

# QUALITATIVE AND QUANTITATIVE ANALYSIS OF BAYER AG

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Science For A Better Life 

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**3<sup>rd</sup> Business Administration. EUS Group**

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Science For A Better Life

# Part 1: Qualitative



## INTRODUCTION

### Mission and values

Founded in 1863 and headquartered in Leverkusen, Germany, since 1912, Bayer is known as an inventor company, a researcher which applies its scientific expertise to create innovations in order to pursue its slogan, Bayer: Science For A Better Life. According to its mission:

“Bayer is a global enterprise with core competencies in the fields of healthcare, nutrition and high-tech materials. As an inventor company, we set trends in research-intensive areas. Our products and services are designed to benefit people and improve the quality of life. At the same time we aim to create value through innovation, growth and high earning power. We are committed to the principles of sustainable development and to our social and ethical responsibilities as a corporate citizen.”

With respect to the Bayer’s values, they can be summarized in a word which in turn belongs to its slogan: LIFE, Leadership, Integrity, Flexibility and Efficiency.

### History and achievements

Bayer was founded 150 years ago, in 1863, Germany. Since then, Bayer has been improving people’s quality of life.

Subgroup	Past	Today
<b>Healthcare</b>	In 1899, Aspirin developed by Felix Hoffmann was introduced in the market and soon achieved worldwide fame as a pain killer.	Today Aspirin remains among the company’s best-selling health care products.  Bayer Group generates half of its sales with healthcare products, which is among the world’s leading innovators in medicine.
<b>CropScience</b>	In 1892, Antinonin, the world’s first insecticide was launched to control caterpillars.	Today, Bayer is among the world’s leading suppliers to the agriculture industry.  Cropscience supposed in 2012 a 20% of total sales of the Group.
<b>MaterialScience</b>	In 1937, Otto Bayer invents polyurethanes for the manufacture of foams. The uses include insulating buildings against heat or cold, which helps to save energy. Also thanks to polyurethane coatings, surfaces can be	Today, Bayer MaterialScience is among the world’s largest polymer manufacturers, with sales of roughly 30% of the Group in 2012.  Supplier of high-performance materials plays an important role in conserving fossil resources: lightweight materials in cars helps

protected for longer than ever before to reduce fuel consumption.

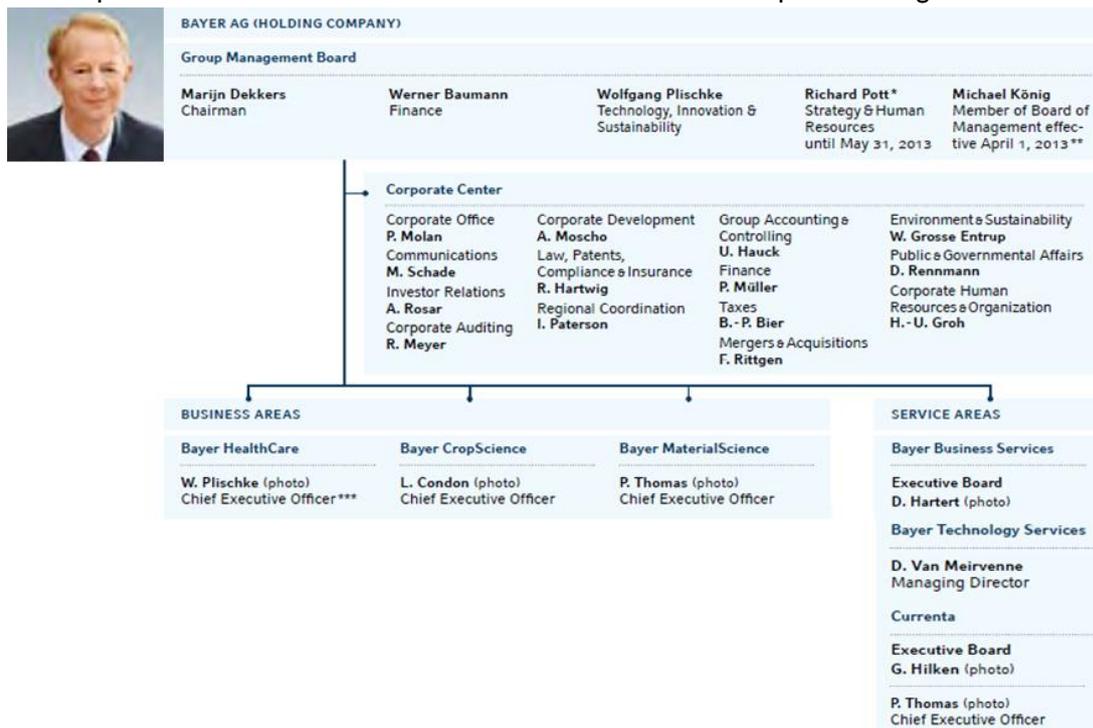
## CORPORATE STRUCTURE

The Bayer Group comprises 291 fully consolidated companies on the five continents. The Group is headed by a management holding company, Bayer AG, which Board of Management is committed to serving the interests of the entire enterprise and achieving a sustained increase in corporate value. It also defines corporate strategy, setting the budget and allocating corporate resources for the whole Group. Headed by Marijn Dekkers, the Board of Management publishes quarterly reports and also ensures that the Supervisory Board receives regular information.

The Supervisory Board is formed by 20 members and its function is to oversee and advise the Board of Management. Half of members of the Supervisory Board are elected by the stockholders, and half by the company's employees. The chairman is Werner Wenning, and he and the rest of members are directly involved in important decisions to the company and confer with the Board of Management on the company's strategic alignment. There are 4 committees: Presidential Committee, Audit Committee, HHRR Committee and Nomination Committee.

Due to the Bayer huge structure, they have their administrative functions done outside their operational subgroups, in the called Corporate Center, which it is dedicated to Finance, Taxes, HHRR, Patents, and Corporate Office in general.

The corporate structure can be seen graphically in the next picture, where it appears the photo of the Chairman of the Group Management Board.



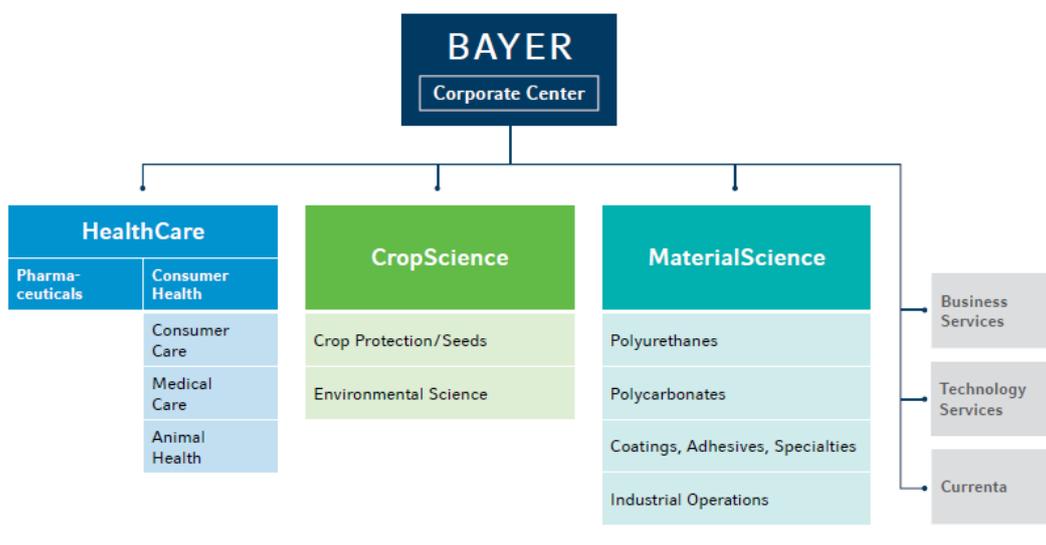
Both Board of Management and Supervisory Board sets the strategic framework for the subgroups and services companies, which operate all as separate legal entities, AG for the former, GmbH for the latter.

The business is divided among three operational subgroups: Bayer Healthcare AG, Bayer CropScience AG and Bayer Material Science AG and three service companies – Bayer Business Services GmbH, Bayer Technology Services GmbH and Currenta GmbH – which provide services for both internal and external customers. The corporate Center supports the Group Management in its task of strategic leadership.

Making another zoom in the subgroups and the services companies we can see how these are internally divided, that is, their scope, in what they are dedicated.

Bayer Group Structure

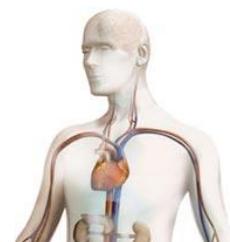
[Graphic 3.1]



We can distinguish 3 operating subgroups dedicated each one to a branch of science: to make life healthier, to improve agriculture quality and to create new high-tech materials to be more efficient. The other 3 services companies helps to the Group's daily ongoing. More specifically,

**HealthCare AG** subgroup is among the world's foremost innovators in the field of pharmaceutical and medical products. The mission is to research, develop, manufacture and market innovative products that improve the health of people and animals throughout the world. It is divided into two segments: **Pharmaceuticals** and **Consumer Health**.

The **Pharmaceuticals** segment focuses on **prescription products** such as cardiovascular medicines, anticoagulants, contraceptives, and also in the fields of oncology, hematology and ophthalmology. In the pharmaceuticals market Bayer is among the world's top 15 companies in terms of sales.



Their **Consumer Health** segment includes the Consumer Care, Medical Care and Animal Health divisions. The main focus of the **Consumer Care**



Division is on **non-prescription medicines** for the prevention or treatment of common ailments such as *Aspirin*, and dietary supplements to support a healthy diet such as



*Supradyn*. **Medical Care** offers blood glucose monitoring devices; diagnostic imaging equipment such as contrast injection systems, magnetic resonance, and mechanical systems for removing thrombi from blocked blood vessels. Last but not least, **Animal Health**

Division is destined to maintain animals' health, focusing on infectious diseases and repelling parasites. In livestock for food safety and companion animals for receive an easy-to-use medication to care for them and their owners.



**CropScience AG** subgroup is among the world's leading companies in the areas of crop protection, non-agricultural pest control and seed and plant traits. Contributing in the production of food, feed and fiber, the company offers several solutions for modern, sustainable agriculture and non-agricultural applications. It is organized into two operating segments: **Crop Protection / Seeds** and **Environmental Science**.

**Crop Protection / Seeds** division has high-value seeds and traits by chemical and biological pest solutions, and offers extensive service backup for sustainable agriculture.

**Crop Protection's** mission is to help every inch of their fields thrive and stay healthy. Its portfolio of herbicides, insecticides, fungicides and seed treatment products, can help farmers struggling with the harshest of environments.



**Seeds'** scope is breeding techniques, genetic analysis and targeted trait development, which offer smart ways to their boost taste, nutrient quality and look, and help plants survive the barrage of stresses they meet out in the field. They are experts in cotton, oilseeds and vegetables, as well as wheat and rice.

**Environmental Science** division focuses on **non-agricultural applications**, in keeping people's environments hygienic and beautiful, without ever letting them down on safety and sustainability. Supported by a board portfolio of chemicals pest control products and services, the scope goes from indoor like home, restaurants to gardeners and forestry. And finally,

Bayer **MaterialScience AG** subgroup is among the world's largest manufacturers of high-tech materials and develops innovative products and solutions used in many key industrial sectors such as automotive, construction and electronics to bring about sustainable improvements to the quality of life. They are focused on sustainable solutions for the major challenges of our times such as climate change, scarce resources and



Together on tour: The automotive industry is supplied by all three business units.

growing mobility. MaterialScience is organized into the **Polyurethanes**, **Polycarbonates**, and **Coatings**,



*Solar Impulse With innovative high-tech polymer materials and energy-saving lightweight materials Bayer is helping to enable the Solar Impulse aircraft to circumnavigate the globe powered by solar energy alone.*

**Adhesives, Specialties** business units, and the **Industrial Operations** area.

**Polyurethanes** division is the world's largest producer of the components needed to produce them. They can be rigid and brittle as well as soft and elastic, and whether in upholstered furniture, insulating board, a ski boot or a bed mattress. This business unit generated sales of one half of total sales. In addition to high-volume basic products, customers also receive tailored solutions from a worldwide network of systems suppliers.



A mattress simple examined under an electron microscope. Flexible polyurethane foam due to the cells are open.

**Polycarbonates** division is the world leader in this field. This high-tech plastic from Bayer can be found over the world. Customers range from the automotive and electrical/electronic industries to the construction and medical equipment sectors. In addition to granules, the company supplies polycarbonate sheets and customer-specific blends via compounding centers all over the world. Transparent, shatterproof and eminently shapeable: the high-tech plastic polycarbonate gives us more lightweight cars and makes bold roof structures possible.



**Coatings, Adhesives, Specialties** division examples are environment-friendly coatings that dry by means of ultraviolet rays; adhesives that are solid yet elastic.

**Industrial Operations** area supports the business units in the performance of their tasks such as safe plants, a reliable supply of raw materials and the efficient use of resources.

Bayer AG's globally subgroups, HealthCare, CropScience and MaterialScience, are supported by their three service companies: Business Services, Technology Services and Currenta.

**Bayer Business Services GmbH** is the Bayer Group's global competence center for IT and business services. Some 6,400 highly skilled, customer-focused employees work for Bayer Business Services throughout the world to support the Bayer Group's business processes in the most efficient way possible. Bayer Business Services offers Bayer companies competitive and innovative services wherever and whenever they need them. Its portfolio is focused on services in the core areas of IT infrastructure and applications, procurement and logistics, human resources and management services, and finance and accounting.

**Bayer Technology Services GmbH**, the global technological backbone and a major innovation driver of the Bayer Group, is engaged in process development of innovative technology solutions, plant engineering, construction and support for the safe and cost-optimization of plants. In other words, it stands for integral solutions over the entire life cycle of plants and processes.

**Currenta GmbH** offers services for the chemical industry including utility supply, waste management,

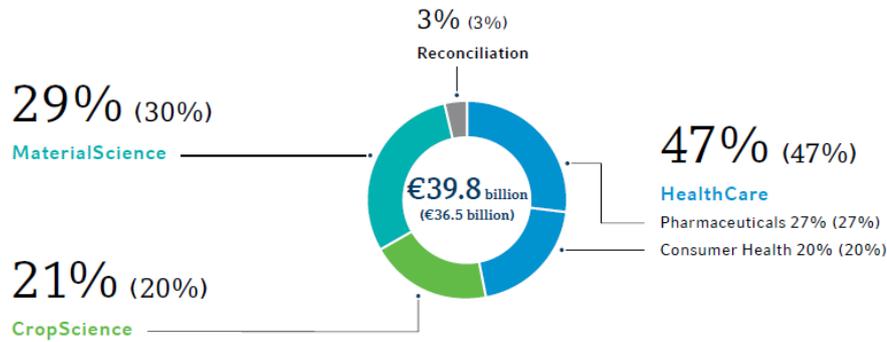


infrastructure, safety, security, analytics and vocational training. Currenta is a joint venture between Bayer AG and LANXESS AG, and it also offers some of these services to customers located outside CHEMPARK.

In order to know how important each section is, we may know it seeing their percentages of total sales in the next graph.

Share of Sales by Segment 2012

[Graphic 3.2]



2011 in parentheses

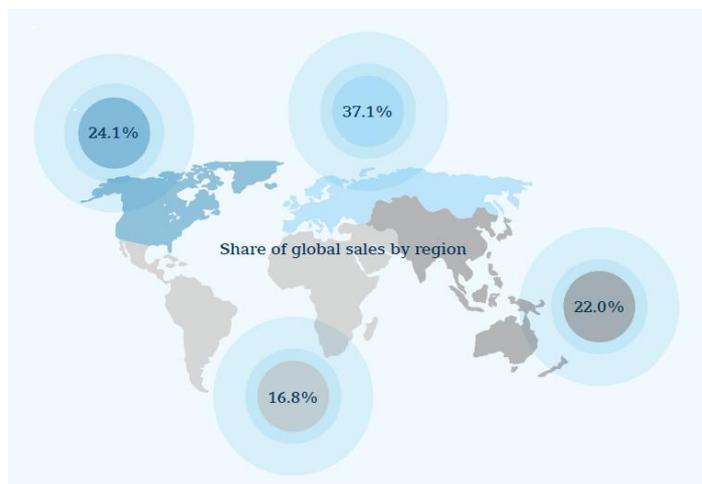
Healthcare subgroup represents a half of total sales, followed by MaterialScience subgroup with a 29% of total sales and a 21% from CropScience. As we can see, sales have increased a 10% approximately with respect to 2011, getting closer to the €40 billion, whereas the percentage of sales of each subgroup has remained constant. Bayer Business Services, Technology Services and Currenta service are reported in the reconciliation, which also includes the Corporate Center and the consolidation effects. In the next table we can see it in absolute terms.

## THROUGHOUT THE WORLD

Bayer is a multinational company present in the five continents. Its geographical scope is divided by 4 main markets: Europe, North America, Asia/Pacific and Latin America/Africa/Middle East.

In **Europe**, Bayer achieved sales of €14,7 billion in 2012, a 37,1% of total sales, what means the greatest share of sales is in the European market, where work 52300 employees.

In **North America**, 15300 employees generated €9,6 billion in 2012, a 24,1% of total sales, being the second



greatest market of Bayer.

**Asia/Pacific** constitutes a challenge of growth for the company, due to it is likely to be the main market in the future. In 2012 there were generated €8,8 billion in sales, a 22% of total sales working 26700 employees.

The fourth and last region is **Latin America/Africa/Middle East**. In 2012 there were working 16200 employees, and €6,7 billion in sales were generated, a 16,8% of total shares.

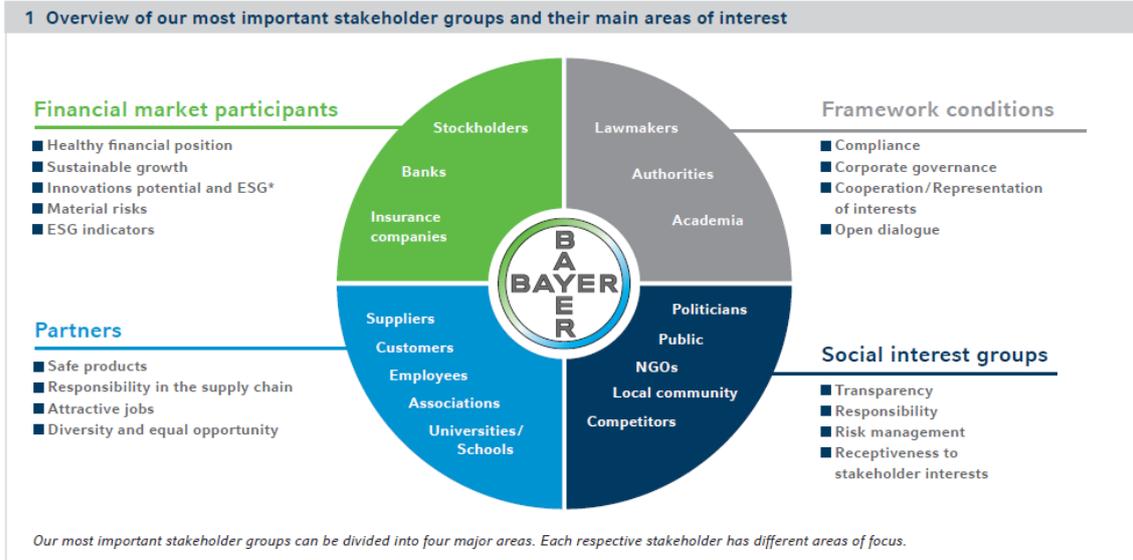
Some data with regard to the Bayer's scope, in absolute terms:



The Bayer Group in 2011 in figures (values for previous year in parentheses)					
	North America	Latin America/Africa/ Middle East	Europe	Asia/Pacific	Total
Sales (€ million)	8,177 (8,228)	6,068 (5,628)	14,441 (13,751)	7,842 (7,481)	36,528 (35,088)
Employees	15,800 (16,400)	16,400 (16,100)	53,600 (54,300)	26,000 (24,600)	111,800 (111,400)
R+D expenditures (€ million)	528 (612)	42 (35)	2,187 (2,246)	175 (160)	2,932 (3,053)
No. of fully consolidated companies	42 (42)	44 (43)	139 (150)	58 (53)	283 (288)

## STAKEHOLDERS AND STOCKHOLDERS

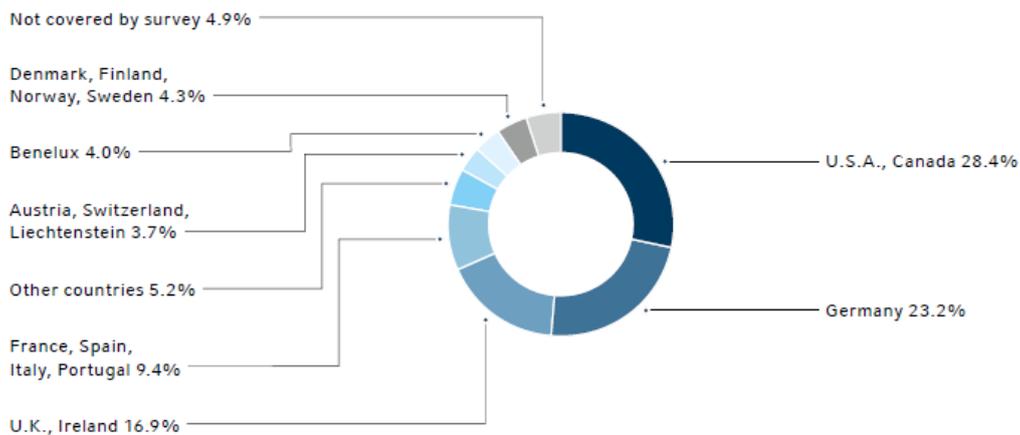
Bayer's purpose is also focused on creating value, not only for their customers, and their employees, but also for their stockholders. The stakeholders are shown in the next graph.



The capital stock of Bayer AG on December 31, 2012 amounted to €2,117 million, divided into 826,947,808 registered shares, with right to get paid dividends. Each share confers one voting right. Shareholders are shown in the next graph by country.

Ownership Structure by Country

[Graphic 2.5]



As we can see, more than three quarters are owned by foreign capital.

The top ten shareholders of the company, according to Amadeus register are:

	Shareholder	%	%	
1.	<b><u>PUBLIC</u></b>	83.96	n.a.	jul 2012
2.	<b><u>CAPITAL GROUP COMPANIES, INC., THE via its funds</u></b>	5.94		sep 2012
3.	<b><u>BLACKROCK, INC. via its funds</u></b>	4.23		oct 2012
4.	<b><u>GOVERNMENT OF NORWAY via its funds</u></b>	2.16		ago 2012
5.	<b><u>FMR LLC via its funds</u></b>	1.70		sep 2012

6.	<u>DODGE &amp; COX via its funds</u>	1.64	sep 2012	↻
7.	<u>STATE STREET CORPORATION via its funds</u>	1.64	sep 2012	↻
8.	<u>SUN LIFE FINANCIAL INC via its funds</u>	1.44	sep 2012	↻
9.	<u>DEUTSCHE BANK AG via its funds</u>	1.26	sep 2012	↻
10.	<u>BANK OF NEW YORK MELLON CORPORATION via its funds</u>	1.22	sep 2012	↻
11.	<u>SOCIÉTÉ GÉNÉRALE via its funds</u>	1.12	sep 2012	↻
12.	<u>DEKABANK DEUTSCHE GIROZENTRALE via its funds</u>	1.09	sep 2012	↻
13.	<u>ALLIANZ SE via its funds</u>	1.07	sep 2012	↻
14.	<u>MORGAN STANLEY via its funds</u>	1.07	sep 2012	↻
15.	<u>BNP PARIBAS via its funds</u>	1.04	sep 2012	↻

## PRODUCTS, DISTRIBUTION AND MARKETS

### Global Economy

	Growth in 2011	Growth in 2012
World	+ 3.0%	+ 2.6%
European Union	+ 1.6%	- 0.2%
of which Germany	+ 3.0%	+ 0.7%
United States	+ 1.8%	+ 2.3%
Emerging markets	+ 6.2%	+ 4.9%

\* Real GDP growth

Global economic growth continued to slow in 2012. This was mainly due to the crisis in the eurozone, which caused tangible anxiety among consumers and investors. Growth was also hampered by the fact that oil prices remained high. There was, however, a positive stimulus from the still very expansionary monetary policy in the industrialized countries.

The world economy is predicted to grow at about the same pace in 2013 as in the previous year. The main factors are the economic crisis in Europe and the high level of government debt in a number of industrialized countries. Bayer continues to anticipate relatively strong growth in the emerging markets especially in China and Brazil, because they are to show stronger growth in 2013 following a relatively weak prior year.

### Business development by subgroup:

Bayer had a very successful year in 2012, both strategically and operationally. The group achieved its targets and made progress with its innovation projects in the subgroups.

**Healthcare.** The most important products that Bayer group offer are: **Xarelto** – medicine for blood clotting, **Aspirin** to protect against heart attacks and **Adalat** to treat high blood pressure and coronary heart disease. Also have women’s healthcare products such as Yasminelle and Mirena contraceptives, and hormone replacement therapies like Angeliq. The firm also offers specialty



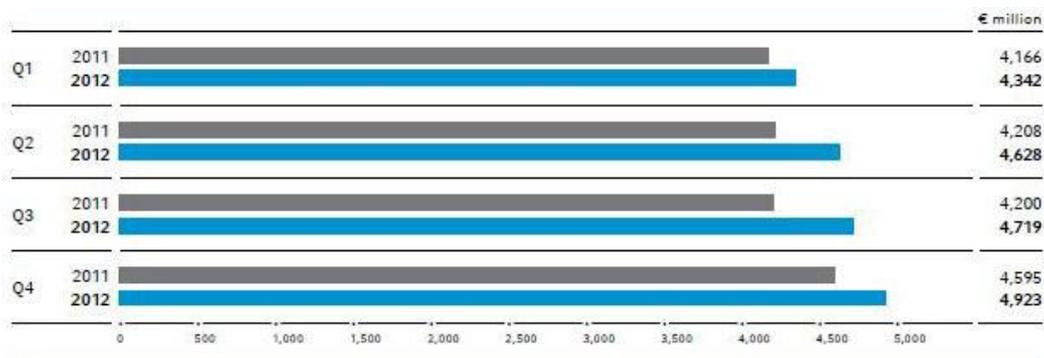
pharmaceuticals like Betaferon for multiple sclerosis and Nexavar for treatment of certain types of cancer. Their pharmaceutical products are primarily distributed through wholesalers, pharmacies and hospitals. Agreements between pharmaceuticals companies for better R+D ensures optimum progress in this area, conferring regional marketing rights that enable

the partners to share in the products expected success.

The Consumer Care Division specializes in medicines available **non-prescription** products. The sales and distribution channels are generally pharmacies, although supermarket. In the Medical Care Division they offer blood glucose monitoring with **high-new-technology**. In Europe these products are generally sold to consumers mainly through pharmacies while outside Europe through pharmacies, drugstores, hospitals or wholesalers. The Animal Health Division offers pharmaceuticals and grooming products. These products are available to end users as prescribed by a veterinarian or prescription-free from veterinarians, pharmacies or retail stores. In terms of sells, Bayer is the world’s fourth-largest animal health company.

The restrictive health policy hold framework the expansion of the pharmaceuticals market in the United States and the major European countries. And the demand for prescription and non-prescription medicines in the emerging markets such as Brazil, China and Russia rose as health services became accessible to broad segments of the population.

Sales of the HealthCare subgroup rose by 4.2% in 2012 in both the Pharmaceuticals and the Consumer Health segments contributing to this growth respect to the previous year. Business developed well in the **North America** and **emerging markets**, especially in China.



Bayer expects growth in 2013 in the pharmaceuticals market to continue to be driven by emerging markets, **BRIC**. The United States and European countries are likely to declines due to result of persistently restrictive health system policies.

### CropScience.

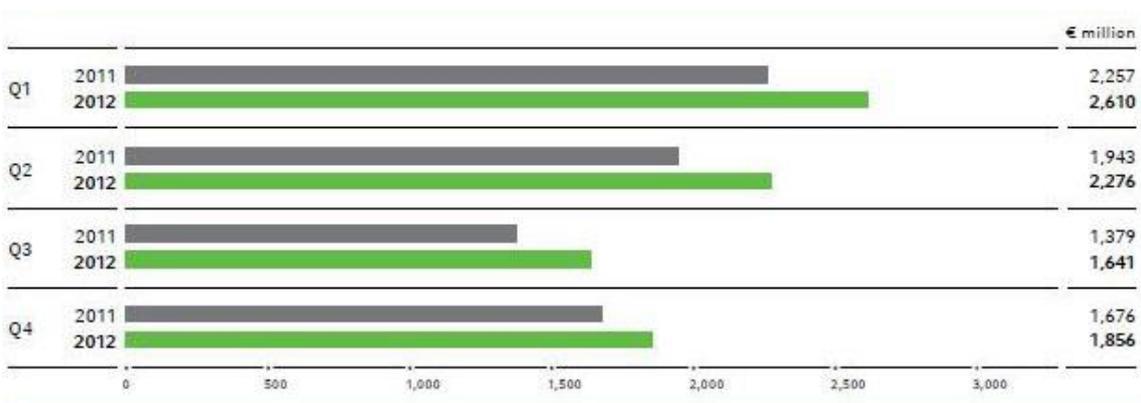
The Crop Protection business is based on a broad portfolio of highly effective **herbicides, fungicides, insecticides** and **seed treatment** products. These products are distributed via wholesalers or directly through retailers. In the BioScience business unit, the distribution activities are focused on seed production in the four core crops of oilseed rape / canola, cotton, rice and vegetables. In these four crops the company has achieved strong market positions and is globally represented.



The products of Environmental Science business unit, designed for **non-agricultural** uses, are based on proprietary and unlicensed active ingredients. Their home and garden products are sold to consumers through wholesalers and specialist retailers. In terms of sales, Bayer is the world's leading suppliers of non-agricultural pest and control products.

And finally, the global **seed and crop protection** market continued to show dynamic development in 2012 and it was again driven by Latin America, particularly Brazil. Also, the generally positive market trend continued in 2012 in Asia. And, in area of crop protection, China and India showed strongest markets growth.

CropScience increased sales in 2012 by 12.4% in an attractive market environment.



This growth was due to good business with new products in Crop Protection and quickly expanding sales of Seeds. Environmental Science also developed favourably. The realignment of Bayer's marketing, the distribution activities and efficiency of the product range contributed to the rewarding performance.

In seed and crop production Bayer expects the market environmental in 2013 to remain positive due to the market grew by more than 10% in 2012 for the second straight year. Farmers' economic prospects are also likely to remain positive, spurring investment in high-value seed and crop protection products.

**MaterialScience.** The products of Material Science are mainly used in the automotive, construction, electrical / electronics and furniture industries. The principal products that have are: **Baydur** which is Polyurethane integral-skin foam and molding systems for appliance housings,



medical equipment, sports goods, sanitary items and furniture; **Fantasia** – is a number of technologies for coloring plastics, especially of finished plastic products;

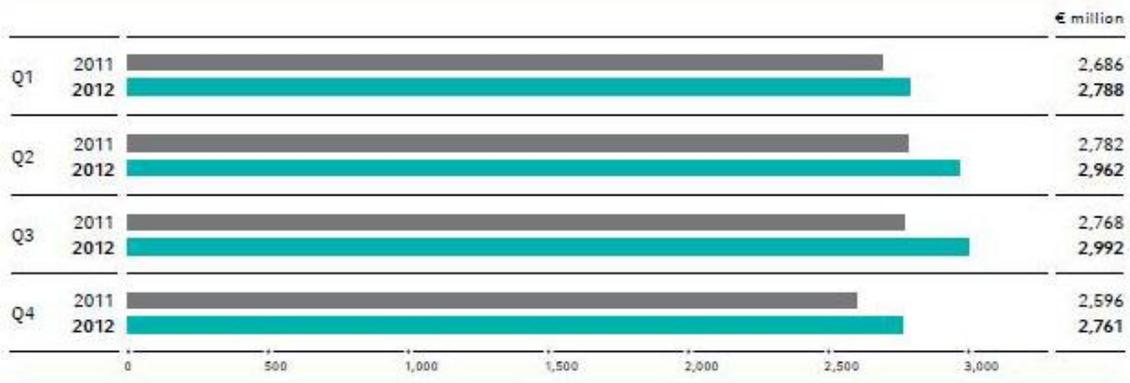


**Makrolon** - transparent, impact-resistant polycarbonate for CDs, DVDs, automotive applications, architectural glazing, electrical and electronic applications. MaterialScience as

Cropscience, has regional and local channels for distribution, making increasing use of e-commerce platforms for order processing. They also work with trading houses and local distributors.

This subgroup has been benefited of the global automotive industry growth as well as the global construction industry. The growth has been in the major Asian countries. Moreover, the global electrical / electronics industry experienced solid growth in 2012 as a result of its broad diversification. These demand continued to increase, particularly in the BRIC countries thanks to the deployment of new technologies and innovations. And the decreasing furniture industry in Europe was compensated by Asian markets.

Sales of the MaterialScience subgroup rose in 2012 by 3.0%.



This growth was mainly the result of an overall increase in volumes, which were flat with the previous year in Europe but posted good gains in the other regions. In addition, Bayer was able to slightly raise prices in all regions except Asia / Pacific.

For 2013, the company predicts continue stable growth in the principal global customer industries for MaterialScience. In four segments: automotive, construction, electrical / electronics and furniture industry, they expect slower growth than 2012. And sales are likely to go increasing in emerging markets, BRIC, while in Western Europe is expected to decline.

## PROCUREMENT AND PRODUCTION. SUPPLIERS

In 2012, purchase orders for goods and services worth a total of €18.1 billion from 101,000 suppliers in 125 countries. Production specific procurement activities, like production itself, are organized separately for each subgroup. However, the procurement of indirect goods and services that are not relevant to production is centrally organized within the service companies.

3 Number of suppliers and procurement expenses by economic region (percent)		
	Suppliers	Spending
OECD countries	73	84
Non-OECD countries	27	16

4 Purchasing volume in OECD and non-OECD countries (percent)				
Spending OECD	Germany	United States	Japan	Other
		31.4	20.4	7.0
Spending Non-OECD	China	Brazil	India	Other
		6.2	3.0	2.3

As we can see, most of the suppliers and the spending related to it, are located in the OECD countries, especially in Germany, the country where Bayer is headquartered, and United states.

The Bayer Supplier Code of Conduct forms the basis for the work with suppliers. This code of conduct is an established part of Bayer supplier selection and evaluation process and is contractually integrated into ordering systems and agreements throughout the Group.

**Healthcare.** The Product Supply unit of HealthCare steers the subgroup's entire supply chain utilizing a global production network consisting of its own sites and those of subcontractors. In this way it's possible to reduce costs, increase the flexibility and delivery reliability.



The **Pharmaceuticals** segment generally procures the starting materials for the active ingredients of its prescription pharmaceuticals from external suppliers. The active ingredients are manufactured in Germany and United States. These substances are processed into finished products and packaged worldwide. Theses medicines come in a wide range of delivery

forms including solids, semi-solids and liquid pharmaceuticals used in injections or infusions.

In **Consumer Health** segment the Consumer Care Division produces certain active substances, such as acetylsalicylic acid and clotrimazole, within the Bayer Group in La Felguera, Spain. The principal raw material is paracetamol. For the Medical Care Division, the Diabetes Care products are mainly procured from original equipment manufacturers. The majority of medical devices are manufactured at the U.S. sites. The Animal Health Division procures the pharmaceutical active ingredients for its veterinary medicines both from within the Bayer Group and from external suppliers throughout the world. The animal health products are manufactured mainly in Germany, and United States, and marketed worldwide.



**CropScience.** CropScience manages procurement and production as a unit, enabling an integrated supply chain from raw material purchase through end-product manufacture to warehousing. These raw materials are procured externally and on the basis of long-term agreements. In this case the aim is to improve the cost structures, increase flexibility and ensuring a reaction more quickly to market volatility. The CropScience products are manufactured at production sites and formulating facilities of Bayer's own around the world. The largest are the facilities in Germany, United States and India.

**MaterialScience.** The procurement in this subgroup is globally controlled by an organizational unit "Procurement and Trading." The aim is to optimize internal structures and processes to ensure that procure raw materials, energies and services. The operation of the production facilities requires large amounts of energy, mostly in the form of electricity or steam. The production facilities of MaterialScience are centrally managed by the Industrial Operations unit. The major production sites are located at Belgium, Germany and Spain. Each of these sites is managed by the respective business unit.

## STRATEGY

As an innovation company with the mission "Bayer: Science For A Better Life," Bayer focuses on its core competencies in developing new solutions for the fast-growing, innovation-driven areas of health care, agriculture and high-tech materials. Based on this innovation capability and other core competencies, they are pursuing a value-creating strategy of sustainable and profitable growth in their businesses. They consistently exploit both organic and external growth opportunities while at the same time optimizing structures and processes and improving their cost base.



**-Portfolio:** They plan to continue playing leading roles in attractive markets and to steadily expand the strong positions they already hold, placing special emphasis on the development of their life-science businesses. They also aim to leverage research synergies by gaining a better understanding of human, animal and plant biology.

**-Growth:** They are systematically investing in their innovation capabilities and maximizing the value of their research and development pipeline and their technological expertise. They are also taking advantage of opportunities in the emerging markets.

**-Productivity:** Based on the maxim “More innovation – less administration,” they are continuing their efforts to improve efficiency and simplify structures and processes throughout the Bayer Group.

**HealthCare.** The objective of their strategy is to achieve above-average, profitable and sustainable growth. To this end, their focus is on innovation and on further strengthening their position in the emerging markets. Their research pipeline contains projects with the potential to spawn innovative products that will improve treatment



options, especially for chronic illnesses that particularly affect the growing number of older people in the global population. In selected areas they are working to round out their portfolio, partly with more value-based approaches and services.

Their largest segment in terms of sales – Pharmaceuticals – aims to become a leader in cardiovascular health and continue to expand the leading position it already holds in women’s healthcare. They are trying to growth strategies in the key markets of Brazil, China and Russia.

**CropScience.** They aim to enhance their Crop Protection portfolio by innovating, concentrating on core markets and focusing on integrated crop protection solutions. In line with their commitment to sustainable agriculture, crop protection products in this category are to be replaced with new, user-friendly and more environmentally compatible formulations.

To lead the way in innovation, they have refocused their research and development. A major focus of their activities is on seeds and on new growth areas such as plant health and stress tolerance. The goal of the new structure is to better exploit and develop their expertise in areas such as abiotic stress tolerance or yield improvement for the three research areas of seeds, small molecules and biologics.

**MaterialScience.** With its high-tech materials and solutions, Material Science is helping to address these challenges in areas including energy and resource efficiency, environmentally friendly mobility and sustainable construction, which are particularly important growth drivers in emerging economies such as China, India and Brazil. They therefore expect



the increase in volumes at Material Science to outpace global GDP growth in the long term.

Within the scope of their strategy, they endeavor to exploit profitable business opportunities in the emerging markets amid challenging competitive conditions while safeguarding their existing positions in the traditional markets. They are focusing on improving cost efficiency to safeguard their cost leadership for the long term.

## SUSTAINABILITY

Sustainability – which essentially means future viability – forms an integral part of their strategy. They are convinced that they can only be commercially successful in the long run if they balance economic growth with ecological and social responsibility. In this they are guided by long-term values. Their commitment to sustainability is underlined by clear references to the topic in their mission statement “Bayer: Science for a better life”, their pledge to the ten principles of the United Nations Global Compact, and their participation in the Global Compact’s new “Corporate Sustainability Leadership – LEAD” initiative and the chemical industry’s Responsible Care initiative. The goal of their sustainability strategy is clearly defined: they aim to create opportunities for their company by integrating sustainability into business activities and to generate economic, ecological and social benefits at the same time. They are pursuing this goal at four levels:



-	<b>Dialogue and commitment:</b> Bayer takes into account the expectation of all stakeholders. This applies also to their employee relations and discourse between industry, academia and politicians, and takes in their social commitment.
-	<b>Responsible business practices:</b> Bayer attaches great importance to responsible practices in the areas of compliance, human resources, product stewardship, health, safety and supplier management.
-	<b>Integration into business activities:</b> The sustainability strategy is accepted by all areas of the company and integrated into their business activities. Innovations and products that directly contribute to sustainable development make it a core element of their business activity.
-	<b>Relevant sustainability issues:</b> Bayer’s Sustainability Program comprises solutions to major social challenges. It places special importance on alliances for sustainable health care, innovative partnerships to improve the supply of high—quality food, and new solutions for climate and resource protection.

Targets and indicators serve to operationalize their sustainability strategy. With their “Targets 2015”, they aim to integrate sustainability even more into their business activities along the entire value chain.

## Achievements and Key Indicators

They regularly review their performance in the areas of health, safety and environment on the basis of key performance indicators, many of which they further improved in 2011, despite a roughly 5% increase in manufactured sales volume. Due to this higher volume, not only secondary energy consumption but also emissions of volatile organic compounds, nitrogen and organic carbon in waste water increased in 2011. The increase in the amount of hazardous waste was due to a groundwater and soil remediation project at one of their sites in India. In 2011, there were significantly fewer environmental incidents, and the number of transport incidents was also down. Moreover, from 2007 to 2012 the decrease on air pollution was 35%, a great achievement for Bayer and more than they expected to decrease.

Key Performance Indicators (Table 3.40)

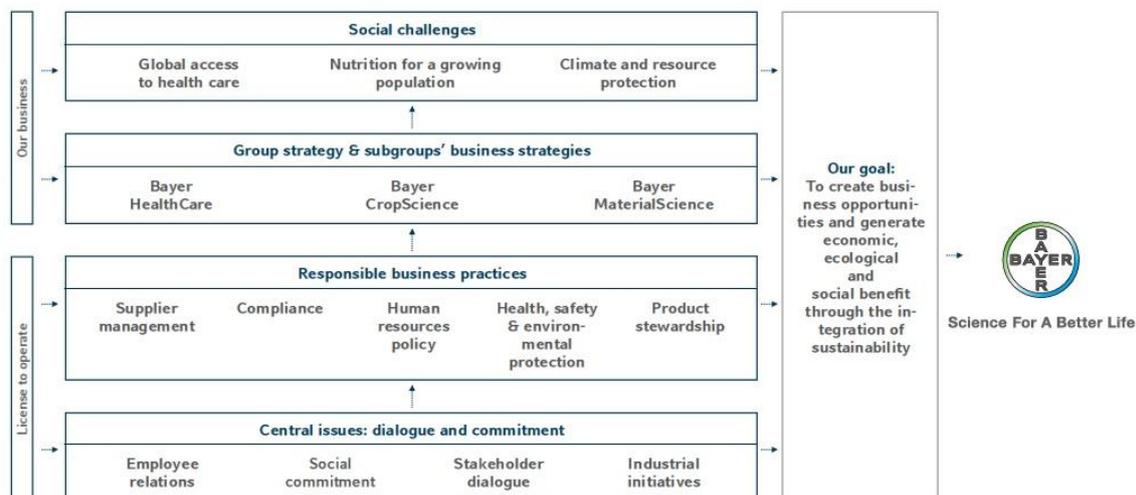
Category	Key Performance Indicators for Health, Safety and Environment	2011	2012
Health and Safety	Occupational injuries to Bayer employees with lost workdays (LTRIR)*	0.31	0.27
	Reportable occupational injuries to Bayer employees (RIR)*	0.56	0.49
	Environmental incidents	3	5
Emissions **	Transportation incidents	7	6
	Direct greenhouse gas emissions (CO <sub>2</sub> equivalents in million metric tons)***	4.23	4.24
	Indirect greenhouse gas emissions (CO <sub>2</sub> equivalents in million metric tons)***	3.92	4.12
	Volatile organic compounds (VOC) (thousand metric tons/year)	2.69	2.60
	Total phosphorus in waste water (thousand metric tons/year)	0.08	0.15
	Total nitrogen in waste water (thousand metric tons/year)	0.53	0.70
	Total organic carbon (TOC) (thousand metric tons/year)	1.50	1.42
Waste **	Hazardous waste generated (million metric tons/year)	0.47	0.60
	Hazardous waste landfilled (million metric tons/year)	0.12	0.18
Use of resources **	Water use (million m <sup>3</sup> /year)****	411	384
	Primary energy use for generating steam and electricity (petajoules [10 <sup>15</sup> joules]/year)	50.10	49.05
	Secondary energy use for generating steam, electricity and refrigeration (petajoules [10 <sup>15</sup> joules]/year)	34.85	34.14

\* (LT) RIR = (Lost Time) Recordable Incident Rate  
 \*\* Environmental indicators are determined at all production sites.  
 \*\*\* as per Greenhouse Gas Protocol  
 \*\*\*\* 2011 figure restated. See Sustainable Development Report 2011, page 59

## Sustainable investment

Bayer stock has been included for many years in numerous stock indices and investment funds that list companies with sustainable and responsible corporate strategies. In 2011 they were included in the Carbon Disclosure Leadership Index (CDLI) for the seventh consecutive year on the basis of their transparent sustainability reporting, this time being named as one of the four best companies worldwide across all industry sectors. In addition, Bayer was again included in the CPLI, now with an A rating, in recognition of its efforts to reduce CO<sub>2</sub> emissions (As explained, a 35 in 5 years).

### Bayer's sustainability strategy



We realize at four levels our goal of balancing ecological and social responsibility with corporate interests.

Index/Fund		Bayer's listing		
		2009	2010	2011
	DJSI World	✓	✓	✓
	DJSI Europe	–	✓	✓
	FTSE4Good Global Index and FTSE4Good Europe Index	✓	✓	✓
	FTSE4Good Environmental Leaders Europe 40 Index	✓	–	–
	ASPI Eurozone	✓	✓	✓
	Storebrand SRI Funds	✓	✓	✓
	Carbon Disclosure Leadership Index*	✓	✓	✓
	Carbon Performance Leadership Index* (published in 2010)		✓	✓
	NYSE Euronext Low Carbon 100 Europe Index	✓	✓	✓
	Access To Medicine Index*	✓**	✓	✓**

## Commitment

Bayer's social commitment is an established part of their sustainability strategy and corporate policy. They consider themselves part of society and view their commitment to corporate citizenship as an investment in the future and a contribution to a positive business environment. Their social commitment is exemplified by numerous projects in various parts of the world, some of which they have organized or supported for many years. In 2011 they provided some 54€ million in funding for such projects in the four main areas of education and research; environment and nature; health and social needs; and sports and culture.

They made several funding programs, to improve the entire scientific training and path, The funding programs of the Bayer Science and Education Foundation cover the entire scientific training and career path. In 2011 the foundation approved total funding of about 1,2 million for dedicated school students, innovative school projects, ambitious trainees, exceptional university students, outstanding young scientist and leading researchers. They are also globally committed to improving social conditions and health care with the dual aims of promoting stability in the communities near their sites and helping to solve global health challenges.

## RESEARCH AND DEVELOPMENT

Innovation is the key driver of the Bayer Group's future growth. Challenges such as providing health care and nutrition for a growing world population and using natural resources efficiently can only be overcome with innovative solutions. That is why the inventor company Bayer focuses on research and development. In 2011, Bayer spent 2.932 € million on research and development. This was equivalent to 8,0 percent of sales.



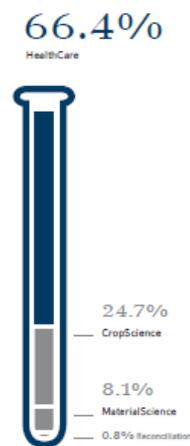
To strengthen its position in the global competitive arena, Bayer is deploying its resources selectively and narrowing its focus –even within individual business units- to areas where there is an urgent need for innovation and significant growth opportunities therefore exist. This pooling of expertise enables the company to rapidly translate new business ideas into successful products.

With a strong, efficient research and development organization, and international network of partners and a focus on growth areas and markets, Bayer is laying the foundations for its future success. The company’s activities remain centered on customers’ needs – true to the mission “Bayer: Science for a better life”.

Moreover, Bayer is focusing on investing in Asia, the emerging market.

### Research in the three subgroups

Of the Group’s entire research and development expenditures in 2011, Bayer HealthCare accounted for 66,4%, Bayer CropScience for 24,7% and Bayer MaterialScience for 8,1%. Further information on each subgroup’s research and development activities is provided in the respective chapter of this brochure.



Shares of research and development expenses 2011 – subgroups and reconciliation (other companies)

### Bayer technology Services

All the subgroups work closely with Bayer Technology Services worldwide on technology solutions, particularly in the fields of process technology, plant engineering, automation and product development. Examples include the new TDI production process being used for the first time at the Bayer MaterialScience site in Shanghai and the catalytic conversion of carbon dioxide to polymers.

Centralized development work on technologies relevant to more than one subgroup, such as biotechnology or expertise in mathematical simulation and statistical data analysis, helps Bayer HealthCare and Bayer CropScience to shorten development times for new products. This also includes the development times for new products.

## EMPLOYEES

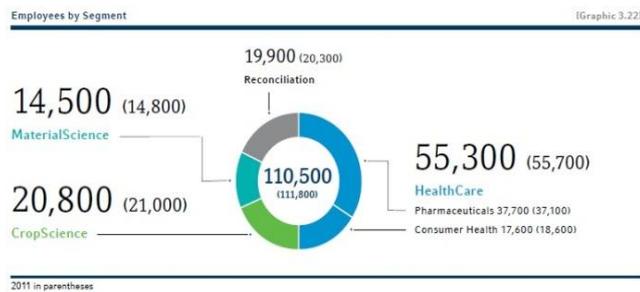
### Vocational training and Recruiting

As an employer, Bayer endeavors to appeal to the best and most talented people worldwide and to retain employees for long periods by providing good development opportunities, a modern working environment and competitive compensation. In 2011 this enabled the company to hire a total of more than 5.400 academically qualified specialists and managers worldwide. Nearly 1.99 university graduates were recruited in China alone, some 750 in India, roughly 400 in Germany and more than 250 in the United States. In 2011 nearly 12.000 people were hired across all occupations. In addition, more than 3.000 challenging internships were awarded to talented young students worldwide to give them pre-graduation insight into the variety of career opportunities at Bayer.

Such young people often return to the company as employees at a later date. Apart from the hiring of university graduates, the company's own training programs for young people are among the most important steps taken to guard against a possible shortage of specialist due to demographic change.

### Advancing knowledge and leadership skills and Employee compensation and benefits

Providing continuing education for employees is central both to talent management and to addressing the consequences of demographic change. Apart from the acquisition, expansion and retention of specialist knowledge, a further focus of the company's training



programs is on improving leadership skills. An important principle of Bayer's human resources policy is to link employees' compensation to their performance and enable them to share in the company's success. Regular benchmarking against competitors and a globally standardized system help in setting base salaries in line with the demands and responsibilities of each position. These salaries are supplemented by performance-related compensation components and extensive ancillary benefits.

	Dec. 31, 2011	Dec. 31, 2012
	FTE	FTE
<b>Employees by region</b>		
Europe	53,600	52,300
North America	15,800	15,300
Asia/Pacific	26,000	26,700
Latin America/Middle East/Africa	16,400	16,200
<b>Employees by corporate function</b>		
Production	47,600	45,700
Marketing and distribution	41,800	42,800
Research and development	13,300	12,900
General administration	9,100	9,100
<b>Total</b>	<b>111,800</b>	<b>110,500</b>
Trainees	2,500	2,500
	%	%
Proportion of women in senior management	22	23
Proportion of full-time employees with contractually agreed working time not exceeding 48 hours per week	100	100
Proportion of employees with health insurance	94	94
Proportion of employees eligible for a company pension plan or company-financed retirement benefits	69	66
Proportion of employees covered by collective agreements on pay and conditions	54	53

The number of employees on either permanent or fixed-term contracts is stated in full-time equivalents, with part-time employees included on a pro-rated basis in line with their contractual working hours.



## Conclusions

Healthcare is the most important segment on Bayer's structure. It represents more than the 50% of the weight for investments, employee's distribution, and other sectors. The other less weighted segments are CropScience and MaterialScience.

Several emerging markets are appearing in the world in the Bayer view, and Bayer is taking advantage of it, especially the emerging ones such as Asia. Asia represents a challenge for the future of Bayer, looking at the expected growth of the continent.

We also have noticed the huge structures The Bayer Group is, so it needs for another organism, the Corporate Center, which accomplish administrative functions.

Another point is the Norway sobering investment fund as shareholder of Bayer, and other investment funds like Blackrock.

With regard to 2012, Bayer had a successful year strategically and operationally speaking. The group achieved its targets and made progress with the innovation projects in the subgroups. Moreover, Bayer has improved with respect to 2011 and has a great accumulative rate of growth from more years before. Bayer also cares for the whole society, because of the great amount of investment and effort for Sustainability, Research and Development, and new Technology to improve the short future and the business environment.

To end up, Bayer has a lot of products. Bayer has 150 years of great innovation on healthcare, crop and materials. Its history and its cross, and the image, make Bayer a good firm which people think it as a great and modern company.



Science For A Better Life

# Part 2: Risk Analysis

## 2.1 Market risk Eurostoxx50 – Bayer

### Volatility analysis

In order to study the Bayer Group in the stock market, we have taken the last 4 years, day by day historical data of the Eurostoxx50, to compare the behavior with regard to the same market.

	Eurostoxx50					Bayer AG				
	2009	2010	2011	2012	2009-2012	2009	2010	2011	2012	2009-2012
<b>Mean</b>	0,076	-0,01	-0,025	0,06	0,017	0,13	0	-0,03	0,16	0,069
<b>Std</b>	1,771	1,5	1,8	1,3	1,608	2,06	1,41	2,1	1,57	1,817
<b>V.c.</b>	23,17	124,7	72,1	22,2	92,986	15,05	382,7	70,3	9,8	26,384
<b>1std</b>	-1,69;1,84	-1,5;1,48	-1,8;1,78	-1,25;1,36	-1,59;1,62	-1,93;2,2	-1,4;1,41	-2,14;2,08	-1,4;1,73	-1,75;1,89
<b>2std</b>	-3,46;3,61	-3;2,98	-3,6;3,58	-2,55;2,67	-3,20;3,23	-4;4,27	-2,81;2,82	-4,25;4,19	-2,98;3,3	-3,56;3,70
<b>3std</b>	-5,23;5,38	-4,5;4,48	-5,4;5,38	-3,86;3,97	-4,81;4,84	-6,1;6,33	-4,2;4,43	-6,36;6,3	-4,5;4,87	-5,38;5,52
<b>Beta</b>	0,7862									
<b>R^2</b>	0,4835									
<b>N</b>	1019 observations									
?										
?										

Note: Var (%) day by day in stock market. All historical data available in Annex.

Looking at the row variation coefficient, in 2009, 2011 and 2012, we can see that Bayer had less volatility than Eurostoxx50, what makes Bayer more stable and recommended, whereas in 2010 Bayer had more volatility than Eurostoxx50, maybe because that year the Bayer's CEO changed and made the company's future more uncertainty from an outside view. In general we can see in the column 2009-2012, that Bayer has had much less volatility (26,3) than Eurostoxx50 (93)

Regarding the confidence intervals, in the row 1std we can see at a probability of 66% in which interval the variation (%) would be, in the row 2std for a probability of 95%, and 3std for a probability of 99%.

Finally making regression we have found a  $\beta=0,7862$ . That means that when Eurostoxx50 increases or decreases 1%, Bayer increases or decreases in the same way 0,7862%. So as we can see Bayer always increases or decreases less than Eurostoxx does. That means Bayer is less volatile, less risky to fall, more confident. Moreover,  $R^2$  tells us the relation between Eurostoxx50 and Bayer is not a good one. It is a normal thing, due to eurostoxx50 is formed by a lot of companies, so it makes sense that one doesn't follow strictly the others as a whole.

## Tendency analysis

Taking the last 5 years stock data in var (%), we have drawn the Bayer and the Eurostoxx 50 evolution in the next graph. We also have studied the Bayer evolution through 3 moving averages, a short-term of  $k=50$ , a medium-term of  $k=100$ , and a long-term of  $k=200$ , in order to subtract more or less noise.



Firstly, we can see how Bayer trend is constantly increasing its stock market price, whereas Eurostoxx50 is maintaining the position in the last year. More specifically, Bayer has increased more than a 40% since 2008, whereas Eurostoxx50 has decreased a 30% approximately during the same period of time. That means Bayer to be a good value.

If we see the 3 moving averages, we can observe that during the last year Bayer has been consolidating his stock price growth, because the three moving averages are growing in a parallel way since then.

We also have to point out that before dividend payment date, stock market price usually increases, what makes us to think this is happening again in this year. Moreover, after dividend payment, stock market price tends to decrease.

## 2.2 Bayer internal risk

As a global enterprise, Bayer is exposed in the normal course of business to credit risks, liquidity risks and various market price risks that may materially affect its net assets, financial position and results of operations.

In line with company policy, a central risk management process is applied to identify and analyze the market price risks arising from operating activities and from the resulting financing requirements. Their use of derivatives to eliminate or minimize these risks relates almost entirely to hedge recorded or forecasted transactions and is subject to strict internal controls based on centrally defined mechanisms and uniform guidelines.

Derivatives are used to reduce this risk. In some cases they are designated as hedging instruments in a hedge accounting relationship. Asset and liability fair values and future cash flows are exposed to currency, interest-rate and commodity price risks.

The following section explains the various risks associated with financial instruments and how these risks are managed.

### BALANCE

#### Changes Capital Structure

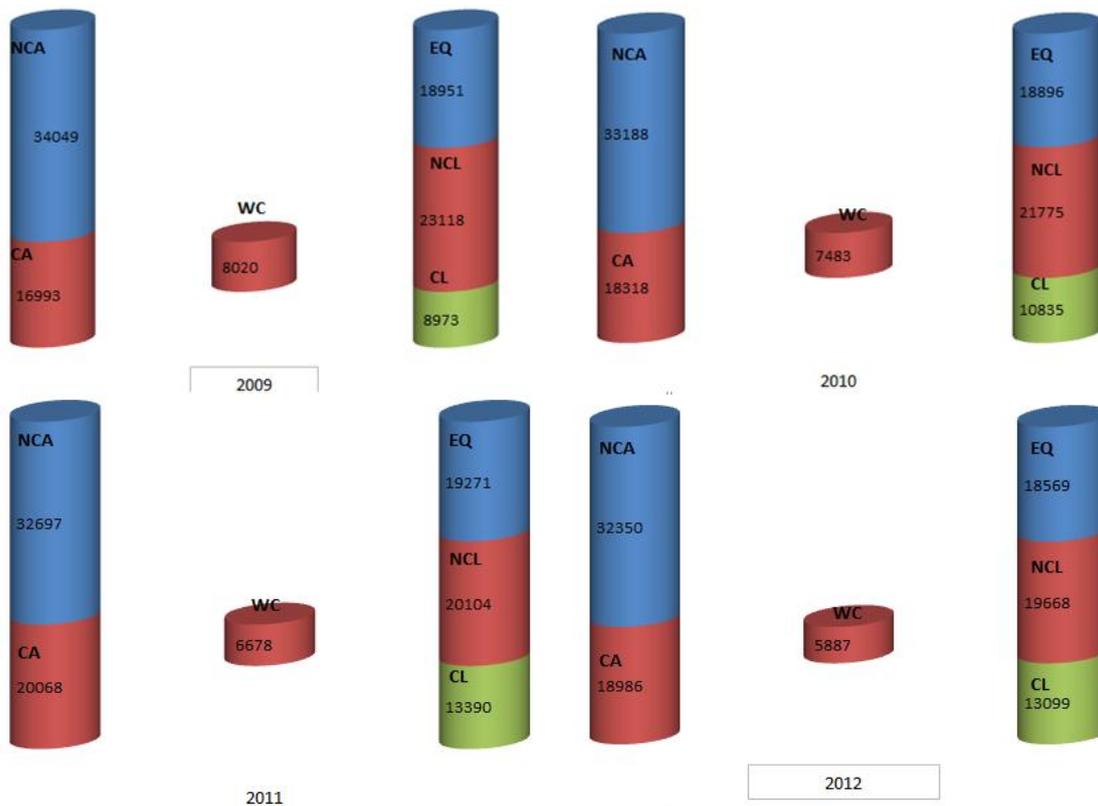
Bayer Group Summary Statements of Financial Position

[Table 3.22]

	Dec. 31, 2011	Dec. 31, 2012	Change
	€ million	€ million	%
<b>Noncurrent assets</b>	32,697	32,350	-1.1
<b>Current assets</b>	19,984	18,986	-5.0
Assets held for sale	84	-	.
<b>Total current assets</b>	20,068	18,986	-5.4
<b>Total assets</b>	52,765	51,336	-2.7
<b>Equity</b>	19,271	18,569	-3.6
<b>Noncurrent liabilities</b>	20,104	19,668	-2.2
<b>Current liabilities</b>	13,387	13,099	-2.2
Provisions directly related to assets held for sale	3	-	.
<b>Total current liabilities</b>	13,390	13,099	-2.2
<b>Liabilities</b>	33,494	32,767	-2.2
<b>Total equity and liabilities</b>	52,765	51,336	-2.7

As we can see in the table, total assets declined in 2012 by 2.7% with respect to the previous year, which means that they finally had a total value of €51.3 billion. This fall was provoked, on the one hand, by the decrease of 1.1% of the non-current assets, and, in the other hand, by the fall of 5% in the value of current assets, which implies more risk for the firm as its capacity to pay all the debt is lower (specially short term liabilities).

Equity was reduced by €0.7 billion up to €18.6 billion as there was an increase of dividend payments in 2012, which could imply that there would be more risk for the company because now the group has less internal sources to face the debts. But given that total liabilities also fell by the same amount mainly due to the redemption of several bonds, risk has not changed during this year.



And now, we are going to analyze the balance sheet in the previous 4 years. Generally all groups have been maintained.

First of all, non-current assets in these 4 years have declined while the current assets has generally going up. So it is good for the company because have less risk in average of the 4 years in terms of total assets.

The equity of the Bayer has increased and decreased in the previous years. If we compare the last year, we can say that in 2012 the Bayer's Group has more risk because they have less equity, less internal resources to face the external debts.

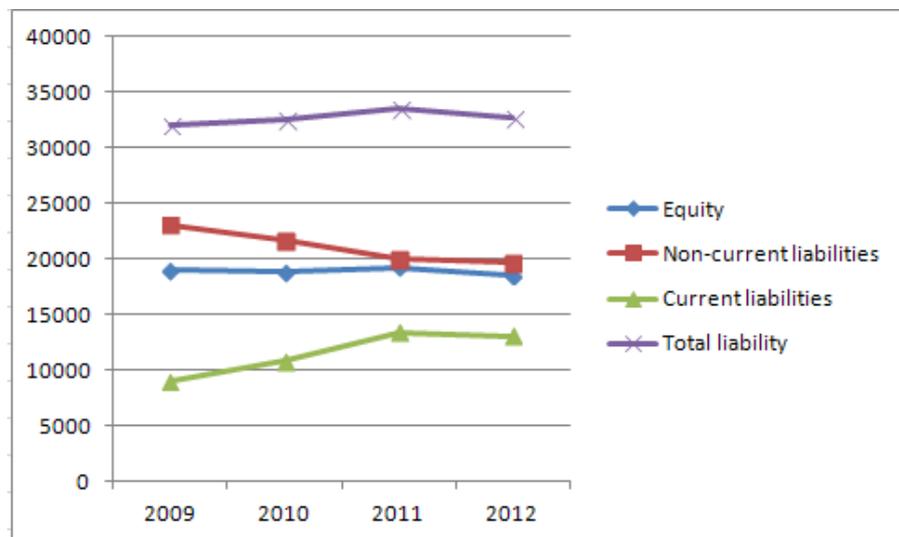
About total liabilities, the results shows that it going up in 2009, 2010 and 2011 while in 2012 is going down, which means that now there are less risk comparing in the previous years. It caused by the decrease of the non-current liabilities and the increase of the current liabilities.

Now we are analyzing the relationship between the internal and external capital.

As we have said, the equity is going down very slowly in these 4 years, which not represents a change in risk terms. The total liability also is going up until 2011 and in 2012 is going down, so if we compare 2012 in respect of the previous years, now it seems to be the same risk.

The current liabilities are going up in 2009, 2010 and 2011 but in 2012 is maintain more or less the same. In terms of current liabilities there is more risk.

About the non-current liabilities, we can said that it maintains the same but in 2012 is going down a bit, so it is less risk for the company.



We can say during the last years there's no a change in equity or debt, but a change inside the debt, becoming more greater the short-term and lower the long-term, what makes the company more risky.

## Equity

The most important objectives of Bayer financial management is ensure the Group's creditworthiness and liquidity. Also, is to help bring about a sustained increase in the value of the Bayer Group for the benefit of all stakeholders.

For this propose, the Bayer's capital management strategy is based on the debt ratios, which look at the cash flow for a given period in relation to debt.

This strategy focuses on an "A" rating and on preserving the financial flexibility and, also, reflects the company's good creditworthiness and ensures access to a broad investor base for financing.

Rating			
	Long-term rating	Outlook	Short-term rating
Standard & Poor's	A-	positive	A-2
Moody's	A3	stable	P-2

[Table 4.63]

This table shows us that the Bayer has a good rating which converts the group a company with less risk in order to invest.

- **Capital Stock:** The capital stock of Bayer on 2012 amounted to €2,117 million divided into 826,947,808 registered shares, and was fully paid in.
- **Authorized Capital:** Authorized capital can be used to increase the capital stock by issuing new no-par registered shares against cash contributions, but may not exceed a total of €423 million. Further, the Board of Management is authorized to increase the capital stock by a total amount of up to €212 million by issuing new no-par registered shares against cash contributions, until April 29, 2015.

## Credit and country risks

Credit risks arise from the possibility of the value of receivables or other financial assets being impaired because counterparties cannot meet their payment or other performance obligations. The Bayer Group does not conclude master netting arrangements with its customers for non-derivative financial instruments. In the case of derivatives, positive and negative market values may be netted under certain conditions.

Bayer has put in place a standardized risk management system where each invoicing company has appointed a responsible credit manager who regularly analyzes customers' creditworthiness. Some of these receivables are collateralized, and the collateral is used according to local conditions.

To minimize credit risks, financial transactions are only conducted within predefined exposure limits and with banks and other partners that have investment-grade ratings. All risk limits are based on methodical models. Adherence to the risk limits is continuously monitored.

### Trade accounts receivable

Trade accounts receivable amounting to €7,320 million were not individually impaired. Of this amount, €1,095 million was past due or due immediately on the closing date. In the following table we can see the amounts of impaired and past-due trade accounts receivable:

	Carrying amount	Of which neither impaired nor past due at the closing date	Of which unimpaired but past due at the closing date				Of which impaired at the closing date
			up to 3 months	3-6 months	6-12 months	more than 12 months	
	€ million	€ million	€ million	€ million	€ million	€ million	€ million
December 31, 2012	7,431	6,225	743	144	104	104	111
December 31, 2011	7,061	5,936	595	156	121	176	77

The impairment losses has increasing with the time because of the crisis

The gross carrying amount of individually impaired trade accounts receivable was €248 million. The impairment losses recognized on these assets totaled €137 million, resulting in a net carrying amount of €111 million. The unimpaired receivables were estimated to be collectible on the basis of established credit management processes and individual assessments of customer risks.

Receivables from government health service institutions, especially in Greece, Italy, Portugal and Spain, are under special observation in view of the government debt crisis. It is possible that future developments in these countries could result in payment delays and / or defaults. This could necessitate the recognition of impairment losses due to new occurrences, with a total of €240 million.

## Financial liabilities

Financial Liabilities [Table 4.84]

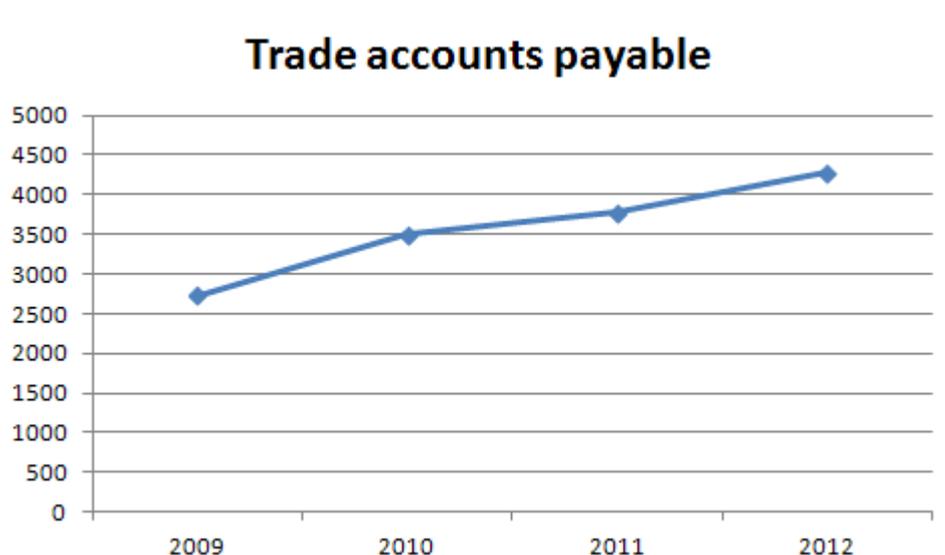
	Dec. 31, 2011		Dec. 31, 2012	
	Total	Of which current	Total	Of which current
	€ million	€ million	€ million	€ million
Bonds and notes/promissory notes	7,710	2,453	5,528	1,094
Liabilities to banks	2,657	729	2,841	876
Liabilities under finance leases	554	53	542	235
Liabilities from forward commodity contracts	17	17	5	5
Liabilities from other derivatives	513	268	303	104
Other financial liabilities	228	164	313	256
<b>Total</b>	<b>11,679</b>	<b>3,684</b>	<b>9,532</b>	<b>2,570</b>

As we can see, the financial liabilities have decreased in 2012 in respect to 2011, from 11679 to 9532. The most important aspect is bonds and notes that represents, more or less, the 57.9% of the total Financial Liabilities. Now let's go to see how this liability is break downed.

The Bayer Group's financial liabilities are mostly with the exception of the subordinated €1,300 million hybrid bond and are of equal priority.

## Trade accounts payable

Trade accounts payable comprised €4,267 million (2011: €3,730 million) due within one year and €28 million (2011: €49 million) due after one year.



## Liquidity and solvency risks

Liquidity risks – those arising from the possibility of not being able to meet current or future payment obligations because insufficient cash is available – are centrally managed in the Bayer Group. The Group holds sufficient liquidity to ensure the fulfillment of all planned payment obligations at maturity. In addition, a reserve is maintained for unbudgeted shortfalls in cash receipts or unexpected disbursements.

The liquidity reserve is then determined which, with a defined probability, will cover a negative deviation from budgeted cash flows. The size of this reserve is regularly reviewed and adjusted as necessary to current conditions.

	2009	2010	2011	2012
<b>Liquidity ratio (cash cycle) in days</b>	-27,125	-22,938	-42,744	-15,002
<b>Solvency Ratios (WC)</b>	1,89	1,69	1,50	1,45
<b>Acid test</b>	1,21	1,13	1,02	0,92
<b>Disponibility ratio</b>	0,30	0,26	0,14	0,13
<b>Debt quality ratio</b>	0,28	0,33	0,40	0,40
<b>Autonomy ratio</b>	0,59	0,58	0,58	0,57
<b>Leverage ratio</b>	2,69	2,73	2,74	2,76
<b>Guaranty ratio</b>	1,59	1,58	1,58	1,57

About the **Working Capital** we can see that Bayer has solvency. The solvency is going down through the time what it means more risk, but it is still good because the group can pay its short term debts with its current assets. CA-CL

**Cash Cycle** is negative, due to we get paid more time later than when we pay. That represents a risk due to Bayer has to look for financial resources between that difference of time. APP-APC

**Acid test:** In 2012 Bayer group has less **immediately** solvency than in 2009, what makes the company more risky to pay more immediately debt. RA+C/CL

**Disponibility ratio:** As it is low, the firm will have troubles to pay the **short term** debt with their more liquid resources. C/CL

**Debt quality:** The quality of debt has become worse, due to now has more **short-term** debt than long-term debt. CL/L

**Autonomy ratio:** This ratio measures the financial autonomy degree with respect to external finance (indebtedness) in the **long-term**. The ratio is maintaining if we compare the 4 years, so we can see that in 2012 has the same autonomy. E/L

**Leverage ratio:** This ratio is going up with the pass of time, which means that in 2012 there is more risk than the previous years. A/E

**Guaranty ratio:** We can say solvency in the **long-term** has not suffered changes. A/L

## Other risks

### Legal Risks

The Bayer Group is exposed to risks such as product liability, competition and antitrust law, patent disputes, tax assessments and environmental matters, which mostly cannot be predicted and can affect revenues and earnings and Bayer's reputation.

### Product development risks

The Bayer's competitive position and earnings depends on the development of new products. Because of that, it cannot be ensured that all the products developed will actually reach commercial success as scheduled. Moreover, adverse effects and litigations for damages may diminish earnings.

	2008	2009	2010	2011	2012
	€ million				
Research and development expenses	2,653	2,746	3,053	2,932	3,013

R&D expense ratio (%)	Research and development expenses	8.0	7.6
	Sales		

To ensure an efficient use of resources in research and development, it is implemented an organizational structure with working groups and reporting systems that monitor development projects.

## Regulatory risks

Relating to the testing, manufacturing and marketing of products, in some countries the regularity controls increase, such as government clinical toxicological studies, which may increase development costs and delay product registration. Moreover, projects have been initiated to coordinate the implementation of new regulatory controls.

## IT risks

Production processes internal and external communications of Bayer are dependent on information technology systems. Possible failures may result in loss of data or impairment of business and production processes.

Technical precautions such as data recovery and continuity plans have been established with the internal IT service to address this risk.

## Income Statements

### Net Sales

Net sales are derived primarily from product deliveries. Total reported net sales increased by €3,232 million, or 8.8%, from 2011 to €39,760 million in 2012. This increase is explained by the following factors:

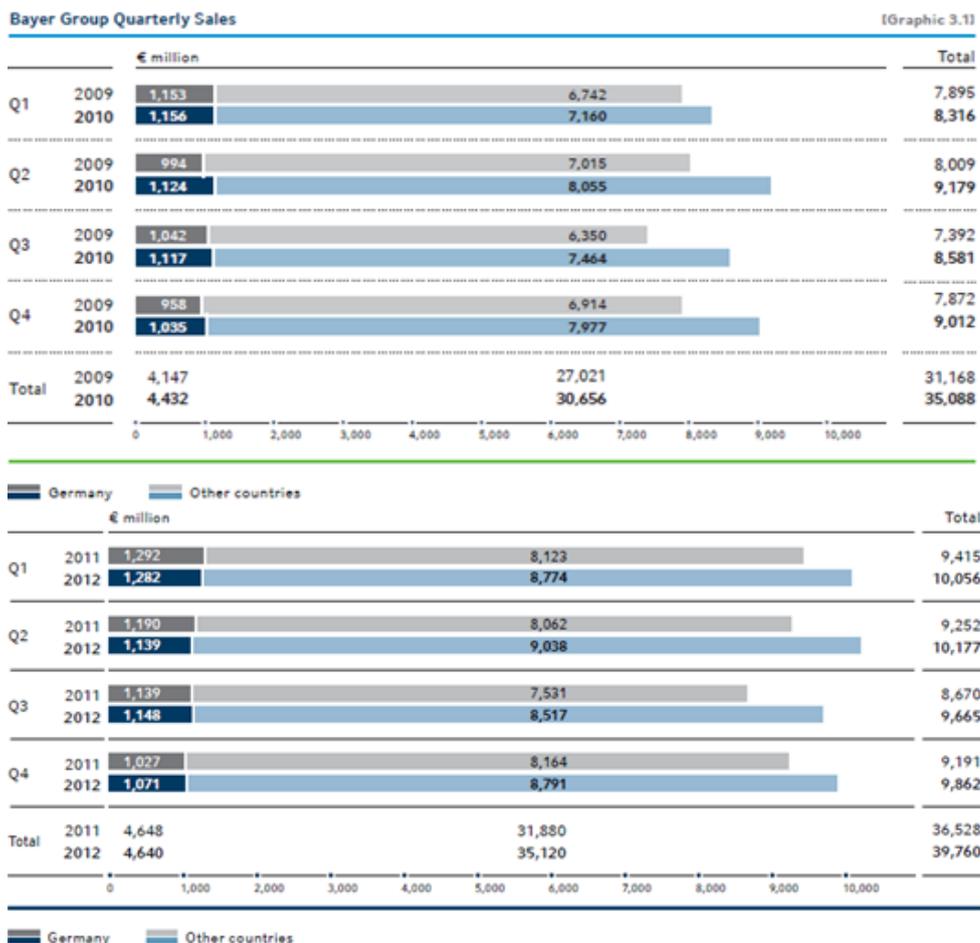
	2012	
	€ million	%
Volume	1,713	+4.7
Price	224	+0.6
Currency	1,477	+4.0
Portfolio	(182)	-0.5
<b>Total</b>	<b>3,232</b>	<b>+8.8</b>

It must be highlighted the increase not only in the volume units, a 4,7%, but also its price, a 0,6%. This shows that Bayer's sales function is not suffering a dropping trend, what leads to say that Bayer's market risk is not a problem today. In next graph we can see the sales of the last 5 years.

	2008	2009	2010	2011	2012
	€ million				
<b>Bayer Group</b>					
Sales	32,918	31,168	35,088	36,528	39,760
Sales outside Germany	85.4%	86.7%	87.4%	87.3%	88.3%

We can observe an increasing trend since 2009, what leads to say Bayer has no sales risk.

We can study other characteristics of Bayer's sales such as their seasonality. In the next graph we can see it from 2009 to 2012 by trimesters.



We can observe a seasonality pattern. During the third trimester sales usually drop, whereas during the second and the fourth trimester sales tend to increase, when cold appears and maybe when Aspirin is more demanded. We have to point out that in 2012 this seasonality seems to be smoother than last years, so Bayer has achieved to decrease the seasonality of the sales risk.

## Industry risks

Pharmaceutical product prices are controlled in many markets by governments which intervene directly setting prices, or setting less expensive **generic** treatments. Also, in markets with major purchasers of pharmaceutical products have more power to pressure on prices. This reduces earnings and may leads to a market introduction of a new product unprofitable.

The sales and earnings are affected by the economic circumstances of their customers. The analyses of the global economy and forecasts support business planning.

### GLOBAL ECONOMY

#### Economic Outlook

	Growth in 2012*	Growth forecast for 2013*
World	+2.6 %	+2.5 %
European Union	-0.2 %	+0.1 %
of which Germany	+0.7 %	+0.4 %
United States	+2.3 %	+1.7 %
Emerging markets**	+4.9 %	+5.1 %

\* real GDP growth, source: Global Insight; source for Germany: Federal Ministry of Economics and Technology  
\*\* including about 50 countries defined by Global Insight as emerging markets in line with the World Bank

#### Key Data by Region

	Europe		North America		Asia/Pacific		Latin America/ Africa/Middle East		Total	
	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012
	€ million	€ million	€ million	€ million	€ million	€ million	€ million	€ million	€ million	€ million
Net sales (external) – by market	14,441	14,730	8,177	9,576	7,842	8,766	6,068	6,688	36,528	39,760
Change	+5.0%	+2.0%	-0.6%	+17.1%	+4.8%	+11.8%	+7.8%	+10.2%	+4.1%	+8.8%

The world economy is predicted to grow at about the same pace in 2013 as in the prior year. Looking at the Bayer's sales by regions, we can see a correlation between economic growth and sales, what makes us to recommend to Bayer to allocate more resources to emerging markets.

Bayer businesses also will increase, due to the market on that will increase too.

#### Economic Outlook for the Subgroups

[Table 3.43]

	Growth in 2012*	Growth forecast for 2013*
<b>HealthCare</b>		
Pharmaceuticals market	+3 %	+3 %
Consumer care market	+4 %	+3 %
Medical care market	+1 %	-1 %
Animal health market	+4 %	+5 %
<b>CropScience</b>		
Seeds and crop protection markets	> 10 %	≥ 5 %
<b>MaterialScience</b> (main customer industries)		
Automotive	+6 %	+2 %
Construction	+3 %	+4 %
Electrical/electronics	+3 %	+5 %
Furniture	+4 %	+5 %

\* Bayer's estimate; excluding pharmaceuticals market, source: IMS Health. Copyright 2013. All rights reserved; currency-adjusted; 2012 data provisional

That  
ensures a

good future for the company, which have a great potential for growth.

### **Patent risks**

As we know, Bayer's main business is Healthcare, and as we have mentioned before, products price are affected by generic products that governments are imposing more and more in order to reduce their expenses. This is an important risk to take into account since competition will use it, unless Bayer owns patents on their developed products, as it happens.

A large proportion of their products are protected by patents. They are currently involved in lawsuits to enforce patent rights in their products: generic manufacturers and other attempt to contest patents prior to their expiration. When a patent expires, their prices come under pressure because of increased competition from generic products entering the market. So we can say that patents offer an inelastic demand on their products, due to the monopolistic position, whereas once patent expires, it appears substitutes at a lower price with the same active principle that make that product demand more elastic, due to the introduction of competition, unless a strong people fidelity on a brand, as it happens with the 'Bayer cross' logo and the 61000 national trademark registrations and 1900 international trademarks, especially with *Aspirin*.

Patent protection includes defending mainly individual active ingredients, specific formulations and combinations containing active ingredients, and manufacturing processes.

The protection that a patent provides varies from country to country, depending on the type of claim granted, the scope of the claim's coverage and the legal remedies available for enforcement.

The Bayer Group currently owns 76000 patents or patent Applications. No single patent is essential to their business as a whole, what represents an important data. As we can see in next table, the main important patents for Bayer and their expiration dates depends on the country.

Expiration Dates of Most Important Patents (Table 4.48)

	Market								
	Germany	France	U.K.	Italy	Spain	Japan	China	U.S.A.	Canada
<b>Products</b>									
<b>Avalox™/Avelox™</b>									
Active ingredient	2014	2014	2014	2014	2014	2014	2013	2014	2015
Active ingredient monohydrate	2016	2016	2016	2016	2016	2016	2016	2016	2016
Tablets	2019	2019	2019	2019	2019	2019	2019	2019	2019
<b>Betaferon™/Betaseron™</b>									
Active ingredient	-	-	-	-	-	-	-	-	2016
<b>Eylea™/Eylia™</b>									
Active ingredient	2020	2020	2020	2020	2020	2020 <sup>a</sup>	2020	-	2020
<b>Kogenate™</b>									
Active ingredient	-	-	-	-	-	-	-	2014	2019
Formulation	2017	2017	2017	2017	2017	2017	2017	2017	2017
<b>Levitra™</b>									
Active ingredient	2018	2018	2018	2018	2018	2020	2018	2018	2018
<b>Magnevist™</b>									
Process	-	-	-	-	-	-	-	2013	-
<b>Mirena™</b>									
Applicator	2015	2015	2015	2015	2015	-	2015	2015	2015
Process	2013	2013	2013	2013	2013	2013	2013	2013	2013
<b>Nexavar™</b>									
Active ingredient	2020 <sup>a</sup>	2021	2021	2021	2021	2020 <sup>a</sup>	2020	2020	2020
<b>Stivarga™</b>									
Active ingredient	2024	2024	2024	2024	2024	2024	2024 <sup>b</sup>	2024 <sup>b</sup>	2024 <sup>b</sup>
<b>Xarelto™</b>									
Active ingredient	2020 <sup>a</sup>	2023	2023 <sup>c</sup>	2023	2023	2020 <sup>a</sup>	2020	2021 <sup>a</sup>	2020
<b>YAZ™</b>									
Formulation	2020 <sup>c,d</sup>	2021 <sup>a</sup>	2020	-	2020				
Dosage regimen	-	-	-	-	-	2014 <sup>b</sup>	-	2014	2014
Production process	2025	2025	2025	2025	2025	2026 <sup>b</sup>	2026	2025	2026 <sup>b</sup>
<b>Yasmin™</b>									
Formulation	2020 <sup>d</sup>	2020	2020	-	2020				
Production process	2025	2025	2025	2025	2025	2026 <sup>b</sup>	2026	2025	2026 <sup>b</sup>
<b>Yasminelle™</b>									
Formulation	2020 <sup>d</sup>	2020	2020	-	2020				
Production process	2025	2025	2025	2025	2025	2026 <sup>b</sup>	2026	2025	2026 <sup>b</sup>

The expiration dates for the most important patents of Bayer are not concentrated in a period, so the risk for becoming generic and affecting the sales in a puntual period doesn't exist.

## Cost Of Goods sold

### Market risks

Market risks relate to the possibility that the fair value or future cash flows of financial instruments may fluctuate due to variations in market prices. They include currency, interest-rate and other price risks, especially commodity price risks. They estimate market price risks by performing a sensitivity analysis for each category (such as interest rates) on the basis of hypothetical changes in risk variables (such as interest

curves) to determine the potential effects of market price fluctuations on equity and earnings.

The range of sensitivities that they chose for these analyses reflects our view of the changes in foreign exchange rates, commodity prices and interest rates that are reasonably possible over a one-year period.

## Inventories, Commodity price risks

Inventories		[Table 4.561]	
	Dec. 31, 2011	Dec. 31, 2012	
	€ million	€ million	
Raw materials and supplies	1,223	1,347	
Work in process, finished goods and goods purchased for resale	5,138	5,620	
Advance payments	7	13	
<b>Total</b>	<b>6,368</b>	<b>6,980</b>	

As we can see in the graph, the inventories were comprised as follows: Raw materials and supplies, work in process, finished goods and goods purchased for resale and, finally, advance payments.

The Bayer Group requires significant quantities of petrochemical feedstocks and energy for its various production processes. The prices of these inputs may fluctuate considerably depending on market conditions. As in the past, there may be times when it is not possible for us to pass on increased raw material costs to customers through price adjustments. This applies particularly to our MaterialScience business.

We have addressed this risk by concluding long-term contracts with multiple suppliers. Hedging contracts are also used to partly reduce exposure to fluctuations in future cash flows resulting from price changes on procurement markets.

Fair Values of Derivatives [Table 4.94]

	Dec. 31, 2011			Dec. 31, 2012		
	Notional amount*	Fair value		Notional amount*	Fair value	
		Positive fair value	Negative fair value		Positive fair value	Negative fair value
	€ million	€ million	€ million	€ million	€ million	€ million
Commodity price hedging	153	20	(17)	47	11	(5)
Forward commodity contracts	153	20	(17)	30	11	(5)
of which fair value hedges	-	-	-	-	-	-
of which cash flow hedges	-	-	-	-	-	-
Commodity option contracts	-	-	-	17	-	-
of which fair value hedges	-	-	-	-	-	-
of which cash flow hedges	-	-	-	-	-	-

Here we can see the expenditure on hedging raw materials Bayer's needs.

### Production, procurement market and environmental risks

Production capabilities at some manufacturing facilities can be affected by: technical failures, natural disasters, regulatory rulings or disruptions to supplies of key raw materials or intermediates, as in the case of dependence on a single source for critical materials, such as biotech products because of the complex manufacturing processes. This leads to not meet demand and decline sales.

The supply of important raw materials is ensured through long term contracts and by purchasing by multiple suppliers. Furthermore, all stages of the production processes and the material inputs are continuously monitored.

The presence of unintended trace amounts of genetically modified organisms in agricultural products and/or foodstuffs cannot be completely excluded.

Product and environmental risks are addressed by adopting suitable quality assurance measures, a quality, health, environmental and safety management system ensures process stability.

### Personnel expenses and employee numbers

Personnel expenses rose in 2012 by €477 million to €9,203 million (2011:

Personnel Expenses [Table 4.34]

	2011	2012
	€ million	€ million
Salaries	7,054	7,374
Social expenses and expenses for pensions and other benefits	1,672	1,829
of which for defined contribution pension plans	461	481
of which for defined benefit and other pension plans	255	256
<b>Total</b>	<b>8,726</b>	<b>9,203</b>

€8,726 million), with higher variable compensation accounting for €186 million of this increase. Changes in exchange rates increased personnel expenses by €220 million.

The personnel expenses shown here do not contain the interest portion of the allocation to personnel-related provisions – mainly for pensions and other post-employment benefits – which is included in the financial result under other financial expenses, which are available in the table below.

Other Financial Income and Expenses		
	2011	2012
	€ million	€ million
<b>Expenses</b>		
Interest portion of interest-bearing provisions	(336)	(320)
Exchange loss	(53)	(69)
Miscellaneous financial expenses	(24)	(28)
<b>Income</b>		
Miscellaneous financial income	7	9
<b>Total</b>	<b>(406)</b>	<b>(408)</b>

If we want to take a look at the average employee distribution for the Bayer Group, we have the table below available. With a quick view, we see the total numbers of employees decreases from the year 2011 to 2012. This could be because of the more intense crisis.

Employees		[Table 4.35]	
	2011	2012	
Production	47,674	46,835	
Marketing and distribution	41,705	42,590	
Research and development	13,451	12,992	
General administration	9,629	9,093	
<b>Total</b>	<b>112,459</b>	<b>111,510</b>	
Trainees	2,361	2,320	

We also can look at the percentage of salaries compared with EBITDA.

$$2012: (\text{Salaries}/\text{EBITDA}) \cdot 100 = (7374/8284) \cdot 100 = 89,02\%$$

$$2011: (\text{Salaries}/\text{EBITDA}) \cdot 100 = (7054/7613) \cdot 100 = 92,66\%$$

In 2012 the relation between salaries and EBITDA has decreased, due to EBITDA has increased more proportionally than Salaries costs.

## **Personnel risks**

For the employee section of the Bayer Group, there is a risk that they are trying to manage. They need skilled and concerned people. People who can develop work on Bayer successfully. This people are all around the world and there are some countries which handwork is not skilled or not as skilled as they need. To palliate this risk, Bayer runs a program positioning internationally the company as a employer and carrying out comprehensive personnel marketing to convince our target groups of the benefits of working for Bayer.

Then, once they have the personnel they want, they train, prepare, compensate and take care of them so that these employees do not go and help the Bayer Group to keep growing.

Being unable to recruit and retain high skilled employees could have considerable adverse consequences for the future success. This risk is addressed by doing marketing to convince the benefits of working in Bayer, like competitive compensation, training and development opportunities.

## **Interest risks**

### **Currency risks**

Since the Bayer Group conducts a significant portion of its operations outside the eurozone, fluctuations in currency exchange rates can materially affect earnings. Currency risks from financial instruments exist with respect to receivables, payables, cash and cash equivalents that are not denominated in a company's functional currency. In the Bayer Group these risks are particularly significant for the U.S. dollar, the Japanese yen, the Canadian dollar and the Chinese renminbi.

The anticipated foreign currency exposure from forecasted transactions in the next twelve months is hedged on a basis agreed between the Group Management Board, the central finance department and the operating units. A significant proportion of contractual and foreseeable currency risks are hedged mainly through forward exchange contracts and currency options.

In order to make an idea for the hedging, they applied a hypothetical adverse scenario in which the euro simultaneously depreciates by 10% against all other currencies compared with the year-end exchange rates.



Fair Values of Derivatives [Table 4.94]

	Dec. 31, 2011			Dec. 31, 2012		
	Notional amount*	Fair value		Notional amount*	Fair value	
		Positive fair value	Negative fair value		Positive fair value	Negative fair value
	€ million	€ million	€ million	€ million	€ million	€ million
<b>Currency hedging of forecasted transactions</b>	<b>4,494</b>	<b>31</b>	<b>(157)</b>	<b>4,554</b>	<b>127</b>	<b>(24)</b>
Forward exchange contracts	3,750	25	(146)	3,418	108	(19)
of which fair value hedges	-	-	-	-	-	-
of which cash flow hedges	3,721	17	(140)	3,314	107	(18)
Currency options	744	6	(11)	1,136	19	(5)
of which fair value hedges	-	-	-	-	-	-
of which cash flow hedges	-	-	-	355	13	(2)

### Interest-rate risks

The Bayer Group's interest-rate risks arise primarily from financial assets and liabilities with maturities exceeding one year. In the case of fixed-rate financial instruments, such as fixed-rate bonds, the risk of fluctuations in capital-market interest rates results in a fair-value risk because the fair values fluctuate as a function of interest rates. In the case of floating-rate instruments, a cash flow risk exists because interest payments could increase or decrease in the future.

Interest-rate risks are managed via the duration set by the Board of Management, which implicitly also includes the ratio of fixed-rate to floating-rate debt. The duration is subject to regular review. Derivatives – mainly interest-rate swaps, cross-currency interest-rate swaps and interest options – are employed to preserve the target structure of the portfolio.

We can see a table in the next page which explains, in number, the evolution of the interest-rate and currency risks (among other values) from 2011 to 2012.

	Dec. 31, 2011			Dec. 31, 2012		
	Notional amount*	Fair value		Notional amount*	Fair value	
		Positive fair value	Negative fair value		Positive fair value	Negative fair value
	€ million	€ million	€ million	€ million	€ million	€ million
<b>Currency hedging of recorded transactions</b>	<b>10,375</b>	<b>89</b>	<b>(422)</b>	<b>10,477</b>	<b>180</b>	<b>(227)</b>
Forward exchange contracts	8,327	88	(205)	8,705	180	(65)
of which fair value hedges	-	-	-	-	-	-
of which cash flow hedges	360	3	-	330	14	-
Cross-currency interest-rate swaps	2,048	1	(217)	1,772	-	(162)
of which fair value hedges	-	-	-	-	-	-
of which cash flow hedges	1,746	-	(211)	1,461	-	(159)
<b>Currency hedging of forecasted transactions</b>	<b>4,494</b>	<b>31</b>	<b>(157)</b>	<b>4,554</b>	<b>127</b>	<b>(24)</b>
Forward exchange contracts	3,750	25	(146)	3,418	108	(19)
of which fair value hedges	-	-	-	-	-	-
of which cash flow hedges	3,721	17	(140)	3,314	107	(18)
Currency options	744	6	(11)	1,136	19	(5)
of which fair value hedges	-	-	-	-	-	-
of which cash flow hedges	-	-	-	355	13	(2)
<b>Interest-rate hedging of recorded transactions</b>	<b>8,564</b>	<b>306</b>	<b>(92)</b>	<b>5,066</b>	<b>267</b>	<b>(67)</b>
Interest-rate swaps	8,564	306	(92)	5,066	267	(67)
of which fair value hedges	3,834	200	-	3,960	212	-
of which cash flow hedges	-	-	-	-	-	-
Interest-rate options	-	-	-	-	-	-
of which fair value hedges	-	-	-	-	-	-
of which cash flow hedges	-	-	-	-	-	-
<b>Commodity price hedging</b>	<b>153</b>	<b>20</b>	<b>(17)</b>	<b>47</b>	<b>11</b>	<b>(5)</b>
Forward commodity contracts	153	20	(17)	30	11	(5)
of which fair value hedges	-	-	-	-	-	-
of which cash flow hedges	-	-	-	-	-	-
Commodity option contracts	-	-	-	17	-	-
of which fair value hedges	-	-	-	-	-	-
of which cash flow hedges	-	-	-	-	-	-
<b>Total</b>	<b>23,586</b>	<b>446</b>	<b>(688)</b>	<b>20,144</b>	<b>585</b>	<b>(323)</b>
of which current derivatives	15,484	228	(417)	13,776	381	(118)
for currency hedging	11,841	89	(355)	12,713	275	(90)
for interest-rate hedging**	3,490	119	(45)	1,016	95	(23)
for commodity hedging	153	20	(17)	47	11	(5)

\* The notional amount is reported as gross volume, which also contains economically closed hedges.  
\*\* The fair value of long-term interest-rate swaps resulting from current interest payments was classified as current.

## NET INCOME

### Earnings per share risk

Earnings per share are determined according to IAS 33 (Earnings per Share) by dividing net income by the weighted average number of ordinary shares in issue during the year.

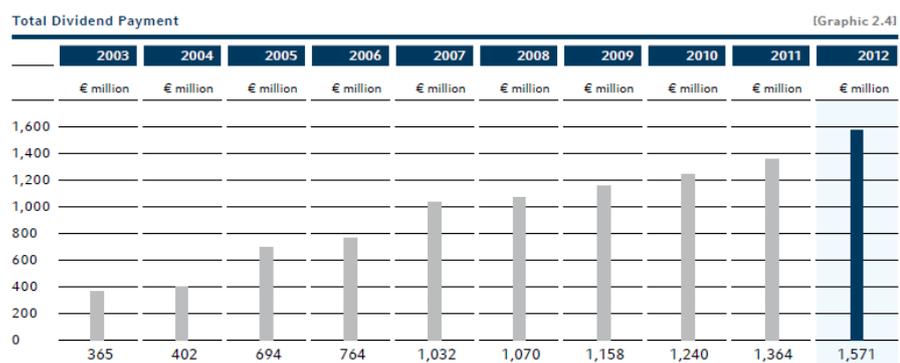
Earnings per Share		
	2011	2012
	€ million	€ million
Income after taxes	2,472	2,496
of which attributable to non-controlling interest	2	50
of which attributable to Bayer AG stockholders (net income)	2,470	2,446
	Shares	Shares
Weighted average number of issued ordinary shares	826,947,808	826,947,808
	€	€
Basic earnings per share	2.99	2.96
Diluted earnings per share	2.99	2.96

We can see a decrease on the earnings per share. It is a few one, just a 1,00334%. It is not due to the decrease of the net income (which has increased instead), but for the larger part

attributable to non-controlling interest, which is 48 million bigger (2400% of increase, because it was 2 million for the year before).



For the Bayer Group, the earning per share risk could be attached and related, mainly, to the net income



and the weighted average number of issued ordinary shares. If one of these two factors varies, the earning per share will do in consequence. Bayer manages to not modify the weighted average number of issued ordinary shares with big movements so that the investors of the Bayer Groups do not alert or get frightened by the idea of a decrease on the earnings.

Regarding the net income, the risk is the same for all the firms, but Bayer has to be very careful with its R&D and their commercial, products and marketing processes.

In the next page there is a graph of the evolution of the dividends per share and total dividend payments.

### Excel net income

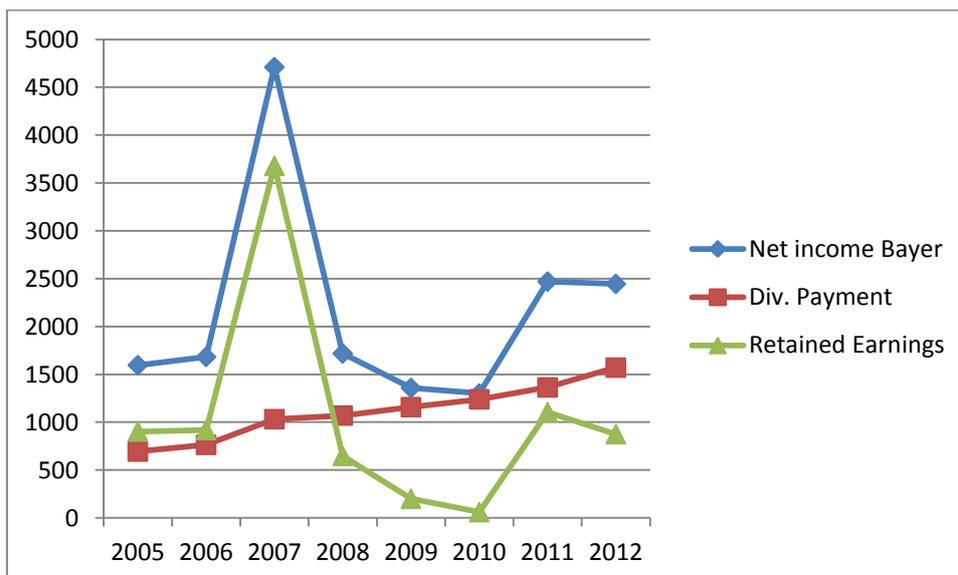
Year	Net income
2005	1597
2006	1683
2007	4711
2008	1719
2009	1359
2010	1301
2011	2470
2012	2446
<hr/>	
mean	2160,75
variance	1100494,19
standard deviation	1049,04
<hr/>	
variation coefficient (volatility) %	0,486
<hr/>	
<b>interes diari mitjà (profitability) %</b>	
<hr/>	
average + std 66% probabilitat	3209,79
average + 2std 95% probabilitat	4258,84
average + 3std 99% probabilitat	5307,88
<hr/>	
average - std 66% probabilitat	1111,71
average - 2std 95% probabilitat	62,66

average - 3std 99% probabilitat	-986,38
max	4711
min	1301
rank	3410

We can see that through the years the Net income has had the trend to increase. Although the graph has an outlier in 2007 due to deferred taxes, the trend is increasing.

### Reserves, or not distributed earnings

After deduction of taxes, in 2012 net income was €2446 million. Retained earnings were €875million, so therefore the distributable profit amounted to €1,571 million. In the next graph we can see the evolution.



As we can see, dividend payment is increasing through years, what makes the investor more secure when get paid his/her dividend payment. whereas retained earnings follow the net income pattern.

## CONCLUSIONS

Bayer has had less volatility than Eurostoxx50 during the last 4 years, looking at the variation coefficient and its  $\beta=0,78$ , what makes Bayer a more confident firm and therefore less risky than Eurostoxx50.

Bayer has increased its stock market price more than a 40% since 2008, whereas Eurostoxx50 has decreased a 30% in the same period, what makes Bayer to be a good value.

Sales don't represent a risk for Bayer, due to its sales trend is constantly increasing for many years ago. From 2011 to 2012, Bayer's sales has increased an 8,8%, mainly because an increase of a 4,7% in volume and an increase of a 0,6% of the products price.

Sales has a seasonality pattern that tends to drop at the third trimester of every year, maybe because the weather is not cold and makes no selling Aspirins and other healthcare products as well as in winter. We have to point out that seasonality has become smothering in 2012.

Bayer has his future ensured, due to looking at the growth estimations of the markets Bayer is, those are increasing, what represents an opportunity for growth for Bayer.

Also Bayer has some troubles with setting prices, not only because government set prices, but also because generic products, what makes the demand more elastic due to competition. However, Bayer has many patents that let Bayer setting prices, because a monopolistic position, so demand is more inelastic. Moreover, the 'cross Bayer' logo, characterizes the strong brand that makes the demand more inelastic. Furthermore, there is no single patent crucial in the business, and there is no concentration of patents expirations in the future.

We are comparing the balance sheet in the previous 4 years of the Bayer Group and we can see that generally all groups have been maintained. The current assets are going up while the non-current assets declined which became the company less risky in terms of total assets. For the other hand, the equity has maintained the same more or less and the total liabilities in 2012 declined making the company less risky.

Moreover, we analyze the relationship between internal and external capital, and we saw that such as the total liabilities as equity is maintained the same. But the problem is coming out from the short term debt that increases in 2012 which makes the company more risky.



And, finally, we are analyzing the different ratios in order to know if the company can face its debts in short and long term. And we see that Bayer Group holds sufficient liquidity to ensure the fulfillment of all planned payment obligations at maturity. Furthermore, the group has a liquidity reserve in order to cover a negative deviation from budgeted cash flows.

We have been able to see how Bayer manages its risk in every step and section of its whole big company. We have got to the conclusion that Bayer has a lot of risky segments and situations and a big structure to hedge. However, we see that Bayer is capable of hedging, managing and monitoring all these risks it has (and it is doing it very well). So, although Bayer has a lot of different risks (as all companies have), it manages them correctly, becoming a low risky company itself.

Then, we can say that it would be a good idea to invest on Bayer. The reasons are clear. Bayer is low risk. It has a trend to increase benefits, a trend to increase dividends and earnings per share. Its situation in the actual crisis is better than the expected for other companies and it is like Bayer is having soft problems to keep on.

Moreover, Bayer knows the importance of its financial and economic structure. And we can see that importance when we look at the different ratios and the quality of them. Although they have decreased in for years, they are still good ratios, stating that Bayer has a good solvency and economic situation.



Science For A Better Life

# Part 3: Profitability

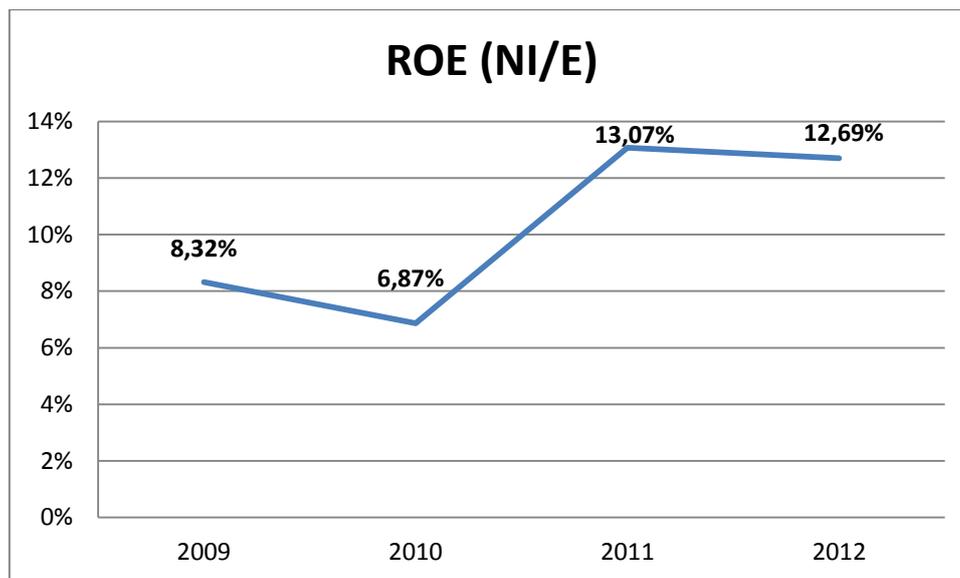
## ROE ratio

When studying the **financial profitability** of a company, we have to understand the ROE ratio, which is:

$$\text{ROE} = \underbrace{\frac{\text{NI}}{\text{Sales}}}_{\text{Net margin}} \times \underbrace{\frac{\text{Sales}}{\text{Assets}}}_{\text{Assets turnover}} \times \underbrace{\frac{\text{Assets}}{\text{Equity Capital}}}_{\text{Leverage factor}}$$

ROE shows the profit generated by a company with regard to the contributed capital by shareholders, in other words, the money a firm generates for a monetary unit invested in the company as equity. ROE is therefore disaggregated by 3 components: the margin ratio, the turnover ratio and the leverage ratio. If we increase one or all of them, we are achieving a financial profitability more favorable, what represents the aim of the company.

Regarding Bayer, we can observe the ROE ratio from 2009 to 2012 in the next graph.



	2008	2009	2010	2011	2012
<b>Net Income</b>	1719	1359	1301	2470	2446
<b>Equity</b>	16340	18951	18896	19271	18569

Note: For any year we have taken Net Income at 31-12 and Equity at 1-1.

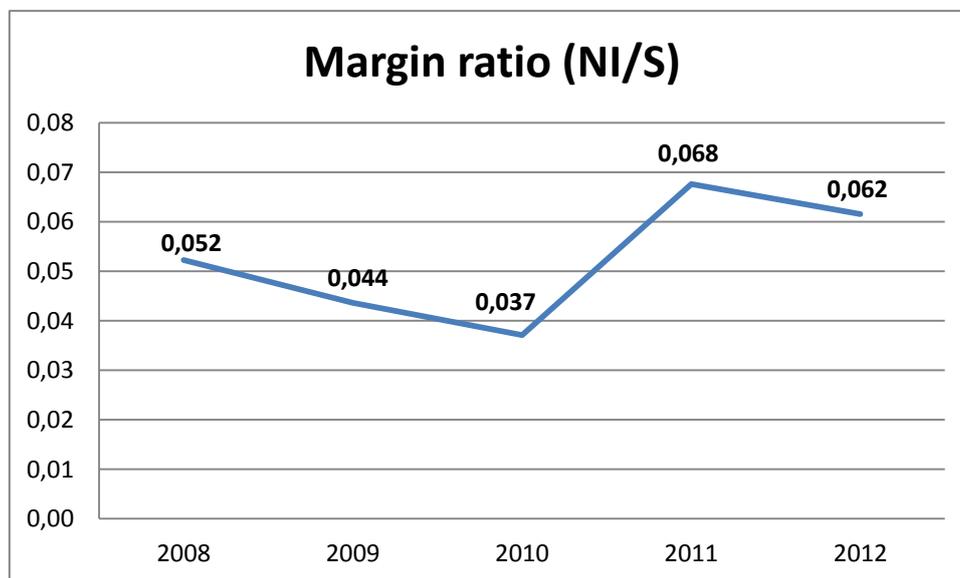
Looking at the graph, in 2012 Bayer generated 1,27€ for each euro invested in the company as equity.

We also can observe a clear change of ROE from the years 2009-2010 to the years 2011-2012. We must point out that in 2010 Bayer changed its CEO, and the next year in 2011 the financial profitability increased due to the increase in net income. In order to know how this change has happened, we should analyze the 3 components of ROE.

## Margin ratio, Turnover ratio and Leverage ratio

The first component of ROE is the **margin ratio**, which indicates the percentage of net profit for a monetary unit sold.

Regarding Bayer, in the next graph we can see the margin ratio evolution from 2008 to 2012.



	2008	2009	2010	2011	2012
<b>Net income</b>	1719	1359	1301	2470	2446
<b>Sales</b>	32918	31168	35088	36528	39760

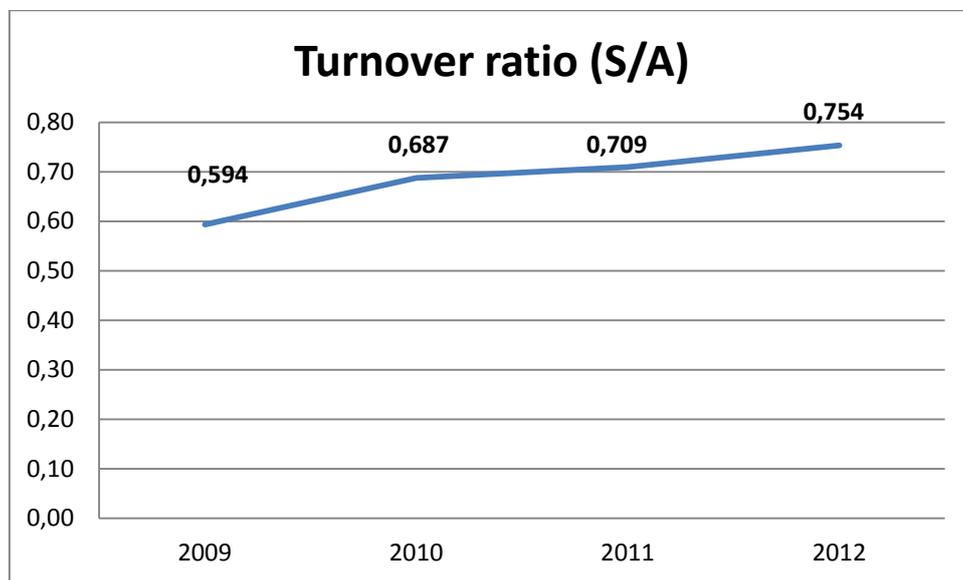
Note: For any year we have taken Net Income at 31-12 and Sales at 31-12 too.

As we can see in the graph, Bayer has decreased its margin from 2008 to 2010, mainly because the decrease of net income, whereas in 2011 and 2012 the firm achieved a better margin due to the huge increase of net income. In 2012, for each euro Bayer has sold, it has generated 0,062€ of net profit. We also can say that Sales component follows an increasingly trend so the change in the margin ratio is mainly due to the net income component.

We can increase this margin by increasing the sales price and/or reducing costs, that means, try to gain more for each unit sold, for example reaching better agreements with suppliers.

The second component of financial profitability is the **turnover ratio**, that is, with the sales of the entire year, which percentage of assets I can buy/finance. We can increase turnover by reducing assets and/or increasing sales.

Regarding Bayer, in the next graph we can see the turnover ratio evolution from 2009 to 2012.



	2008	2009	2010	2011	2012
<b>Sales</b>	32918	31168	35088	36528	39760
<b>Assets</b>	52511	51042	51506	52765	51336

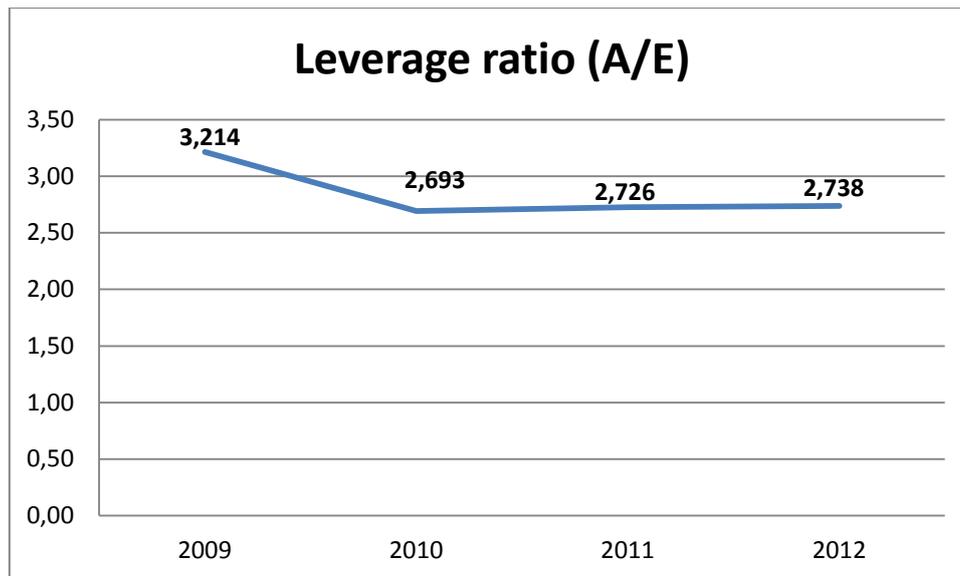
Note: For any year we have taken Sales at 31-12 and Assets at 1-1.

Bayer has increased the turnover ratio constantly through the 4 years. That positive trend is given because sales have increased constantly whereas assets have nearly maintained during the 4 years. With the sales of all 2012, Bayer can buy/finance the 75,4% of its assets.

A way to sell more units with the same investment is making marketing policies like promotion of sales 3x2, as well as trying to sell in other platforms like for example by internet or having more sellers.

The third component of ROE is the called **leverage ratio**. The leverage ratio is the investment (assets) that we have done for each monetary unit of equity. Increasing this ratio means increasing debt, which can give a positive effect when the economic profitability ROA is larger than  $k$ , the external financial cost.

Regarding Bayer, in the next graph we can see the leverage ratio evolution from 2009 to 2012.



	2008	2009	2010	2011	2012
<b>Assets</b>	52511	51042	51506	52765	51336
<b>Equity</b>	16340	18951	18896	19271	18569

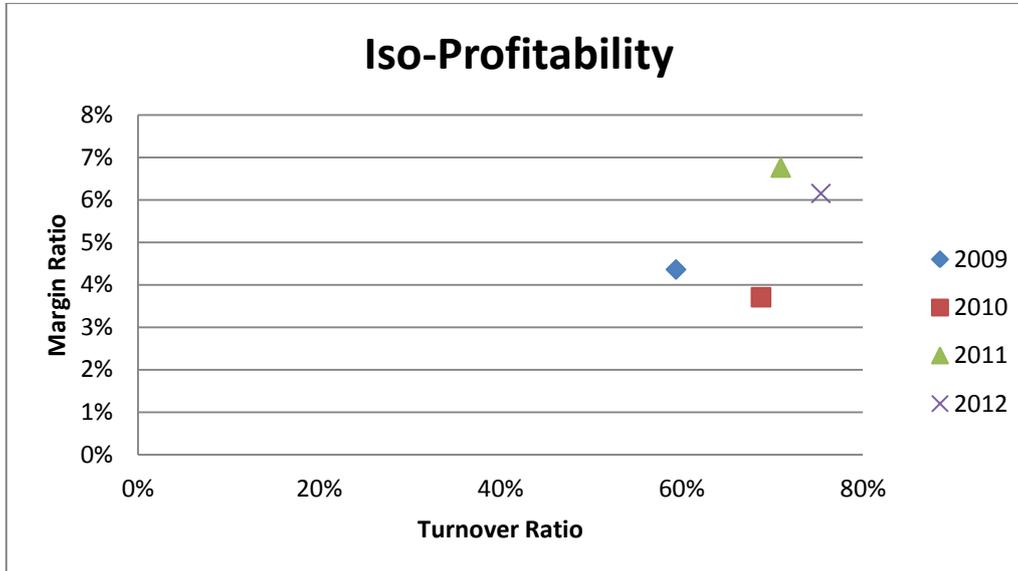
Note: For any year we have taken Assets at 1-1 and Equity at 1-1 too.

From 2009 to 2010, Bayer has reduced its leverage ratio, due to an increase in equity in those years. Then, from 2010 to 2012, Bayer has wanted to maintain its leverage ratio and both assets and equity have not changed significantly. In 2012, for each euro of equity, Bayer has invested 2,74€ in assets, what means the rest is financed by debt.

This ratio is different respect to the last ones in the sense that leverage ratio is not an improvement of the company, since can be increased whenever taking more debt.

Now we can say that the last increase in ROE has been mainly because of the increase in margin ratio, which is easier to achieve in the short-term, since turnover is more difficult. So, we can say that since 2010, Bayer has turned to a more commercial position than an industrial one.

If we add in the same graph margin ratio and turnover ratio, we obtain iso-profitability curves, in order to know if Bayer is more profitable through the last 4 years without taking into account the leverage. As we move to the top-right area, we are more profitable without leverage.



We can see that Bayer is more profitable in 2011-2012 than in the period 2009-2010, both for the margin and the turnover ratio. The position of Bayer also indicates that is a brand champion, as the rest of the Eurostoxx50 companies.

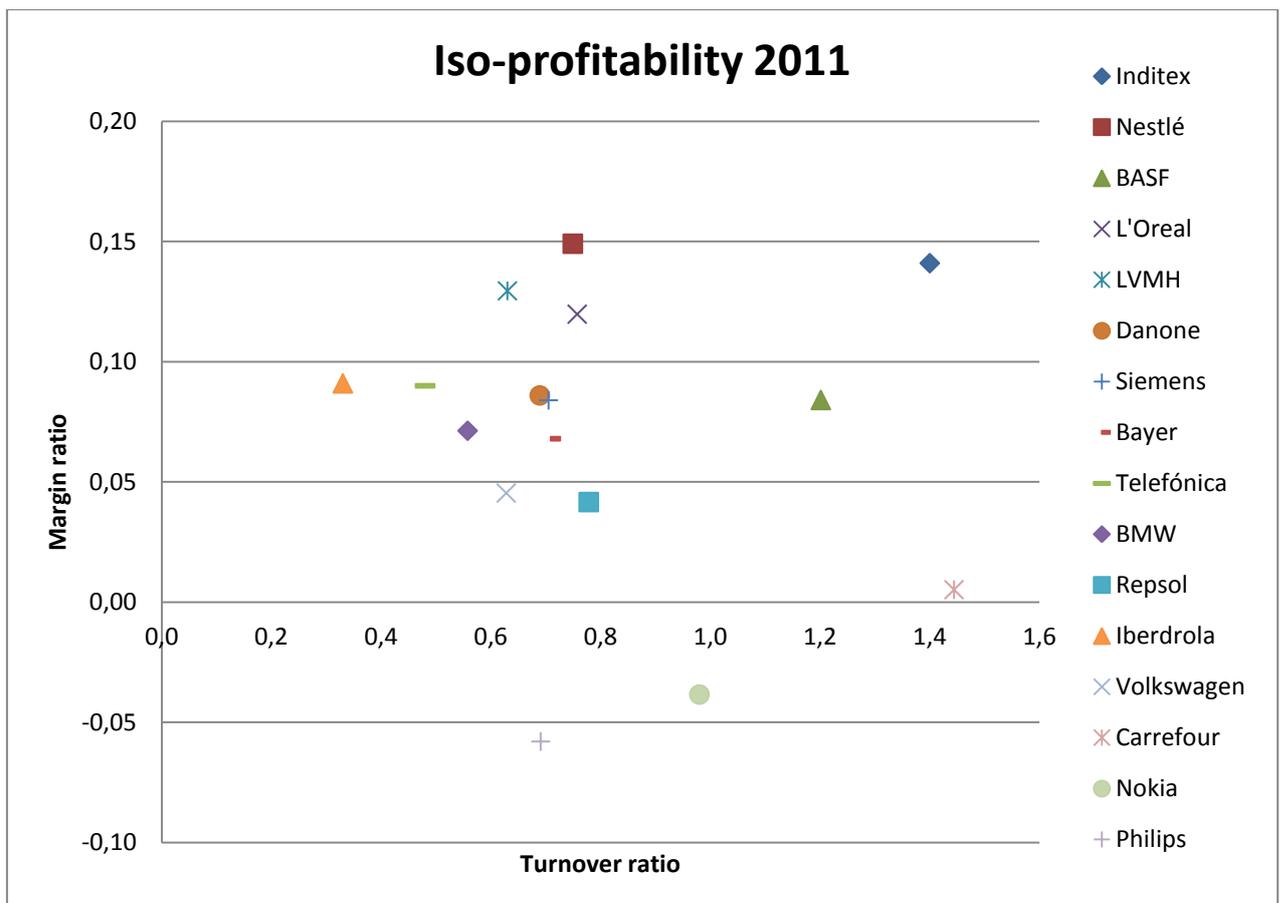
### Comparison with the companies of Eurostoxx50

In this section we want to compare Bayer with the other companies of Eurostoxx50 with regard to both financial and economic profitability in 2011.

The first ranking represents the companies with more margin\*turnover ratio, that is, the profitability without taking into account the leverage ratio.

Ranking best margin*turnover: no consideration of leverage					
2011	ROE	Margin	Turnover	Leverage	margin*turnover
Inditex	30,29%	0,141	1,400	1,530	0,197
Nestlé	19,92%	0,149	0,749	1,783	0,112
BASF	24,35%	0,084	1,201	2,410	0,101
L'Oreal	13,82%	0,120	0,757	1,523	0,091
LVMH	17,80%	0,130	0,630	2,160	0,082
Danone	14,24%	0,086	0,689	2,380	0,059
Siemens	19,58%	0,084	0,705	3,306	0,059

<b>Bayer</b>	<b>13,14%</b>	<b>0,068</b>	<b>0,709</b>	<b>2,726</b>	<b>0,048</b>
Telefónica	22,77%	0,090	0,480	4,700	0,043
BMW	18,10%	0,071	0,558	4,554	0,040
Repsol	8,44%	0,042	0,778	2,603	0,032
Iberdrola	9,17%	0,091	0,330	2,920	0,030
Volkswagen	11,41%	0,045	0,628	4,010	0,029
Carrefour	3,81%	0,005	1,444	5,079	0,008
Nokia	-9,17%	-0,038	0,980	2,400	-0,038
Philips	-8,55%	-0,058	0,691	2,138	-0,040



Inditex is the best profitable company in this map, without taking into account leverage, followed by Nestlé and BASF. On the other hand, we can see as the worst companies Philips, Nokia and Carrefour. Bayer is on the average, both for margin and turnover ratio.

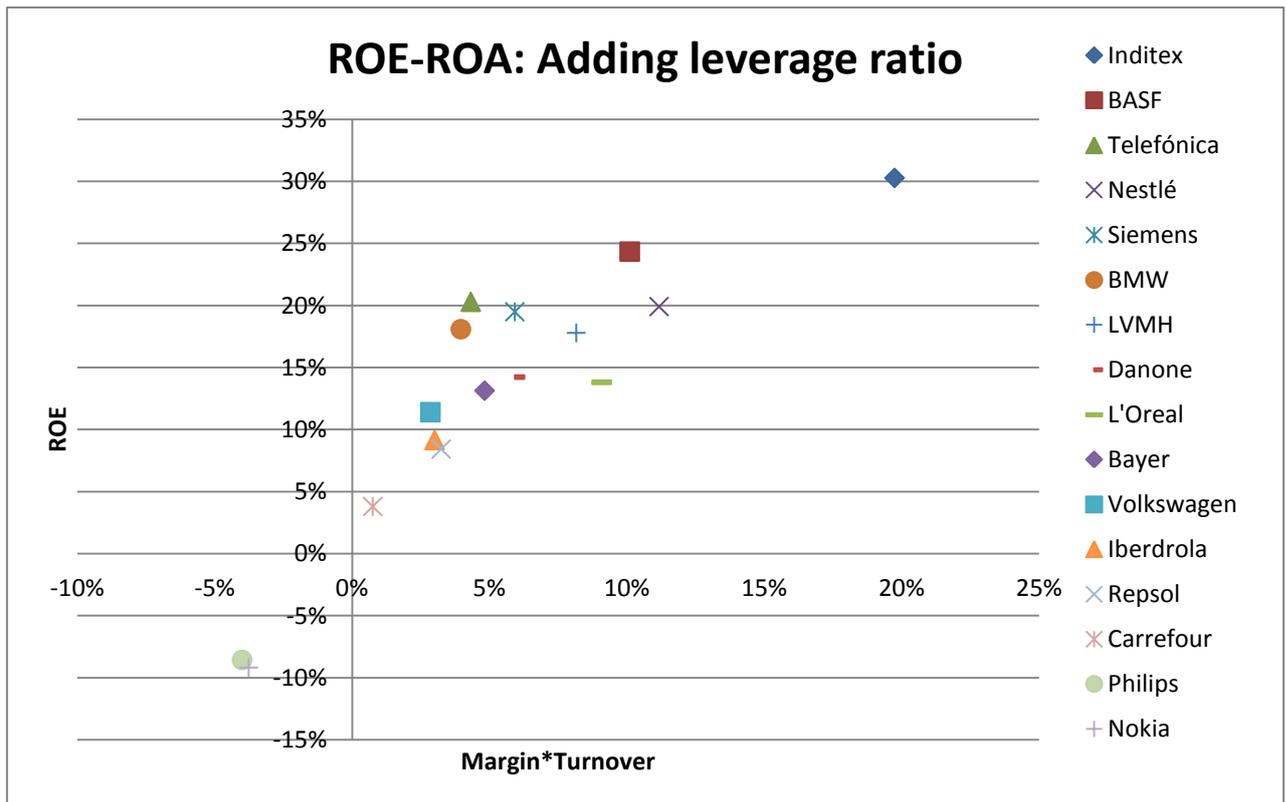
The greatest margin ratio belongs to Nestlé, Inditex and LVMH, whereas Philips, Nokia and Carrefour have the lowest one. Bayer is below the average because even the increase in the last 2 years in the margin, Bayer has strong competitors such as generic products and governmental prices.

With regard to turnover ratio, we have to point out Carrefour, Inditex and BASF as the best ones, and Iberdrola, Telefónica and BMW with the lowest turnover. Bayer is situated on average.

If we disaggregate the map for industries, we can see that the automobile industry has difficulties, looking at BMW and Volkswagen position.

The second ranking and map represents the best companies regarding ROE, which is taking into account leverage ratio.

Ranking best ROE: Taking into account leverage					
2011	ROE	Margin	Turnover	Leverage	margin*turnover
Inditex	30,29%	0,141	1,400	1,530	19,74%
BASF	24,35%	0,084	1,201	2,410	10,10%
Telefónica	22,77%	0,090	0,480	4,700	4,32%
Nestlé	19,92%	0,149	0,749	1,783	11,17%
Siemens	19,50%	0,084	0,705	3,306	5,92%
BMW	18,10%	0,071	0,558	4,554	3,96%
LVMH	17,80%	0,130	0,630	2,160	8,16%
Danone	14,24%	0,086	0,689	2,380	5,93%
L'Oreal	13,82%	0,120	0,757	1,523	9,08%
<b>Bayer</b>	<b>13,14%</b>	<b>0,068</b>	<b>0,709</b>	<b>2,726</b>	<b>4,82%</b>
Volkswagen	11,41%	0,045	0,628	4,010	2,85%
Iberdrola	9,17%	0,091	0,330	2,920	3,00%
Repsol	8,44%	0,042	0,778	2,603	3,24%
Carrefour	3,81%	0,005	1,444	5,079	0,75%
Philips	-8,55%	-0,058	0,691	2,138	-4,00%
Nokia	-9,17%	-0,038	0,980	2,400	-3,76%



X axis represents the last ranking, margin\*turnover, that is, without taking into account leverage. Y axis represents ROE, which is margin\*turnover\*leverage, so each point comes from the x axis multiplied by the level of leverage of each company. For instance, Bayer has a margin\*turnover of 4,82%, which multiplied by the leverage 2,726, the point goes up until a ROE of 13,14%, which is situated on the average.

This way we can appreciate a correlation between the 2 axis, because companies with a high economic profitability are more likely to increase financial profitability taking more debt, and the other way around.

The best profitable company is Inditex, with a return on equity of a 30,29%, far away of the second best, which is BASF with a ROE of a 24,35% and Telefónica with a 20,30%. As before, the worsts companies regarding financial profitability are Nokia, Philips and Carrefour, what shows the leverage does not improve the situation, but potentiates the margin and turnover indicators, being positive or negative.

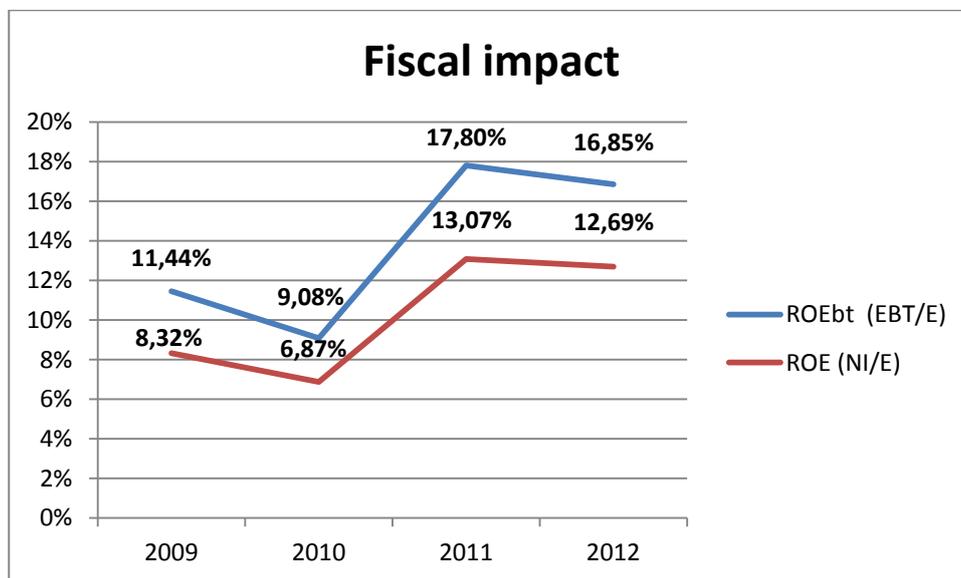
We must point out that Telefónica has risen from the average of margin\*turnover to the third best position of ROE thanks to its leverage ratio of 4,7. The same happens with BMW, which shows the way they are surviving. The most leveraged companies are Carrefour with a 5,079; Telefónica 4,7; BMW 4,554 and Volkswagen 4,01 companies which are below the average of margin\*turnover ratios, whereas the less leveraged

firms are Inditex with a 1,53; l'Oreal 1,52 and Nestlé 1,78 the companies with a higher margin\*turnover ratios.

## ROE before taxes ratio

ROE before taxes ratio subtracts the tax payment from ROE, in other words, it discounts the fiscal impact on the financial profitability. The formula is: EBT/Equities. This way we can see the return on equities without taking into account what the firm pays in taxes.

In the next graph we compare ROE and ROE before taxes, in order to see the fiscal impact in the last 4 years.



	2009	2010	2011	2012
<b>ROE before taxes</b>	0,114	0,091	0,178	0,169
<b>EBT</b>	1870	1721	3363	3248
<b>Equity</b>	18951	18896	19271	18569

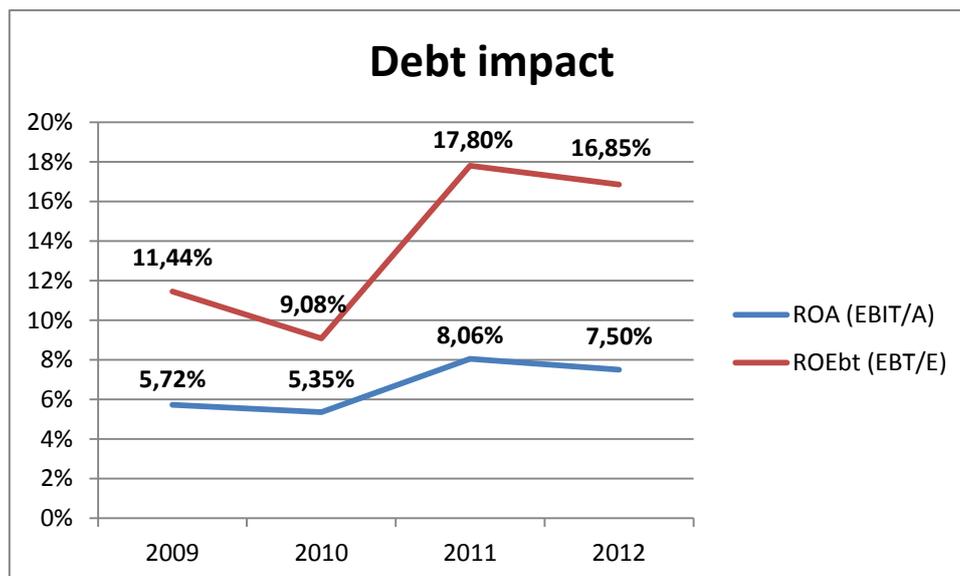
The movement of ROE before taxes follows ROE. But the interpretation changes. Looking at ROE before taxes in 2012, we can say that for every euro hold in equity, Bayer generates 0,1685 euros before taxes, and 0,1269 euros after taxes. So, for each euro invested in Bayer, in 2012 it paid  $0,1685 - 0,1269 = 0,0416$  euros in taxes. Looking at the period 2009-2012, we can see that fiscal impact is greater in 2011 and 2012 than

in 2009 and 2010. That can be explained because in the last two years earnings before taxes also increased, so given that the taxable base was greater, the tax payment was also greater.

## ROA ratio

ROA indicates the **economic profitability** of a company, the profitability of the company's investments, without taking into account its leverage. Calculated by dividing a company's EBIT by its total assets, ROA explains how efficient is the management at using its assets to generate earnings. When comparing different companies, this is one of the best ratios given that neither taxes nor leverage are important.

In the next graph we have calculated the ROA of Bayer for the last 4 years. We also have represented ROE before taxes to see the financial result of the company, since both indicators don't include taxes but ROE before taxes includes debt whereas ROA doesn't.



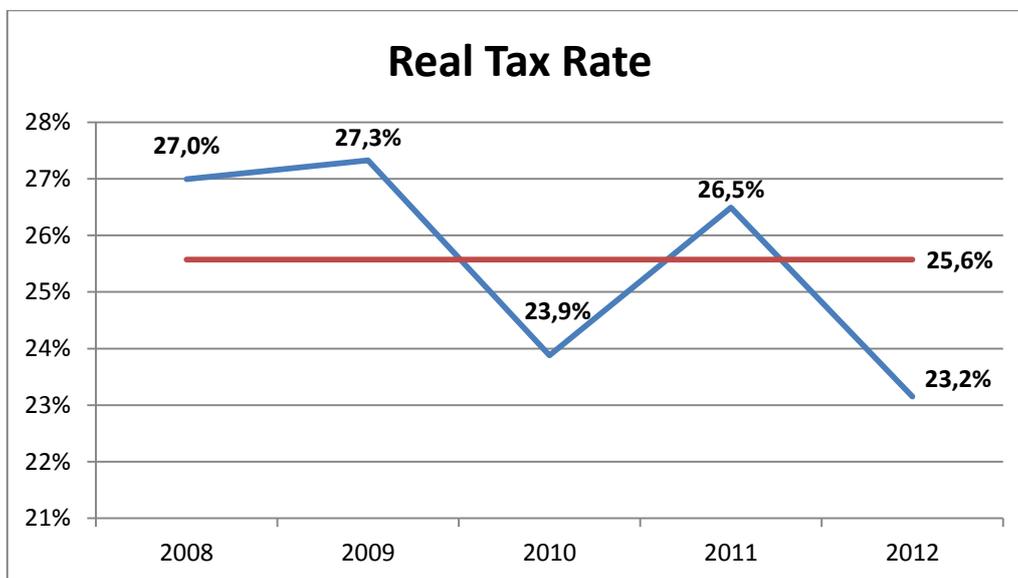
	2008	2009	2010	2011	2012
<b>EBIT</b>	3544	3006	2730	4149	3960
<b>Assets</b>	52511	51042	51506	52765	51336
<b>EBT</b>	2356	1870	1721	3363	3248
<b>Equity</b>	16340	18951	18896	19271	18569
<b>Financial income</b>	589	789	384	586	502
<b>Financial expenses</b>	(1715)	(1877)	(1337)	(1327)	(1168)
<b>Financial result</b>	1188	1136	1009	786	712

In this graph we also can appreciate a convergence between the indicators. In 2012, for each euro invested in Assets, Bayer has generated 0,075 euros on EBIT, without taking into account the financial cost, and for each euro in assets, Bayer has generated 0,1685 euros on EBT taking into account the financial cost. Looking at the period of 4 years, we can see the difference is greater in the last 2 years even though financial result is better in the table. This is because the change in Equity has been greater than the change in EBT, so we are seeing the leverage. ROA has increased from 2009 to 2012, what means there is no a clear risk to suffer important negative changes in ROA.

## Real Tax Rate

In every country there are different rules of paying taxes. In Germany for example the tax rate is progressive, rather than a fixed 30% as in Spain. The real tax rate is achieved by dividing the amount of tax paid by the earnings before taxes obtained in the same year.

We have looked for the percentage Bayer really pays in taxes. Graphically:



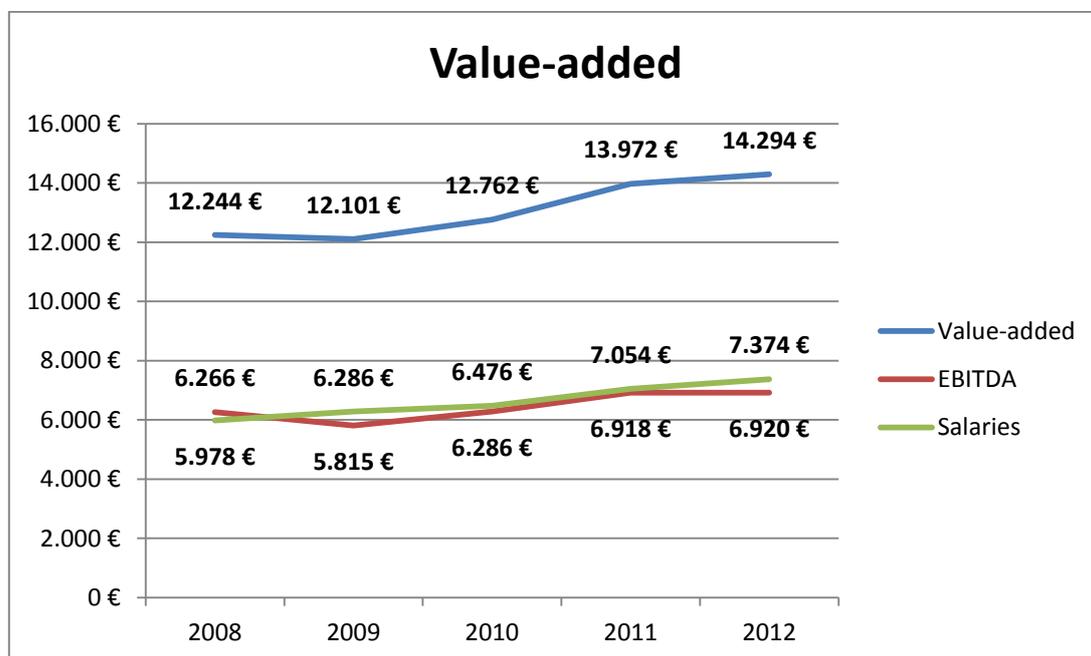
	2008	2009	2010	2011	2012
<b>Taxes paid</b>	636	511	411	891	752
<b>EBT</b>	2356	1870	1721	3363	3248

As appreciated in the graph, the evolution is despair. In the case of Bayer this results depends for example on deductions in research and development. And as we have

said, each country has its own rules and can give Bayer more or less deductions, or more or less facilities to depreciate. As we can see, on average Bayer is paying a 25,6% tax rate, much lower if we consider the size of Bayer and that the normal tax rate is a 30%.

## VALUE-ADDED and EBITDA/SALARIES

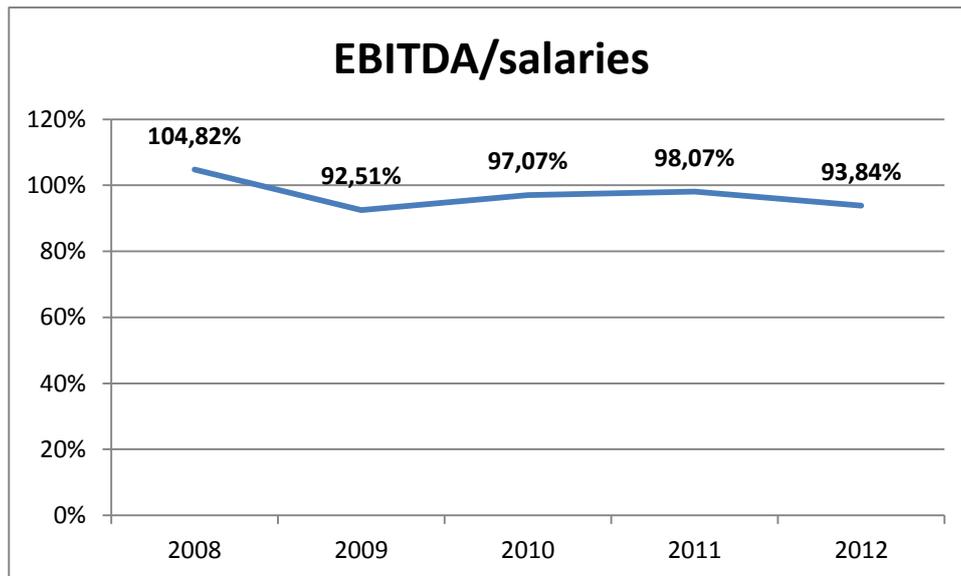
Value added is what employees of a firm add to the products with their effort and work, skills and knowledge. In order to calculate numerically the value-added for Bayer, we sum Salaries to EBITDA. In absolute terms:



	2008	2009	2010	2011	2012
<b>Value-added</b>	12244	12101	12762	13972	14294
<b>EBITDA</b>	6266	5815	6286	6918	6920
<b>Salaries</b>	5978	6286	6476	7054	7374

As it is showed in the graph, the value added has increased through the years as well as the salary costs. That makes Value-added is being distributed among more wage cost, and therefore makes the next relation EBITDA/salaries lower through years.

We also can calculate the percentage of salaries paid with respect to the EBITDA generated. Graphically:

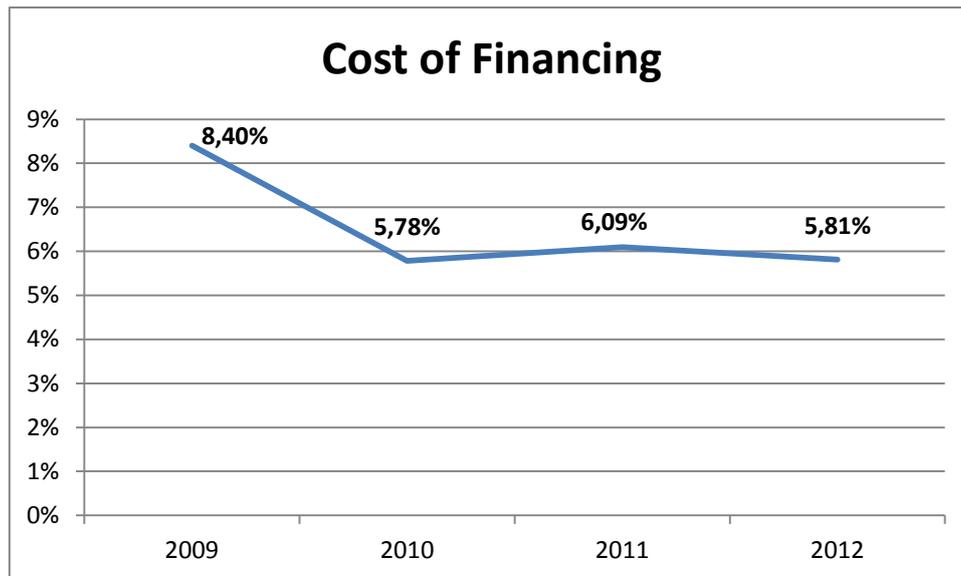


	2008	2009	2010	2011	2012
<b>EBITDA</b>	6266	5815	6286	6918	6920
<b>Salaries</b>	5978	6286	6476	7054	7374

In 2012, for each euro paid in salaries, Bayer has generated 0,9384 euros in EBITDA. We also can observe a slowly decreasing trend. So nearly for each euro Bayer pays to workers, they received as EBITDA, what represents a great value added to the company.

### Cost of financing

We can calculate  $k$ , the cost of financing, through the expression:  $k = \text{Financial expenses} / \text{non-current Liabilities}$ .

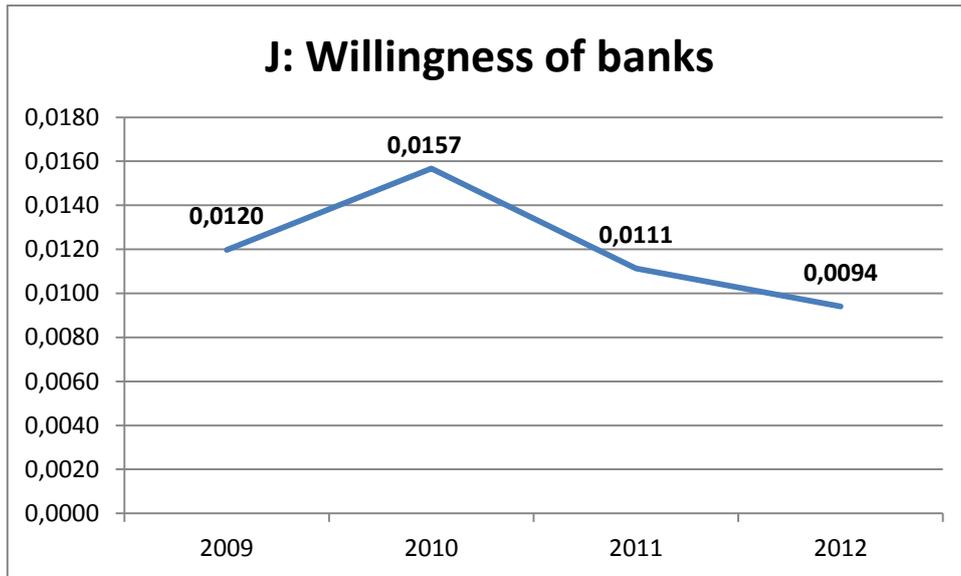


	2008	2009	2010	2011	2012
<b>Interest expenses</b>	1715	1877	1337	1327	1168
<b>Non-current liabilities</b>	22336	23118	21775	20104	19668

As we can see in the table interest expenses have decreased through years what makes the cost of financing cheaper and a decreasing trend in the graph. That is related to the fact that during those years Bayer has changed long-term debt by more short-term one.

### Optimal leverage ratio

In order to calculate the optimal leverage ratio of Bayer, we need to know the willingness to lend money of the banks to Bayer. Making some maths, the expression which calculate J, is:  $J = (ROA + (ROA - e) * (L/E) - ROE_{bt}) / (L/E)^2$ , where we substitute all variables calculated before and we have:

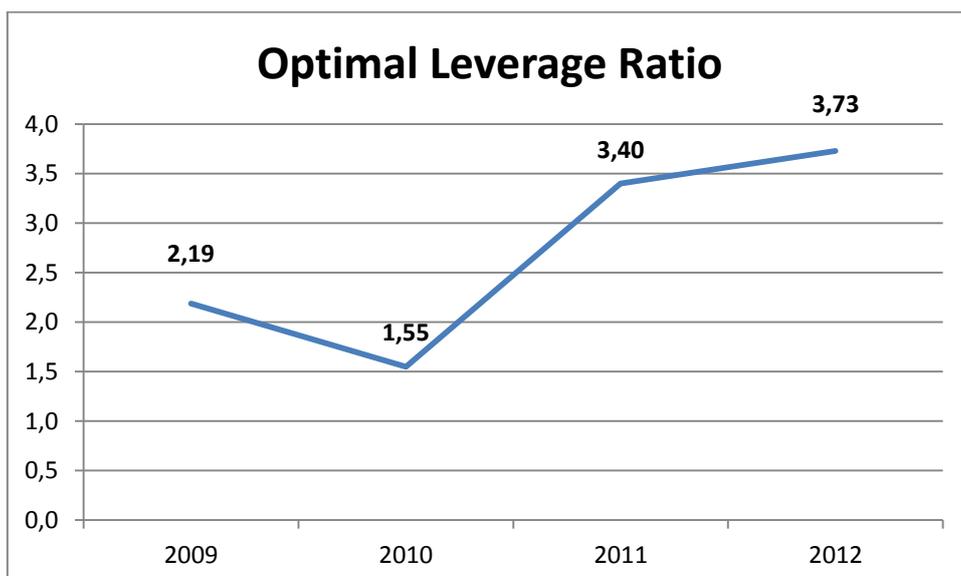


Note: considering the current euribor= 0,49% a one-year time for the entire time serie.

	2008	2009	2010	2011	2012
<b>ROEbt (EBT/E)</b>		11,44%	9,08%	17,80%	16,85%
<b>ROA (EBIT/A)</b>		5,72%	5,35%	8,06%	7,50%
<b>Liabilities (total)</b>	36171	32091	32610	33494	32767
<b>Equity</b>	16340	18951	18896	19271	18569

Looking at the graph, banks are more willing to lend money with respect to Bayer in the last years.

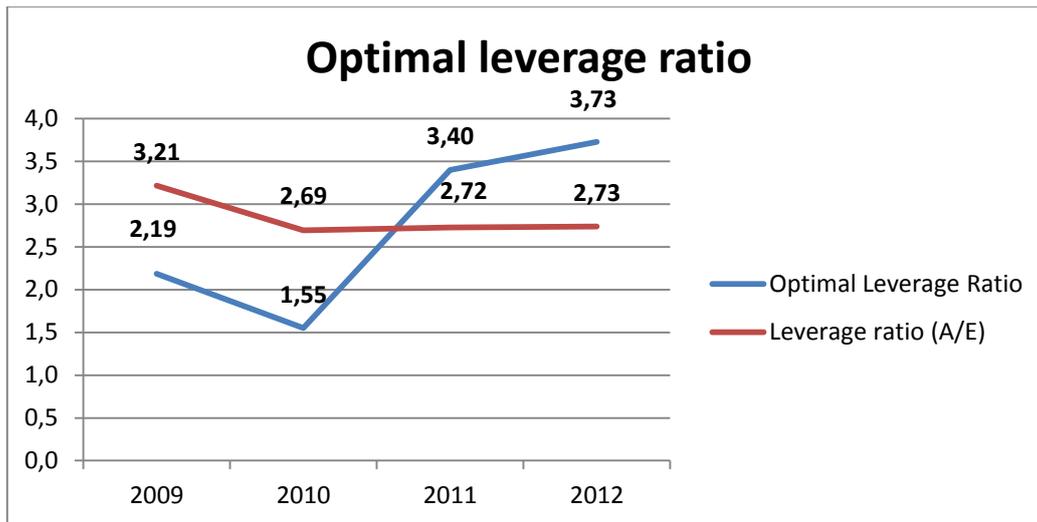
With the expression  $(ROA-e)/(2J)$  now we can know which is the optimal leverage ratio a company has.



Note: considering the current euribor= 0,49% a one-year time.

	2009	2010	2011	2012
ROA (EBIT/A)	5,72%	5,35%	8,06%	7,50%
J: Willingness of banks	0,0120	0,0157	0,0111	0,0094

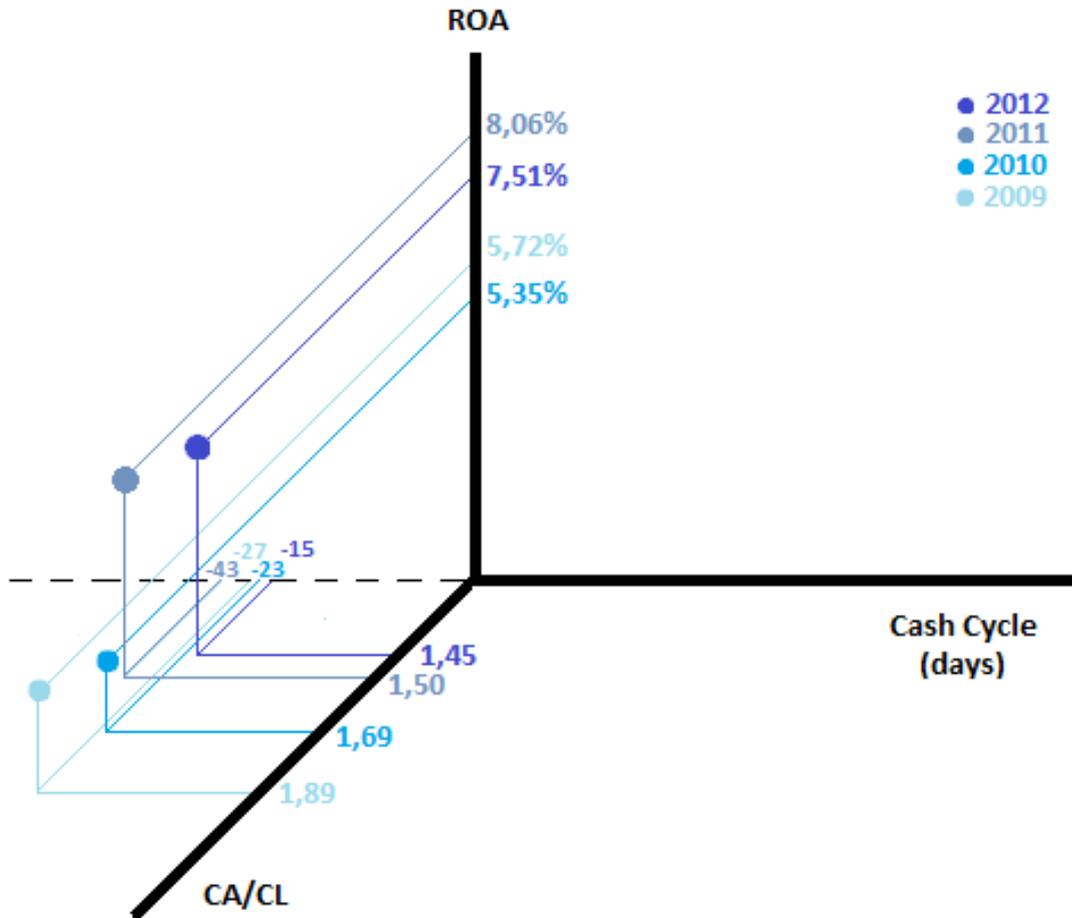
Given that ROA has increased in 2011 and 2012, and that  $j$  has also decreased in the same period, we can see how the optimal leverage ratio has increased until 3,73 in 2012. If we compare with the real leverage ratio:



We can see that in 2011 and 2012 Bayer did not reach the optimal leverage ratio, and Bayer would have been more financial profitability with one more point in the leverage ratio.

### Profitability-risk in the Short-Term

In the next graph we have represented in three axis the cash-cycle and solvency ratio, two short-term risk indicators, and ROA, the economic profitability of the investments, from 2009 to 2012.



	2009	2010	2011	2012
APC	95,8	97,5	118,4	94,9
APP	68,6	74,6	75,6	79,9
<b>Current Assets</b>	16993	18318	20068	18986
<b>Current liabilities</b>	8973	10835	13390	13099
EBIT	3006	2730	4149	3960
<b>Assets</b>	51042	51506	52765	51336

Although cash cycle is always negative, due to its main operational business Healthcare intrinsically get paid with delay mainly because of governments' payments, Bayer is solvent in the short-term because can afford short-term payments with its short-term resources and has had a positive economic profitability.

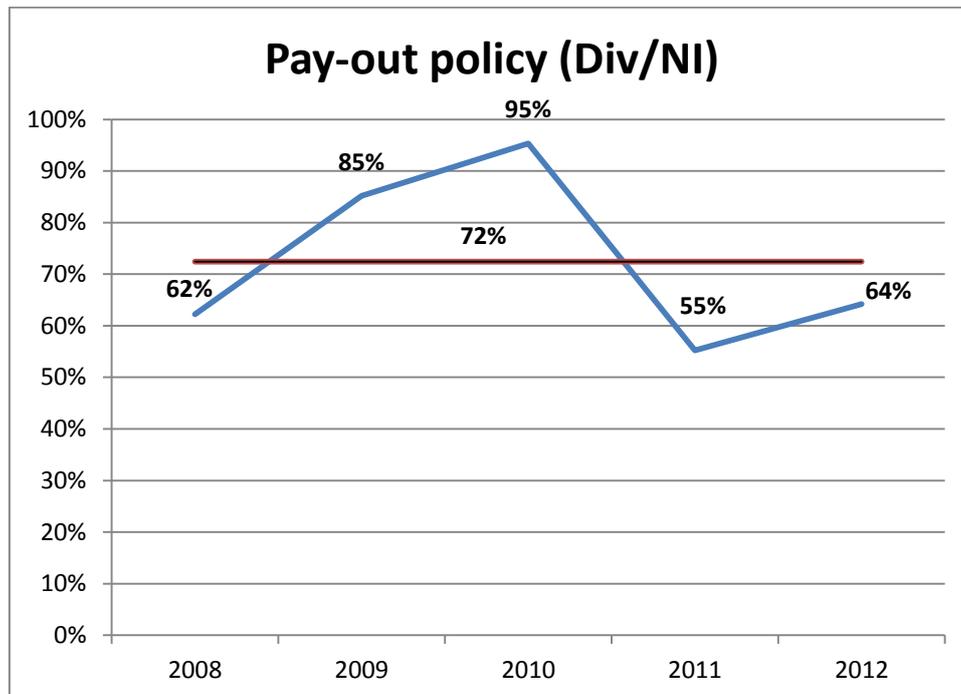
There is no year when all 3 indicators improve. However, we can observe that in the last 2 years Bayer has a better combination. First of all, Bayer is less solvent in 2012 than in 2009 looking at the CA/CL ratio. That is mainly because the new managers in 2010 had changed the quality of debt and turned into a more short-term one.

However, that change has led to a better economic profitability, a better return on investments in 2011- 2012 than in 2009-2010, because the increase of EBIT.

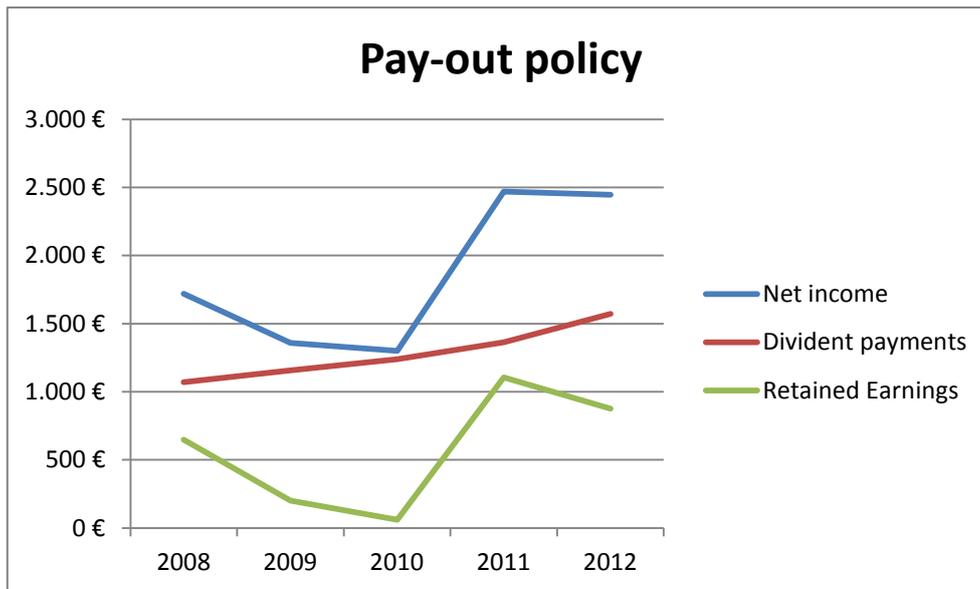
Cash cycle has also improved in 2012. As we can see in the table, that is mainly because Bayer has achieved to pay 6 days later on average than in 2012, reducing the days Bayer needs to finance the difference between it pays and get paid. The fact of paying more in less than a year, gives Bayer more negotiation power to delay the payments' date.

### Pay-out policy

Pay-out policy represents the percentage of net income a company gives to its shareholders as cash dividends.



Pay-out policy has changed through years due to the fluctuation of net income. The average of net income that has been distributed as cash dividends during the last 5 years has been a 72%. In absolute terms:

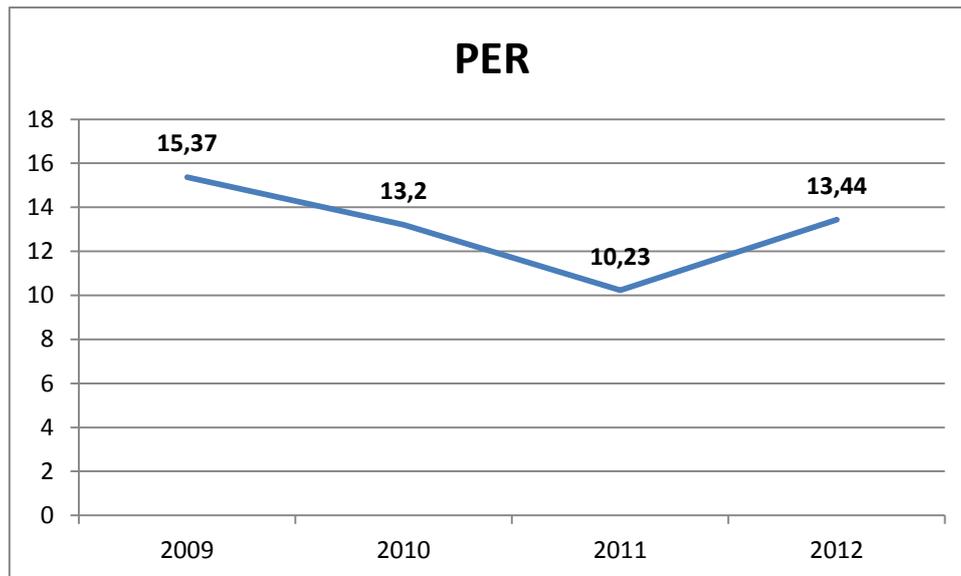


	2008	2009	2010	2011	2012
<b>Net income</b>	1719	1359	1301	2470	2446
<b>Divident payments</b>	1070	1158	1240	1364	1571
<b>Retained Earnings</b>	649	201	61	1106	875

Although Net income has changed through years, the priority was to give an increasing dividend payment, whereas retained earnings has followed the same pattern than net income. So, Bayer has ensured a stabilized dividend payment to its shareholders.

## PER, Price

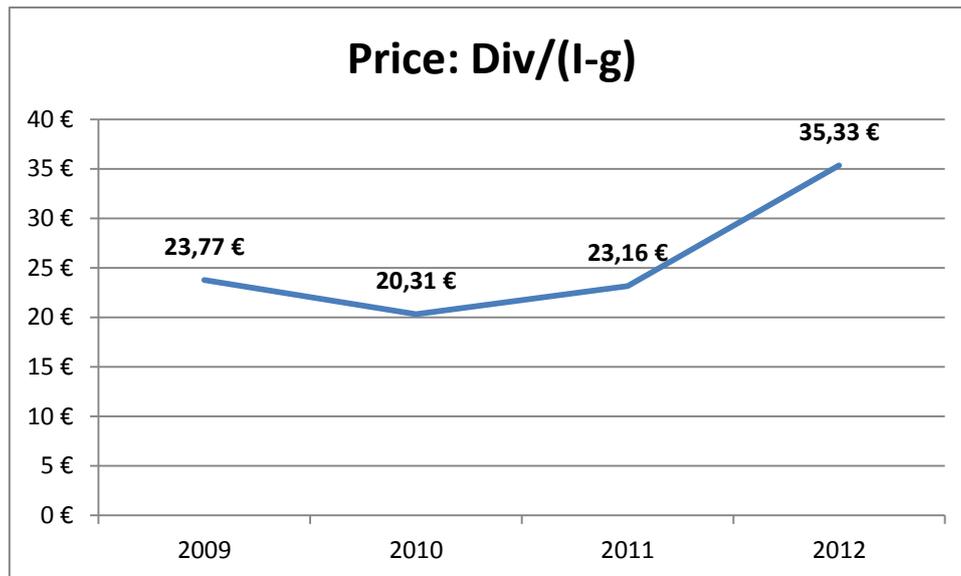
PER refers to the current share price with regard to the earnings per share. We have searched <http://www.eleconomista.es/empresa/BAYER/recomendaciones-consenso> for the case of Bayer in the last 4 years:



	2009	2010	2011	2012
<b>Pay-out</b>	0,85	0,95	0,55	0,64
<b>Real Tax rate</b>	0,27	0,24	0,26	0,23
<b>EPS</b>	1,70	1,57	2,99	2,96
<b>Divident per share</b>	1,40	1,50	1,65	1,90
<b>PER</b>	15,37	13,20	10,23	13,44
<b>I1 Cost of capital of equity</b>	0,07	0,08	0,10	0,07
<b>ROA</b>	5,7%	5,3%	8,1%	7,5%
<b>g</b>	0,006	0,002	0,027	0,021

We can see a recover in 2012 after a decreasing trend since 2009.

In order to calculate the value or the price of a share of Bayer, we need to know two concepts. *I1*, cost of capital have been calculated dividing  $1/PER$ , whereas for *g* we have got a better result using  $g = (1 - \text{payout}) \cdot (1 - \text{real tax rate}) \cdot ROA$ . Finally, price is calculated dividing dividend per share /  $(I1 - g)$ . The evolution of a Bayer share price from 2009 to 2012 is represented in the graph:

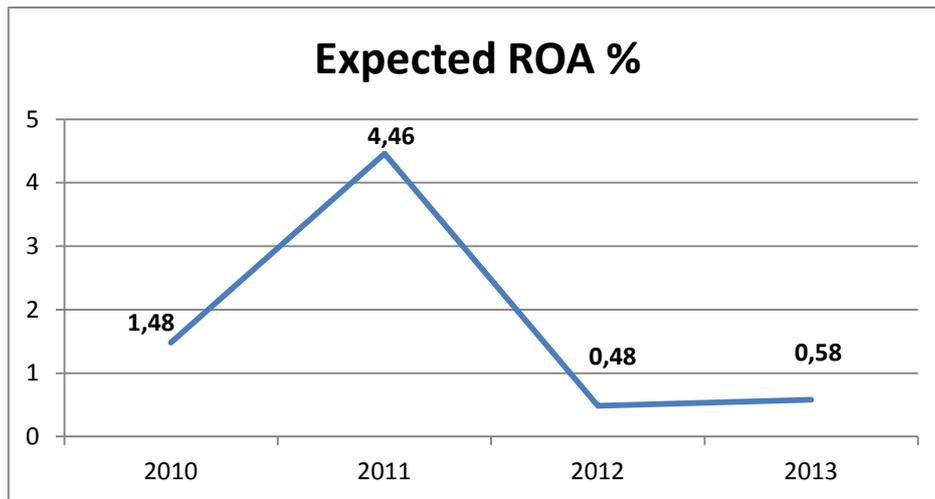


We can see how the price has followed an increasing trend. However, this calculated price does not reflect the current one in the stock market. Looking at eurostoxx50 the evolution of the price in the last 5 years:



We can see how in the stock market the price has followed the same increasing trend as our valuation, but the price is overvalued more and more by the market.

Finally, in order to know which the expected ROA is for the future, we take  $g = (1 - \text{payout}) \cdot (1 - \text{real tax rate}) \cdot \text{ROA}$ , and then we isolate ROA. Now  $g$  is calculated as the average increase of net income year by year to get a better result:



	2008	2009	2010	2011	2012	2013
<b>Net income</b>	1719	1359	1301	2470	2446	
<b>Pay-out</b>	0,622	0,852	0,953	0,552	0,642	
<b>Real Tax rate</b>	0,270	0,273	0,239	0,265	0,232	
<b>g</b>		-0,209	-0,043	0,899	-0,010	
<b>g average</b>		0,159	0,159	0,159	0,159	
<b>Expected ROA</b>			1,481	4,460	0,484	0,579

In this graph we can see the expected ROA for the next year. We can see that for 2013 is expected to be the same as it was the expected for 2012.

## Conclusions

Both financial and economic profitability have increased in Bayer in the last 2 years. In 2010 Bayer changed its CEO. Since then, this increase in ROE has been mainly because the increase in the margin ratio, even though turnover ratio has increased slightly too. Bayer has maintained its leverage ratio during the last 3 years, even though we should wait to see if in the next years it changes. The increase of margin and turnover makes Bayer more profitable in the period 2011-2012 than in 2009-2010 without taking into account leverage.

Comparing with the other companies of Eurostoxx50, Bayer is below the average with respect to the margin ratio, intrinsically mainly because the generic competitors and governmental prices. Bayer is in the average regarding turnover ratio. Both ratios make Bayer to be in the middle of the iso-profitability map. The best situated companies are Inditex, Nestlé and BASF.

Taking into account leverage ratio, Bayer is also in the middle of the ROE ranking, with a 13,14%. Some companies achieved to increase margin\*turnover results thanks to the leverage ratio, like Telefónica and BMW, while do not help for Philips and Nokia, because the negative margin and turnover results.

Comparing ROE and ROE before taxes, we can see that the difference is the fiscal impact, which is greater in the last 2 years because earnings before taxes also increased.

Comparing ROE before taxes and ROA, the difference is the debt impact in terms of financial result, which is greater in the last years although the financial result is better in that period, due to cost of financing was reduced by increasing short-term debt by long-term one. This is because the change in Equity has been greater than the change in EBT, so we are seeing the leverage. ROA, the economic profitability, has also increased from 2009 to 2012, what shows an improvement of Bayer without taking into account leverage. Furthermore, the expected ROA for 2013 is the same as the expected for 2012.

The evolution of real tax rate has changed through years, depending on the deductions and fiscal rules of each country it operates. However, Bayer have paid on average a tax rate of a 25,6%, lower taking into account the size of the firm and the normal tax rate of 30%.

Value-added of the employees to Bayer has increased constantly in the last 4 years, making on average a relation EBITDA/salaries nearly to 1, understanding value-added as the skills and knowledge the workers have and transfer with their work. This means that for each euro in salaries, Bayer has generated nearly the same as EBITDA, a high value-added.

Willingness of banks has reduced and the ROA of Bayer has increased in the last years. That brings about an increase in the optimal leverage ratio to a 3,73. Given that the current leverage ratio is 2,73, Bayer could improve their results by increasing one more point its leverage, what would represent taking at the same time more risk.

And taking more risk is what Bayer has done in the last two years. Bayer has reduced its solvency ratio, the relation CA/CL taking more current liabilities. That has led to Bayer to increase its economic profitability from 5,5 in the period 2009-2010 to nearly an 8% in the period 2011-2012, and in 2012 has led to reduce its cash cycle from -47 days to -15, because a better bargaining position.

Finally, this policy has been transmitted to the share price. Our price valuation of a share of Bayer has increased constantly in the last 3 years, especially in 2012. We have to point out the same increasing trend in the stock market, showing a convergence. However, we can observe the price in the stock market is overvalued. We have to highlight that Bayer has rewarded its shareholders an increasing dividend per share in the last years, whereas retained earnings has moved depended on the net income pattern.