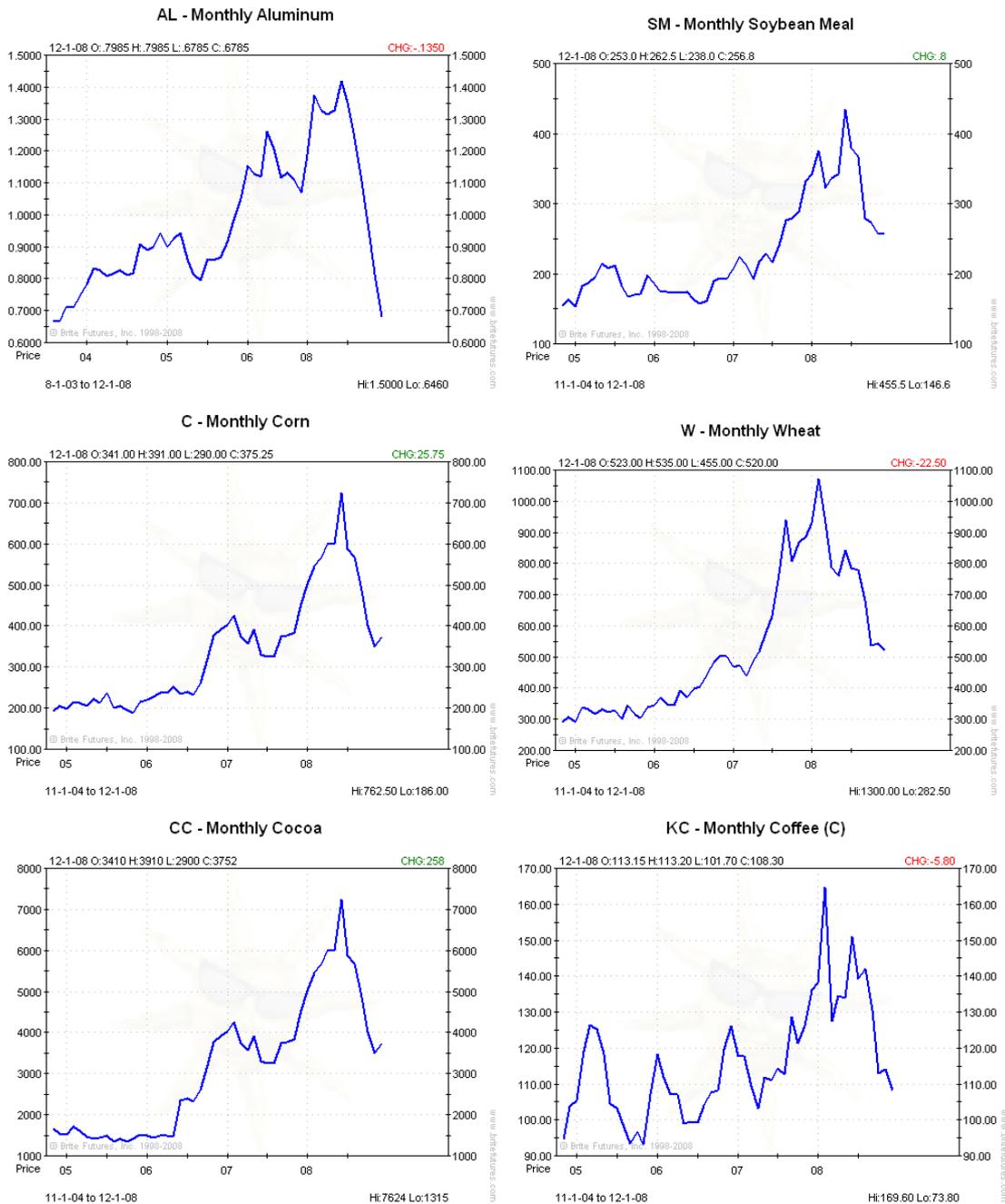


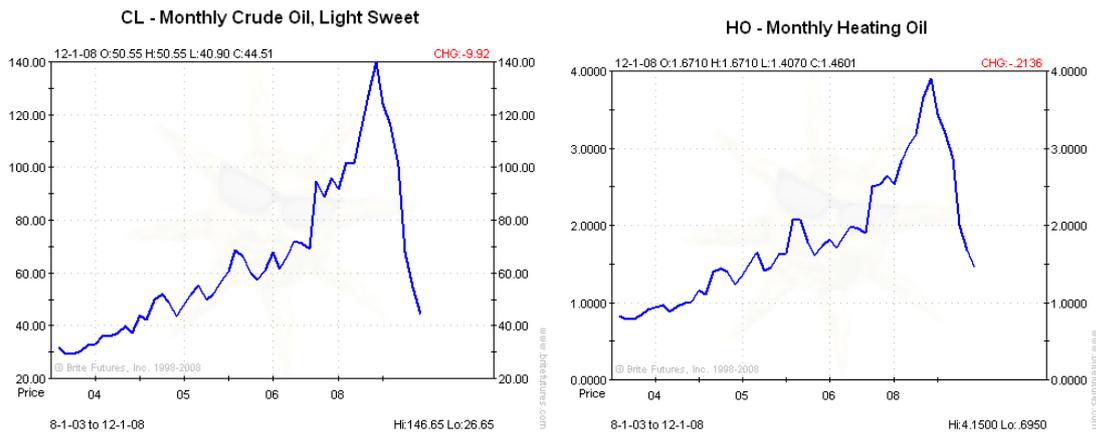
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The down in commerce flows it is due to the reducing demand. Moreover, it has been supported by the freights downfall (see figure 9). The letters of credit market, documentary or not, is dead because there has been problems and heavy doubts about solvency, this explain why the seller’s financial institution doesn’t want to accept them, except trading among subsidiaries or between sound and solvent partners.

Fig. 10. Commodities Futures market prices

Source: <http://www.britefutures.com/>





Strong changes have been produced in commerce behaviour from 2006 to nowadays; they have taken us to two polarized positions. First, they have done a rising in the basic goods market. Second, they did a great downfall in prices due to the economic activity in developed and emerging countries was decelerating. Optimists don't expect important changes before the next 18 months.

Now, the challenge is to indentify what part of the present situation is cyclical and what is structural.

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The coincidence between the impact of the financial market crisis and the real economy rigidity is beginning to be considered. In the last case, supply curves of a large number of commodities are inelastic; they don't change when marginal costs go down as a consequence of transference of R+D+I processes.

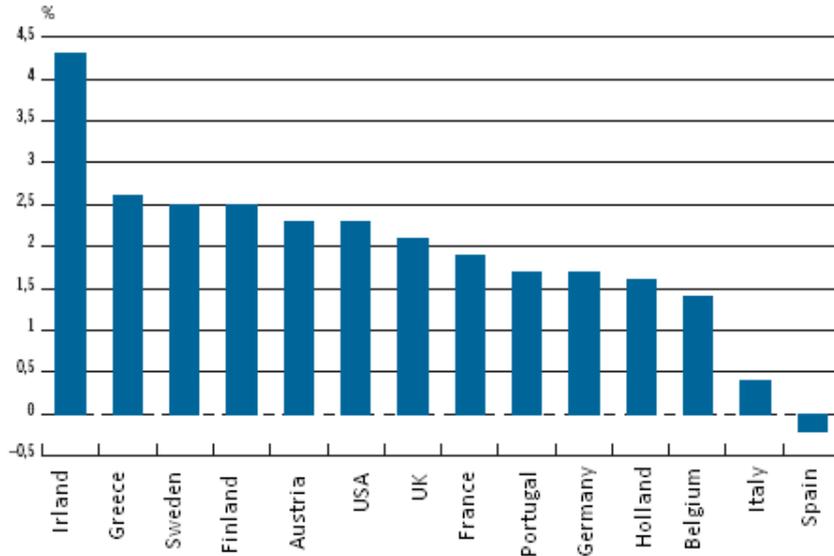
A prices downfall in futures on commodities is shown in figure 10, it foresees an important prices tearing down on them in the next months. In some markets it is speaking of a collapse.

3. THE NECESSITY OF A STRATEGIC COMMERCIAL POLICY FOR THE EUROPEAN UNION

Nowadays, the core discussion is on the necessity of some type of subsidies, more or less sophisticated, those imply rent transfer and if they are really Government financing to so call strategic sectors (they are hidden inside R&D investment) aimed to limit competence⁶. This practice is used in high tech companies with important resources. The strategic commercial policy argument seems the classic justifying of tariff temporal establishment in the case of a “start-up industry”⁷.

Fig. 11. GDP average growth per worked hour (1995-2006)

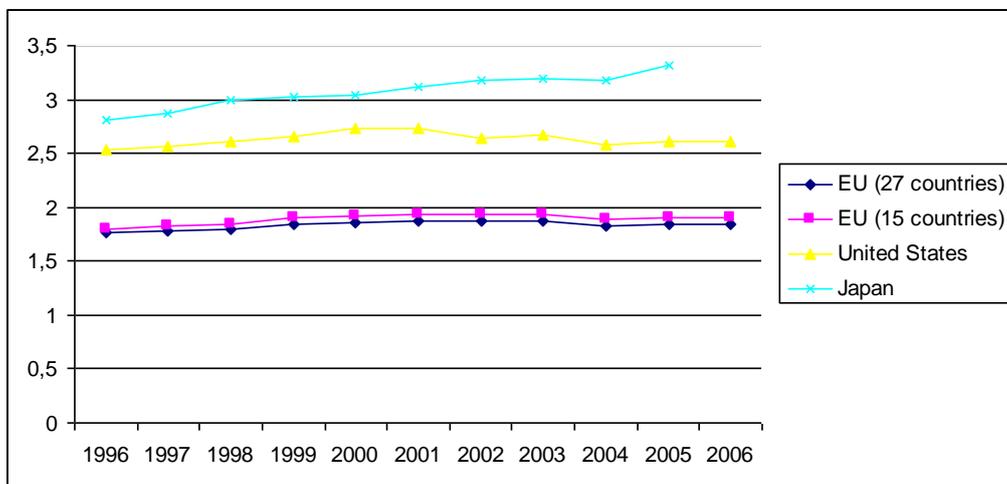
Source: Groningen Growth and Development Centre



The argument against critics on strategic commercial practices⁸ and their negative impacts are based on a simple theory of games application and on the well-known prisoner dilemma.

R&D investment pursues three targets: reducing costs, inventing new products and increasing productivity. The last shows values in the EU lesser than in USA (except Ireland, Greece, Sweden and Finland) with the loss of competitiveness (see figure 11). According to Solow⁹ “a large part of modern economies growth is due to technological progress”.

Fig. 12. R&D spending in all sectors (% GDP)



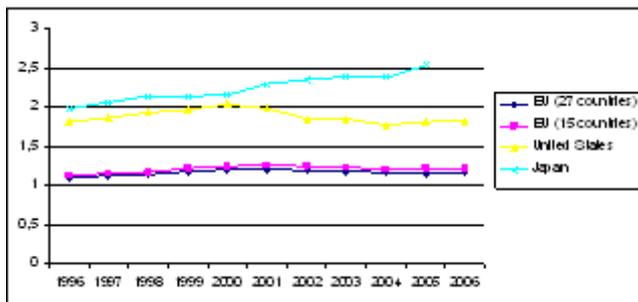
The R&D&I European policy requires necessarily a financing policy of these processes. Direct financing by public sector of developed projects by Universities, official research centres, etc., is not enough and, generally, is directed to basic research which is not benefited of the patent potential returns.

As it is possible to see in figure 12, considering all sectors, spending in R&D as a GDP percentage is much higher in Japan (above 3% in 2000) and USA (over 2.5% from 2000) than in EU where is placed under 2%.

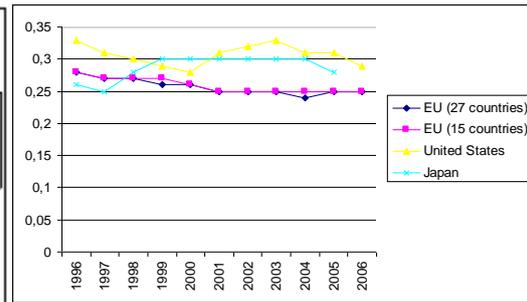
From the sector point of view (following Eurostat data) Japan and USA have centred their attention on business sector while the EU –in relative terms- pays big attention in higher education. They are models clearly different that supports very different postures about what it is expected from R&D&I.

Fig. 13. R&D Spending (% GDP)

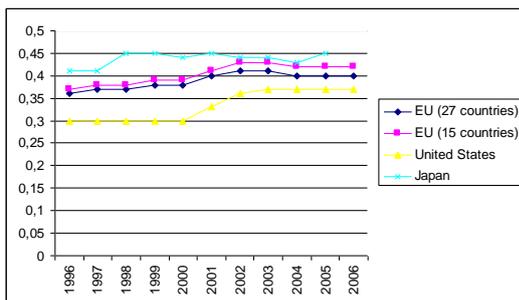
Business enterprise sector



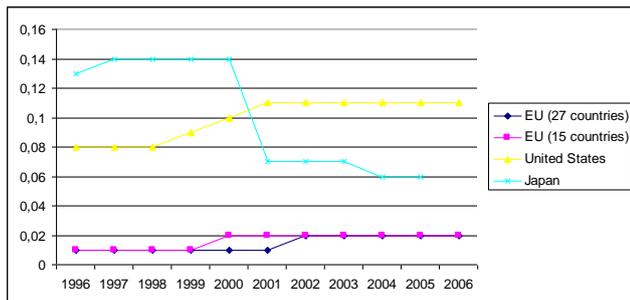
Government sector



Higher education sector



Private non-profit sector



In the other side, applied research is interesting by the companies and for this reason it can attract financing; this a reason to impulse it through an active policy of promoting technology innovation and research don't limited to a specific actions. This implies a fiscal policy for business in order they can compete in the markets. Small fiscal stimulus and joint venture development in EU directed to support a specific type of firms are not enough in comparison with the American medium size firms support system.

An additional reflection is derived from clearly different models live at the same time in the EU-27 (for example, Spain and Sweden). Probably, it is necessary a model of minima that respects positions of those States that have a large participation of business sector. Innovation is expensive and risky option therefore incentives are required. For example, according to several studies¹⁰, over 5,000-10,000 tested compounds (Biotech) only five will do clinic testing and one of this will be approved by FDA in USA. So, only two out of ten approved drugs get recover their costs and -moreover- a R&D project implies a range between 10-15 years of development (see figures 14 y 15).

Fig. 14. The R&D process in biotech

Source: <http://www.phrma.org>

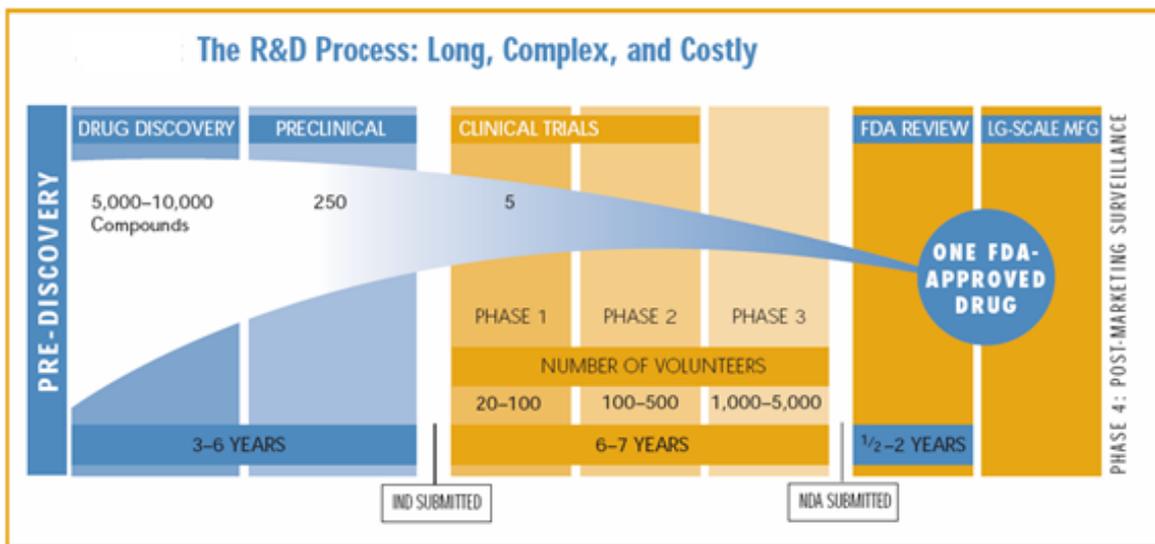
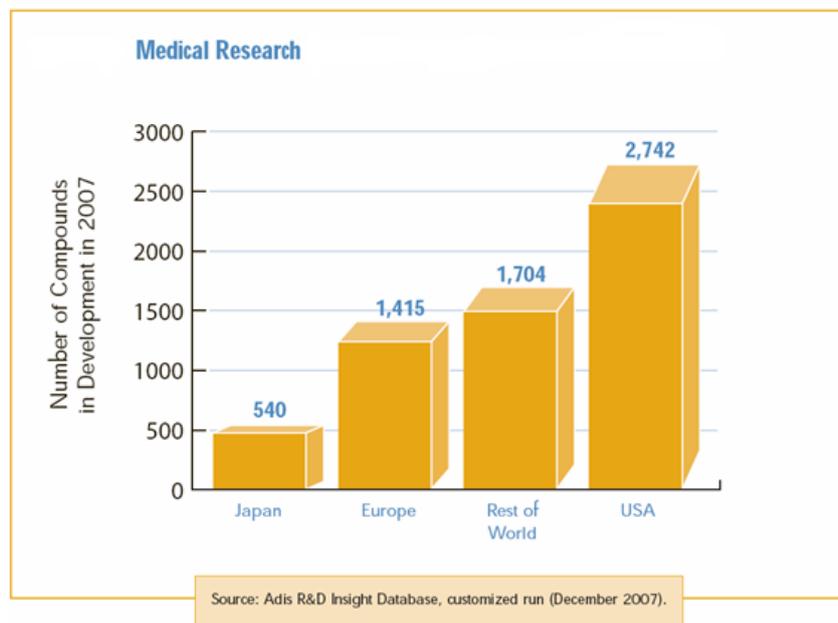


Fig. 15.

Source: <http://www.phrma.org>



It is necessary to create zones of technology support that act like business farms in which tech start-ups¹¹ are living (all of this by public initiative and supranational preferably); they benefit of external economies and economies of scale in base to the competence in a market economy.

The important of adopting in EU, as soon as possible, a series of measures like indicated before is a very important issue in this moment (in the core of a large crisis); it is demonstrated by the dramatic descent of gross fixed capital formation from 2006 and the downturn of Current Account Balance that pushes down to investment and employment (see figures 16 and 17).

Fig. 16. EU Gross Fixed Capital Form (%)

Source: Forecast BBVA Servicio de Estudios. Sept. 2008

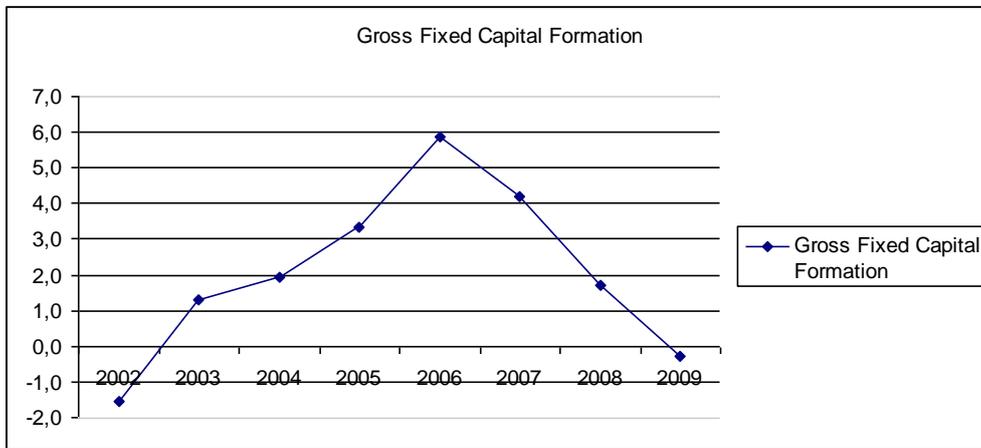
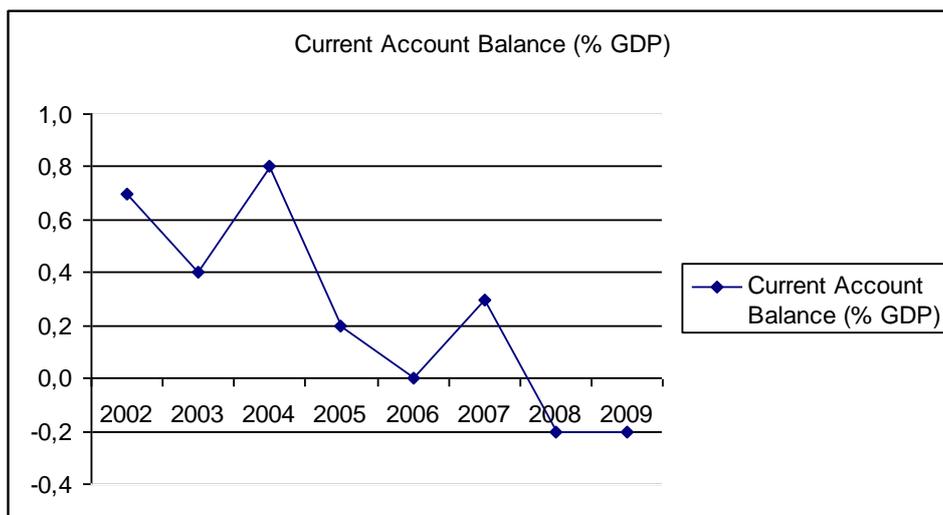


Fig. 17. EU Current Account Balance (% GDP)

Source: Forecast BBVA Servicio de Estudios. Sept. 2008



4. CONCLUSIONS

The present volatility has risen to an outstanding high level that does foreseeing very difficult. However, the evolution of OECD countries macro-magnitudes has showed the beginning of deep adjusts as a monetary level as a real level of economies.

Temptation to establish a protectionism, which is a typical reaction to fight against recessions, it is not a recommendable way to recover GDP growth rates compatibles with a re-launching of the economies.

Reinforcing multilateralism dialoguing among economic blocks it is a necessary condition to stimulate markets but it is not a sufficient condition. Now, from the EU point of view, answering jointly is more necessary than ever in relation with the change in the global scenery; and that answer must be materialized in designing a strategic commercial policy that rests on the supporting to technological advances which push up production, trading and sales.

This implies defining an R&D&I model that encourage participation, impulse, and the leading role of business sector. The idea is to consider R&D&I investment as a part of a company job. Naturally, incentives must be required to adopt this role, as in whatever other business decision.

Characteristics of both aspects (R&D&I investment and procedures to stimulate it) must be the subject of a common work by national representatives of the different models existing in the EU-27.

The technique consisting in to impoverish to the neighbour it is not a medium-long term strategy because it works like a boomerang. By the opposite side, stimulating imports of the good and intermediate services (*off-shoring*) as an application of comparative advantage, it would increase the productivity of the countries and it would assure a good long-range net effect which would compensate initial adverse effects.

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- ⁶ See Brander-Spencer model, pioneer in this type of argument: Brander, J y Spencer, B. (1983): "International R&D Rivalry and Industrial Strategy". *Review of Economic Studies* 50, pp. 707-722
- ⁷ See Sara González (2002), cap. 5, pp. 93-102.
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- ⁹ Solow, R. (1957): "Technical change and the aggregate production function", *Review of economics and statistics* 39, pp. 312-320.
- ¹⁰ See, <http://www.phrma.org/files/2008%20Profile.pdf>. See, Mascareñas, J. (2005) y Gutierrez, E., Jiménez, J. y Mascareñas, J. (2006)
- ¹¹ In this way in USA they exist different business farm that attract firms like Plug and Play Tech Centre that have got nowadays around 170 tech start-ups.

