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VALUE CREATION THROUG M&A : A CLINICAL STUDY ON BLOCKBUSTER DEAL EVIDENCE IN THE PHARMACEUTICAL INDUSTRY

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GENERAL INTRODUCTION

"The purpose of finance is to create value" (Vernimmen, et al. 2011, 513).

Value creation is central to finance, and from a financial point of view, the "firm's primary goal is to maximise shareholder wealth" (Vernimmen, et al. 2011, 285). To do so, firm managers dispose of an arsenal of corporate finance strategies intended to create value for shareholders. In much the same way that an investor is concerned with maximizing the value of his securities portfolio, "[c]orporate strategy is concerned with ways of optimizing the portfolios of businesses that a firm currently owns and with how this portfolio can be changed to serve the interests of the corporation's stakeholders" (Sudarsanam 2003, 4). Perhaps at the pinnacle of these strategies – the diadem, the jewel in the crown – is mergers & acquisitions (M&A)[1].

Yet, the press and literature are rife with sensationalist articles denouncing mergers as failures. As Robert Bruner reports, there is a "view, grown popular in circles of executives, consultants, and journalists, that M&A destroys value" (Bruner 2002, 48), as the following examples from a variety of sources can attest:

> *"Mergers and acquisitions more often destroy, rather than enhance, value for acquirer shareholders. The odds of positive and significant value creation for acquirer shareholders may even be less than 50%, which is what one would get with the toss of a fair coin"* (Sudarsanam 2003, 2).
>
> - Sudi Sudarsanam, in his textbook Creating Value Through Mergers and Acquisitions: The Challenges

> *"A variety of studies on the success rates of mergers and acquisitions (M&As) seem to converge around the conclusion that roughly 20 percent destroy value, 50% have a neutral impact, and 30 percent add value"* (Pudney 2004, 63).
>
> - Roger Pudney, in his article "Marking mergers and acquisitions work"

[1] Throughout this paper, the terms "Merger," "Acquisition," and "M&A" will be used interchangeably, though a distinction does exist. If such distinction is required, it will be indicated.

"83% of mergers failed to unlock value," with 53% flat out destroying value, 30% producing "no discernible difference" and only a mere 17% actually creating value (Kelly, Cook and Spitzer 1999, 7-8).

- KPMG report, "Unlocking shareholder value: the keys to success"

"Fully 61% of buyers destroyed their own shareholders' wealth" (Henry and Jespersen 2002, 63).

- *Business Week* cover story: "Mergers: Why Most Big Deals Don't Pay Off"

"[A]lthough companies in all industries are joining together at ever increasing record rates, the sobering reality is that only about 20 percent of all mergers and acquisitions really succeed. *Most mergers typically erode shareholder wealth […]. While mergers are the largest capital expenditure most companies ever make, they are frequently the worst planned and executed business activities of all. According to McKinsey & Co., nearly 80 percent of all mergers fail to recover the costs incurred in the deal" (Grubb and Lamb 2000, 9-10).*

- Thomas Grubb and Robert Lamb, in their book Capitalize on Merger Chaos: Six Ways to Profit form Your Competitors' Consolidation and Your Own

While the statistics differ from one source to another, the diagnosis is alarming and leads one to question why companies merge at all. However, it would be too hasty to conclude that as a result of these findings, M&A should be written off as a viable strategy for value creation. After all, there must be a reason that firms engage in this activity, driving global M&A expenditure to $4.1 trillion in 2011 (American Appraisal / mergermarket 2012).

Indeed, to answer the question: "Does M&A create value?", one must consider two other questions. Firstly, what is value creation and what does it means for a merger to create value? As there are varying definitions, determinants and degrees of merger "success" or "failure," the frame within which this question is assessed plays a key role in determining its answer. This is a central question, which will be addressed in Part I of this study. Secondly, for whom is this value being created? With so many different stakeholders in a transaction (shareholders, creditors, managers, employees, competitors, etc.), perspective also undoubtedly influences the answer to

the question: “Does M&A create value?” In this study, I will focus exclusively on value creation from the perspective of the acquiring company’s shareholders.

The aim and structure of this thesis is twofold. Part I of this study aims to understand the theoretical underpinnings of value creation as well as academic literature concerning the subject. Part II aims to assess value creation through M&A through the very specific lens of the recent wave of mega-mergers in the pharmaceutical industry, and in particular through one case study: the 2009 “mega-merger” of Pfizer and Wyeth.

PART I: OVERVIEW OF THEORY AND ACADEMIC LITERATURE

Chapter 1: Theoretical overview of value creation

1. Definition

To understand value creation, we must first understand what is meant by "value" in the corporate finance context. Simply put, the value of a company is determined by the market value of its capital employed.

A company needs funds to run its business. Providers of these funds typically include creditors and shareholders, who provide the company with debt and equity, respectively. These sources of funds constitute the company's invested capital. The company uses these funds in the form of fixed assets and working capital, which constitute the company's capital employed. By construction, invested capital is equal to capital employed.

By carrying out this very simple analysis, we can easily see the direct link between the company's outstanding financial securities and its commercial operations. This link can be summarized as follows: "[t]o ensure a flow of financing, financial managers have to transform their industrial and commercial assets into financial assets. This means that they have to sell the very substance of the company (future risks and returns) in a financial form" (Vernimmen, et al. 2011, 520). The investors' role in providing funding is critical; without their support, a company cannot exist. In a sense, investors get the ball on the ground to get the game started.

Investors also play a crucial role in keeping the ball rolling: "[t]he investor has the power not just to provide funds, but also to value the company's capital employed through the securities already in issue" (Vernimmen, et al. 2011, 515). These securities circulate on financial markets, which, as their name implies, are *markets*. As such, they are subject to the market forces determined by economic theory, beginning with the most basic dichotomy in economics: supply and demand. In traditional economics, the demand curve is determined by price as a function of quantity. The curve is downward-sloping, such that the higher the price of a good, the lower the quantity demanded, and vice versa. In the market for companies' financial securities, investors (the demanders) face a cost when buying these securities. In order to decide whether or not to purchase them, investors perform what is known as a cost/benefit analysis in economic terms, or

as a risk/return analysis in financial terms. A security will be attractive to an investor if it yields at least his/her required rate of return. Indeed, "[f]inancial investors evaluate the securities offered or already issued according to their required rate of return. By valuing the company's share, they are, in fact, directly valuing the company's operating assets" (Vernimmen, et al. 2011, 520).

When the demand from investors for financial securities is equal to the firm's supply of these securities, we reach the equilibrium market value of capital employed. The market value of capital employed is also known as enterprise value. At this equilibrium, the return on the firm's investments matches the return required by the company's investors. Just as in any other market, there can be shifts in this equilibrium value, caused by changes in demand and/or supply. For example, an investor who is not getting the rate of return he/she requires can sell his/her securities, thereby moving the equilibrium price for the security down until he/she is obtaining his/her required rate of return. If the equilibrium market value of capital employed decreases, the company's valuation is lowered. We saw previously that there is a direct link between a company's financial securities and its operating assets. We can now see how there is also a direct link between the value of these securities and that of the company. The market value of capital employed "theory underscores the direct link between the return on a company's investments and that required by investors buying the financial securities issued by the company" (Vernimmen, et al. 2011, 513).

A company's value is thus intimately linked to the value of its securities, which itself is intimately linked to the trade-off between risk and return. Indeed, "[t]he value of the securities issued by a company […] simply reflect the market's reaction to the perceived profitability and risk of the industrial and commercial operations" (Vernimmen, et al. 2011, 519). The key word here is "perceived." A key attribute of value is that it is forward-looking. Investors do not invest because a company did well yesterday or even today. They invest because they believe the company can create value in the future. Dobbs *et al*. call this the "expectations treadmill principle," which "explains how movements in a company's share price reflect changes in the stock market's expectations about performance, not just the company's actual performance (in terms of growth and returns on invested capital)" (Dobbs, Huyett and Koller 2010).

Now that we have defined value in the corporate finance context, we can consider the definition of value creation. "The core-of-value principle establishes that value creation is a

function of returns on capital and growth" (Dobbs, Huyett and Koller 2010). When a company decides on a project or investment, it can find itself in one of three situations: (i) the return on this investment is greater than the return required by investors, in which case the investment creates value, (ii) the return on this investment is equal to the return required by investors, in which case there is neither value creation nor destruction, or (iii) the return on this investment is less than the return required by investors, in which case there is value destruction. According to Bruner, "[i]n economic terms, an investment is 'successful' if it does anything other than destroy value" (Bruner 2002, 49). Creation of value clearly corresponds to the difference between the market value of capital employed and its book value. And in order to create value, "the key variables of any financial policy," including the pursuit of M&A, must be "[t]he valuation of capital employed, and therefore the valuation of equity" (Vernimmen, et al. 2011, 516).

2. Measurement

Perhaps the best way to define value creation is to understand how it is measured. As such, the measurement of value creation is addressed in the following section.

Vernimmen *et al*. provide a simple decision rule for the measurement of value creation:

> *"A financial decision harms the company if it reduces the value of capital employed."*
> *"A decision is beneficial to the company if it increases the value of capital employed."*
> - Vernimmen, et al. 2011, 516

This conceptually simple rule reminds us that, just as the value of a company corresponds to the value of its capital employed, so is the measurement of value creation determined by the changes in the value of its capital employed. Hence, to measure value creation, we must measure the value of a company's capital employed, and changes in the value thereof.

In order to carry out this task, we have at our disposal a host of value creation measures. As we consider these different measures, it is interesting to keep in mind the following:

> *"Plainly, no research approach is fault-free, though some command more respect of scientific researchers than others. The task must be to look for patterns of confirmation across approaches and studies much like one sees an image in a mosaic of stones"* (Bruner 2002, 50).

This section focuses firstly on measures intended for the specific assessment of value creation in the context of M&A, namely synergies and event studies. It then addresses the measures of value creation that are applicable to both standalone or merged entities.

2.1 Measures for the specific assessment of value creation in the context of M&A

2.1.1. Synergies

The concept of synergy[2] is ubiquitous in the context of mergers and acquisitions. It is perhaps the most cited reason for carrying out M&A activity: "the most common motives for M&As are growth and synergies" (Dermirbag, Ng and Tatoglu 2007, 45); "[t]he realization of synergies is one of the most important drivers for M&A transaction [*sic*]" (Kerler 2000, cited in Kirchhoff and Schiereck 2011, 37). Synergy is also the principal idea that lies behind value creation through M&A. What exactly are synergies, where do they come from, and what is their role in defining and driving value creation?

Synergy can be very simply summarized as the concept that 2 + 2 = 5, or creating something that is more valuable than the sum of its parts. In other words, "the merging of two firms will generate a more valuable entity than the value of the two firms if they were to stay independent" (Dermirbag, Ng and Tatoglu 2007, 45). Although it is difficult to measure what might have been (i.e. if the companies had kept running separately rather than merging), the core underlying assumption of synergy is that it is something that cannot be achieved alone. According to Lubatkin: "[r]elated to strategic fit, synergy occurs when two operating units can be run more efficiently (i.e., with lower costs) and/or more effectively (i.e., with a more appropriate allocation of scarce resources, given environmental constraints) together than apart" (Lubatkin 1983, 218).

There are two primary types of synergies: revenue-based synergies and cost-based synergies. Both are based on "leveraging the merging firms' current stock of resources and capabilities" (Sudarsanam 2003, 100). Revenue-based synergies arise from top-line growth through revenue enhancement while maintaining the same cost base. Cost-based synergies arise

[2] The term synergy here refers exclusively to industrial synergies, rather than financial synergies that, according to Vernimmen *et al*. do not exist (Vernimmen, et al. 2011, 519).

from bottom-line improvement due to cost savings while maintaining the same revenue level. According to Capron, "[h]orizontal acquisitions create value by exploiting [these] cost-based and revenue-based synergies" (Capron 1999, 988). These revenue-based and cost-based synergies need not necessarily be mutually exclusive. Beyond these two primary sources of synergies, value can also be created through "generating new resources and capabilities that lead to revenue growth or cost reduction" (Sudarsanam 2003, 100).

Revenue enhancement can come from a variety of sources. A combined firm may have increased market share, allowing it have more market power and perhaps even (in some cases) increased pricing power. When two firms combine in a horizontal merger, they are typically similar or related in terms of products and markets but usually not identical. Therefore, when they merge, they can "[leverage] marketing resources and capabilities" (Sudarsanam 2003, 100) and exploit each other's geographic and product platforms to enhance their offering. Other sources of revenue enhancement include "the incorporation of each organization's best practices, scientific and technical gains […], and building a new corporate culture" (Ravenscraft and Long, Paths to Creating Value in Pharmaceutical Mergers 2000, 319). While top-line growth can constitute a veritable source of value creation following a merger, it is deemed "fairly elusive" (Sudarsanam 2003, 83) and is often slighted in favor of its more concrete synergy counterpart: bottom-line improvement through cost savings. Indeed, "[a]s compared to revenue enhancing synergy, cost economies are relatively easy to achieve as they often involve eliminating duplicate costs such as redundant overhead" (Dermirbag, Ng and Tatoglu 2007, 45), and "[l]eading M&A practitioners […] consider cost savings a less daunting challenge than revenue growth" (Sudarsanam 2003, 83).

In economic terms, there are "two fundamental paths to true cost savings – economies of scale and scope and elimination of inefficiencies" (Ravenscraft and Long, Paths to Creating Value in Pharmaceutical Mergers 2000, 316). In M&A terms, these could be viewed as the synergy buzzwords. Economies of scale "occur when the physical process inside the firm is altered so that the same amounts of inputs, or factors of production, produce a higher quantity of outputs. The firm, by using its resources more efficiently, is able to lower its average cost curve and thus enjoy an advantage over competing firms" (Lubatkin 1983, 219). Examples of economies of scale include a leaner workforce, smaller sales teams, a single head office, avoiding duplication in R&D, and pooling of advertising expenditures (Sudarsanam 2003, 107).

As their name implies, economies of scale arise from a size factor. That is, they are "size-based cost advantages assuming firms are operating efficiently" (Ravenscraft and Long, Paths to Creating Value in Pharmaceutical Mergers 2000, 316). Ravenscraft and Long outline three conditions that determine whether or not cost savings stem from economies of scale: the savings need to (i) result from the increased scale caused by the combination of two firms (i.e. savings that could not have been achieved alone), (ii) be "savings that another efficiently operated firm that is smaller [than the premerger acquirer] is not achieving", and (iii) be "savings that do not stem from excess capacity" (Ravenscraft and Long, Paths to Creating Value in Pharmaceutical Mergers 2000, 316).

Similarly to economies of scale, economies of scope also arise from a size factor. The latter "exist when [the] cost of joint production of two or more goods by a multi-product firm is less than the combined costs of separate production of those goods by firms specializing in those goods" (Sudarsanam 2003, 108). Umbrella branding of products and spillovers of information and ideas in R&D are examples of economies of scope (Sudarsanam 2003, 108-109).

The concept of economies of scale is very closely related to the elimination of inefficiencies, which can also be a source of cost savings. Other sources of costs savings include the reduction of excess capacity (reducing supply to match demand) and learning economies, which cumulate over time as "managers and workers become more experienced and effective in using the available resources of the firm over time and help lower the cost of production" (Sudarsanam 2003, 110).

According to Ravenscraft and Long, "cost-cutting in large horizontal deals plays a critical role in value creation" (Ravenscraft and Long 2000, 290). Of course, there are natural limits to cost savings imposed by the minimum efficient scale required for operations. If revenues begin to suffer from cost cuts, this could ultimately lead to value destruction. On the other hand, if revenues increase despite cost cuts, through a combination with revenue-enhancing synergies, the value creation upside potential will increase.

We have thus seen how synergies can lead to the creation of value. However, the existence of synergies in and of itself is not enough to justify that an acquisition will create value. There are two other important potentially offsetting factors to keep in mind.

Firstly, the achievement of synergies does not come free. There are post-merger integration costs involved once a transaction has been closed. For example, there can be costs

associated with firing employees or shutting down plants, as there can be non-accounting post-merger integration costs. Thus, "savings can be offset by the postintegration cost" (Ravenscraft and Long, Paths to Creating Value in Pharmaceutical Mergers 2000, 290). Indeed, post-merger integration is considered as one of the biggest challenges of M&A, and is often cited as a key reason for merger "failure." These costs are not negligible and must certainly be kept in mind when touting the value creation potential of synergies.

Secondly, the present value of the synergies has to exceed the premium paid in order to create value, since "the buyer pays the premium up front and buys an option on uncertain future synergies […;] the premium is an advance payment on a speculative synergy bet" (Rappaport 1998). When an acquirer pays a premium to the target, the latter's shareholders get an immediate benefit. However, the acquirer relies on synergies to capture value, but if the acquiring firm overpays, it lessens its chances of creating value. Indeed, "[s]ome of [the value created] will accrue to the acquirer's shareholders if it doesn't pay too much for the acquisition" (Dobbs, Huyett and Koller 2010).

Keeping these two caveats in mind is especially important given the fact that expected synergies at the time of a deal announcement are often exaggerated or inflated. In reality, most mergers do not achieve the full synergies that were expected of them, and actual post-merger integration costs can sometimes be higher than anticipated. Therefore, it is important to have a cushion between the anticipated level of synergies, the real level of synergies, and the costs associated with capturing these synergies. For as soon as the costs (post-merger integration costs + premium paid) exceed the benefits of the real synergies, value is destroyed for the acquiring firm's shareholders. This is exactly "[w]hat makes mergers so challenging from the bidder's perspective" (Ravenscraft and Long, Paths to Creating Value in Pharmaceutical Mergers 2000, 321).

2.1.2. Event studies

The event study methodology is one of the most popular measures used for assessing value creation through M&A, and has been employed in countless studies since it was first elaborated in 1969 by Eugene Fama, Lawrence Fisher, Michael Jensen and Richard Roll (Fama, et al. 1969). Indeed, according to Higgins and Rodriguez, "[o]ne of the challenges in analyzing

mergers and acquisitions is to find appropriate measures of transactions [*sic*] success, in addition to the widely accepted cumulative abnormal returns" (Higgins and Rodriguez 2006, 357).

"The event-study method is used to determine whether an abnormal stock price effect is associated with an unanticipated event" (Hamza 2011, 182). The methodology consists in looking at the cumulative abnormal returns (CARs) to the acquiring and target firms within an event window (usually relatively short) surrounding the announcement date, as well as CARs to the combined firm. This statistical methodology comprises the following steps, summarized from Kirchhoff and Schiereck (2011) and Hamza (2011):

1) Define a data sample
2) Define the event (e.g. the merger or acquisition announcement date) and event window
3) Estimate the expected return on a security, using the market model:

$$E(R_{i,t}) = \alpha_i + \beta_i * R_{m,t}$$

where α and β are estimated through an Ordinary Least Squares (OLS) regression during a pre-determined pre-event window and $R_{m,t}$ equals the "[m]arket return observed at time t during the event window" (Hamza 2011, 173).

4) Calculate abnormal returns (ARs), which correspond to the difference between the actual return on a security and its expected return

$$AR_{i,t} = R_{i,t} - E(R_{i,t})$$

In other words, "[t]he *abnormal return* is simply the raw return less a benchmark of what investors required that day – typically, the benchmark is the return dictated by the capital asset pricing model (CAPM) or quite simply the return on a large market index, such as the S&P 500" (Bruner 2002, 49).

5) Calculate CARs, which are simply the sum of the average ARs over the observation period within the event window (e.g. from 10 days before announcement to 10 days after then announcement):

$$CAR_{[t1;t2]} = \sum_{t=t1}^{t2} \overline{AR_t}$$

The event study methodology is conditioned on a belief in the semi-strong form of the markets efficiency hypothesis. When markets are informationally efficient, the fundamental value of an asset, or its fair value, p*, such that the net demand for the asset is equal to zero is on average equal to the present value of its future cash flows.[3] When a merger is announced, the future cash flow profile of the combined entity is different from that of the standalone entities. Because of the assumption of semi-strong capital market efficiency, "the capital market immediately evaluates the announcement of the transaction correctly and incorporates it into the stock price" (Kirchhoff and Schiereck 2011, 30). The event study methodology assumes that capital markets have a collective intelligence/omniscience that allows them to almost immediately integrate the future value of the combined firm's cash flows and impute it to the respective firms' stock prices. Thus, if investors expect the cash flows of the combined entity to be superior to the sum of the standalone future cash flows of the two entities, then the share price of one or both of the companies will go up, and vice versa.

CARs, rather than actual returns, are used because they indicate the part of a security's return that is not due to "business as usual" or what could normally be expected: "[s]ince a semi-strong capital market efficiency is assumed, the expected value of the abnormal return should be zero without any new, relevant information" (Kirchhoff and Schiereck 2011, 30). In other words, the abnormal returns measure the impact of the event – in this case a merger announcement – on the value of a security.

The CARs are generally calculated for both the target and acquirer, and occasionally for the combined firm as well. The decision rule for value creation is simple: if CARs are positive (and significant), then the merger has created value for shareholders. If the CARs are negative (and significant), then the merger has destroyed shareholder value.

The event study methodology presents two main advantages: it is "[a] direct measure of value creation for investors" and is "[a] *forward-looking* measure of value creation" (Bruner 2002, 51). Further, as it is a statistical procedure, results can be tested for significance and hypotheses can be tested, allowing the researcher to potentially draw some general conclusions, particularly as sample size increases. Taken together, these elements have contributed to its popularity as a method for measuring value creation.

[3] Class notes from Professor Thierry Foucault's course on "Securities Markets: Mechanisms, Liquidity and Investment Decisions 2011-2012"

However, the event study methodology does have several drawbacks. Firstly, it "[r]equires significant assumptions about the functioning of stock markets: efficiency, rationality, and absence of restrictions on arbitrage. [However, r]esearch suggests that for most stocks these are not unreasonable assumptions, on average and over time" (Bruner 2002, 51). The second drawback relates to the event window. The event study methodology can only be used to measure the immediate or short-term impact of a merger announcement on value, as it is "difficult to assign long-term changes to any one event without a large sample to reduce the noise. Given these constraints the best measure is the stock market reaction using fairly narrow windows" (Ravenscraft and Long, Paths to Creating Value in Pharmaceutical Mergers 2000, 297). Indeed, the "interpretation of longer-run returns following the transaction is complicated by possibly confounding events that have nothing to do with the transaction" (Bruner 2002, 55). Even in the short-term, it may be difficult to fully isolate the impact of a merger announcement (for example, if it coincides with an earnings announcement). Finally, the methodology also presents challenges from a corporate finance theory perspective: "[s]ince the announcement of a takeover reveals information about the potential synergies of the combination, the stand-alone values of the bidder and target, and potential bidder overpayment, it is difficult to interpret the announcement returns for acquiring firms" (Fuller, Netter and Stegemoller 2002, 1792).

2.2 Assessment methods applicable to both standalone or merged firms: value creation indicators

The following section presents a comprehensive selection of measures of value creation, which can be applied both to firms on a standalone basis or to merged firms. Each measure is described, and its advantages and drawbacks discussed hereunder.

Please note that this theoretical overview has been primarily adapted from the *Corporate Finance Theory* textbook by Vernimmen *et al.* (2011) – and especially Chapter 28, "Measuring Value Creation" – combined with notes from various HEC lectures.

2.2.1. Financial indicators

2.2.1.1. Net present value (NPV)

Net present value (NPV) is a concept of paramount importance in corporate finance. In theory, the concept is very simple. The NPV of a project is equal to the sum of its discounted cash flows. NPV is thus a function of time, projected cash flows, and a discount rate that is determined according to the risk associated with the project. In terms of value creation, NPV "is the only true financial tool for measuring value creation" (Vernimmen, et al. 2011, 547), as it "provides the exact measure of value created" (Vernimmen, et al. 2011, 534).

Indeed, NPV corresponds exactly to value creation as it was defined in the first section of this Chapter. Value is created when the NPV of an investment is greater than zero, value is neither created nor destroyed when the NPV of an investment is equal to zero, and value is destroyed when the NPV of an investment is less than zero.

The key advantage of NPV is thus that it provides the true measure of value creation. In addition, "[i]t has been repeatedly demonstrated that intrinsic value creation is the principal driver of *companies' market value*," i.e. the market value of their capital employed (Vernimmen, et al. 2011, 534).

While conceptually simple, however, it is a difficult measure to apply in practice, as it requires inputs that are not typically available to external analysts and is "based on projections that are frequently difficult to assess" (Vernimmen, et al. 2011, 533). This is particularly true when conducting a retrospective analysis.[4]

Thus, alternative measures of value creation must be considered. Albeit less precise, these alternative measures, which are presented below, are nonetheless useful measures of value creation.

[4] For this reason, please note that NPV will not be used as a measure of value creation in the case study subsequently presented in Part II.

2.2.2. Accounting/financial indicators (hybrid measures)

2.2.2.1. ROCE – WACC

The difference between return on capital employed (ROCE) and the weighted average cost of capital (WACC) measures the excess of the economic return over the return required by the company's suppliers of funds (creditors and shareholders). This difference is known as an economic rent, "that is, a position in which the return obtained on investments is higher than the required rate of return given the degree of risk" (Vernimmen, et al. 2011, 525). Economic rents are at the root of value creation, and "[t]he essence of all corporate strategies is to obtain economic rents – that is, to generate imperfections in the product market and/or in factors of production, thus creating barriers to entry that the corporate managers strive to exploit and defend" (Vernimmen, et al. 2011, 525). While in theory rents do not exist when markets are in equilibrium, in reality markets are not always in equilibrium. When companies carry out strategies that would grant them a competitive advantage, they are effectively trying to obtain an economic rent.[5] It is thus telling to look at ROCE – WACC as a measure of value creation.

2.2.2.2. Economic Value Added (EVA)

Economic Value Added (EVA) is a popular measure of value creation, and is measured as: EVA = Capital employed * (ROCE – WACC) = NOPAT – WACC * Capital employed. (Vernimmen, et al. 2011, 536). It is clearly closely linked to ROCE – WACC as described above, except that it is expressed in currency terms. EVA measures the value actually created over one year.

As with ROCE – WACC, a key advantage of EVA is that it takes into account the risk required to generate returns, as "the cost of capital and the amount of capital required to generate [the firm's] level of NOPAT are explicitly recognized before any value can be deemed to be created" (Armitage and Jog 1996).

Nonetheless, this method has two main drawbacks. Firstly, it requires its user "to switch from an accounting to an economic reading of the company" (Vernimmen, et al. 2011, 537) by

[5] Of course, economic rents do not last forever (except perhaps in monopolistic situations, in which case this is reflected in the typically very high ROCE of the monopolist).

making a number of accounting adjustments, thus making it potentially complex to calculate. While this in and of itself is not necessarily problematic, EVA has been decried by some as a marketing coup, whereby "[t]he firms that develop economic profit tools for companies generally have a long list of accounting adjustments that attest to their expertise" (Vernimmen, et al. 2011, 537). This could make it difficult to intuitively reconstruct an EVA calculation.[6]

Secondly, the time frame of EVA can potentially be problematic, as it only measures value creation over one year. While some might argue that "a firm which generates a consistent positive [EVA] each and every year can be regarded as a value-creating-firm" (Armitage and Jog 1996), Vernimmen *et al.* remind us that "it is very difficult to find an annual measure of performance that truly reflects the creation of value" (Vernimmen, et al. 2011, 537). Additionally, the use of EVA as an annual measure of manager performance could skew managers' incentives, and may cause managerial financial short-sightedness, at the expense of long-term sustainable value creation for shareholders.

2.2.3. Accounting indicators

Simply put, the use of accounting indicators as a measure of value creation involves looking at how a firm's operating performance has evolved post-merger vs. pre-merger. Analysts and investors regularly use accounting indicators to gauge a company's operating performance, so as to determine its financial health and its attractiveness relative to other companies. It is therefore not unreasonable to apply this same method of performance measurement to companies that have undergone M&A. Indeed, "[e]valuating acquisitions on the basis of operating performance provides additional insight into the impact of the acquisition" (Sudarsanam 2003, 77). In studying post-merger performance, accounting studies can also be helpful as they are "interested in measuring long term performance effects of mergers […] whereas event studies at best capture expectations of future net revenue growth, measured at the time of merger announcement" (Danzon, Epstein and Nicholson 2007, 310). Previous accounting studies have focused on a range of accounting indicators as measures of value creation. The principal profit and profitability accounting indicators are discussed below.

[6] For this reason, please note that EVA will not be used as a measure of value creation in the case study subsequently presented in Part II.

2.2.3.1. Profit measures: Net profit and EPS

When conducting a financial analysis on a company, as shareholders do to "[assess] whether the company is able to create value" (Vernimmen, et al. 2011, 121), the first steps involve performing a revenue and margin analysis. In the context of a value creation analysis, one of the most frequently used P&L aggregates is EPS. The use of EPS as an indicator of value creation is highly controversial, and the rationale for doing so seems rooted in its long-standing presence and popularity as a simple communication tool between companies and the financial community. Dobbs *et al*. argue "no empirical link shows that expected EPS accretion or dilution is an important indicator of whether an acquisition will create or destroy value. Deals that strengthen near-term EPS and deals that dilute near-term EPS are equally likely to create or destroy value" (Dobbs, Huyett and Koller 2010). Indeed, the "[r]elation between operating performance improvement and shareholder returns may be weak" (Healy and Palepu 1992, cited in Sudarsanam 2003, 77). Dobbs *et al*. further state: "EPS has nothing to say about which company is the best owner of specific corporate assets or about how merging two entities will change the cash flows they generate" (Dobbs, Huyett and Koller 2010). According to Vernimmen *et al.*, the use of EPS is predicated on certain misconceptions, namely that EPS takes into account risk, and that "accounting data influence the value of the company," when clearly a change in accounting policy does not translate into a change in value (Vernimmen, et al. 2011, 541). These drawbacks will be discussed in greater detail below.

2.2.3.2. Profitability measures: ROE and ROCE

The last step of a financial analysis involves assessing the profitability of a company by looking at its return on equity (ROE) and ROCE. These "[s]econd-generation accounting indicators" (Vernimmen, et al. 2011, 533) are better-suited to a value creation analysis. The use of ROE remains questionable, as this ratio can be artificially boosted by increasing a company's leverage (perhaps even pushing it beyond the point of its sustainable debt burden), such that "[e]ven though ROE might look more attractive, no 'real' value has been created since the increased profitability is cancelled out by higher risk not reflected in accounting data" (Vernimmen, et al. 2011, 533). Of the two ratios, ROCE "has tended to become the main

measure of economic performance" (Vernimmen, et al. 2011, 533). As discussed previously, value creation depends on the return on capital and growth (Dobbs, Huyett and Koller 2010). There is thus a direct link between analyzing ROCE and value creation.

2.2.3.3. Summary of advantages and drawbacks

There are several advantages to using accounting data. Firstly, a company's accounts have systematically been audited and certified. Insofar as they have been properly drawn up, this should lend them credibility. Secondly, accounting measures are "[u]sed by investors in judging corporate performance [and as such can be considered as an] indirect measure of economic value creation" (Bruner 2002, 51). Finally, in the case of M&A, revenue-based and cost-based synergies affect the top-line and bottom-line of a P&L, respectively. Hence, an analysis of revenues, margins, and EPS can be a useful tool for tracking the implementation of synergies.

These advantages are far outweighed by the drawbacks, however. Indeed, *ex post* measures of operating performance must be treated with care and must not be used alone in a value creation assessment, as they present several limitations.

The biggest drawback of accounting indicators is "[t]he very fact that they are accounting indicators and are not part of the realm of value, since they do not factor in risk or the cost of equity" (Vernimmen, et al. 2011, 549). Accounting measures only present one side of the risk/return coin. While looking at accounting performance allows us to glean information about the returns that a company has achieved, these backward-looking measures do not provide insight on the risk required to achieve these returns. According to Sudarsanam, "significant operating performance improvement does not mean that the shareholders of acquirers are better off," for by looking at accounting indicators alone, we "lack evidence that this improvement is sufficient to meet the cost of capital incurred in financing the acquisitions" (Sudarsanam 2003, 82).

There are several other disadvantages associated with the use of accounting measures as indicators of value creation. Firstly, problems can arise from the data itself: accounting data can easily be subject to manipulation, it is possible that data is not comparable for the same company over different years, or that it is not easily comparable among companies due to differences in accounting policies (Bruner 2002, 51). Secondly, operating performance measurement problems

can also arise from acquisition accounting (Sudarsanam 2003, 77). Thirdly, "accounting based measures cannot be used to isolate the effects of a specific event such as a merger. It may take years before a firm's profitability reflect the benefits of a merger" (Biggadike 1979, cited in Lubatkin 1983, 222). This is particularly true in the pharmaceutical industry, where an accounting analysis "overlooks the health of the acquiring company's product pipeline, which represents potential future significant cash flows that are not recorded in available accounting data" (Higgins and Rodriguez 2006, 358). Finally, it may also be the case that confounding events occur after the merger or acquisition being studied (for example, another M&A transaction), which complicates the interpretation of accounting performance and prevents its attribution to a single event.

Accounting indicators of value creation should therefore be used with precaution, and they should certainly never be used as the only tool to assess value creation. When used to measure post-merger value creation, "[t]he best [accounting] studies are structured as matched-sample comparisons, matching acquirers with non-acquirers based on industry and size of firm. In these studies, the question is whether the acquirers outperformed their nonacquirer peers" (Bruner 2002, 50).

2.2.4. Market indicators

There is a direct link between the valuation of a company's equity on the stock market and the valuation of its capital employed. Indeed, as "[m]ost of the fluctuation in the value [of a company's] debt stems from changes in interest rates, so changes in the value of capital employed derive mainly from changes in the value of equity" (Vernimmen, et al. 2011, 515). The market valuation of equity is therefore of paramount importance, as its directly influences the market valuation of capital employed. In other words, it directly impacts a company's value.

Further, a company's share price, in efficient markets, is equal to the present value of future cash flows. As such, "the capital market's valuation incorporates an expectation about the future development" (Kirchhoff and Schiereck 2011, 38). For example, "[w]hen the buyer's stock price decreases upon the announcement of an acquisition, this signals that investors believe that the expected present value of synergies is less than the premium paid" (Rappaport 1998). As

previously mentioned, growth is one of the cornerstones of value creation, therefore making it relevant to look at market indicators of value creation.

There are two major market indicators of value creation: market value added (MVA) and total shareholder return (TSR). MVA is measured in currency units and corresponds to: MVA = market value of equity + net debt[7] – book value of capital employed = enterprise value – book value of capital employed. This corresponds to the definition of value creation. TSR is measured as a percentage and corresponds to: TSR = (share price end of period – share price beginning of period + dividends) / share price beginning of period.

According to Vernimmen *et al*., there is a "striking" correlation "between the economic rent measured by the difference between ROCE and WACC on one hand, and stock market prices on the other hand" (Vernimmen, et al. 2011, 525). Since the existence of an economic rent is the very base for value creation, a study of market valuations, if indeed correlated, provides a good measure of value creation. Another advantage of these measures, as has been discussed above, is the direct link between the valuation of a company's equity and the valuation of its capital employed. Finally, market indicators are attractive as a value creation measurement tool, due to their relative ease of use.

As with all the other measures of value creation, market indicators do present some drawbacks. Namely, they can be sensitive to fluctuations in the stock market. This is particularly problematic in the case of TSR, which is usually measured over one year. In order to eliminate the impact of any extreme intra-annual market swings, TSR should be calculated over a longer period (Vernimmen *et al.* suggest a minimum of five years). Another "major weakness with [MVA and TSR] is that they may show destruction in value because of declining investor expectations about future profits, even though the company's return on capital employed is higher than its cost of capital" such that "there may be some major divergences between these indicators and company performance" (Vernimmen, et al. 2011, 534). It is thus important when using market indicators to keep in mind the general market conditions that, even if unrelated to the company being studied, could nevertheless have an impact on its valuation, and to bear in mind the relationship between investor expectations and actual operating performance.

[7] Typically, the book value of net debt is used, unless information about its market value is available

2.2.5. Value drivers/key performance indicators (KPIs)

Financial and stock market analysis readily lend themselves to an analysis of all industries, even if on an industry-by-industry basis, some indicators are more relevant than others. However, each industry has its own specificities that, insofar as they can create a competitive advantage, can be construed as potential sources of value creation. It can therefore be telling, in a value creation analysis, to consider these specificities, which are known as value drivers or key performance indicators (KPIs). Their importance cannot be underestimated: "[v]alue drivers are at the root of business performance because they are frequently leading indicators of performance, while financial results […] are lagging indicators." (Vernimmen, et al. 2011, 534).

As will be explained in more detail in Part II, Chapter 1, innovation is crucial in the pharmaceutical industry. Thus, the relevant value driver in the pharmaceutical industry is the research and development (R&D) pipeline, which includes products in discovery, pre-clinical and clinical development. As products get approved, they will be responsible for generating cash flows for the pharmaceutical firm, thereby driving the value of the firm. Since "[m]anagement has a strong need to understand where the company is going in the future" (Vernimmen, et al. 2011, 534), the R&D pipeline is indeed the place to look to understand upstream how much value a company might generate in the medium to long-term. The healthier its pipeline, the higher a pharmaceutical company's value creation potential.

Relevant KPIs to assess the health of a company's R&D pipeline can be divided into measures of innovation input and measures of innovation output (Sudarsanam 2003, 79). The key KPI for innovation input is R&D intensity, which measures the ratio of R&D expenditure to sales. Two important KPIs for innovation output are R&D productivity and patent count. R&D productivity measures the ratio of new molecular entity (NME) approvals to R&D expenditure. Patent count serves as a good proxy for the pipeline's potential, as a higher number of patents indicates a greater number of pipeline compounds, and therefore a greater chance that the pipeline contains an approvable product, in theory.

Chapter 2: Review of existing literature on value creation

Does M&A create value? Researchers have been pondering this question for many decades. This chapter provides an overview of the key studies on value creation and their findings, both in general and in the pharmaceutical industry in particular.

1. In general

1.1. Event studies

The general literature on value creation through M&A is encyclopedic, and most especially the academic literature that is based on the event study methodology. Though the focus and specifications of the research varies from one study to the next, it seems that researchers have reached a general consensus on the question "Does M&A create value?"

> *"Extensive research has shown that shareholders in target firms gain significantly and that wealth is created at the announcement of takeovers (i.e., combined bidder and target returns are positive). However, we know much less about the effects of takeovers on the shareholders of acquiring firms"* (Fuller, Netter and Stegemoller 2002, 1763).

> *"The mass of research suggests that target shareholders earn sizable positive market-returns, that bidders (with interesting exceptions) earn zero adjusted returns, and that bidders and targets combined earn positive adjusted returns"* (Bruner 2002, 48, in a survey summarizing results from over 100 studies).

> *"Overall, results indicate that while the target firm's shareholders gain significantly from mergers and acquisitions, those of the bidding firm do not"* (Datta, Pinches and Narayanan 1992, 67).

Table 1 below provides a summary of selected key event studies since the 1970s. I have selected nine of the most often-cited studies, and have excluded studies based on less than 100 observations.

Table 1

SUMMARY OF RESULTS FROM SELECTED KEY EVENT STUDIES

Author(s)	No. of obs.	Time period covered	Event window	Returns to:			Comments
				Target	Acquirer	Combined	
Dodd and Ruback (1977)	257	1958-1978	[0,0]	+20.58%*	+2.83%*	n.a.	Successful tender offers only (study also considered returns in the case of unsuccessful tender offers)
Langetieg (1978)	149	1929-69	[-120,0]	+10.63%*	-1.61%	0%	
Bradley, Desai, and Kim (1988)	236	1963-1984	[-5,5]	+31.77%*	+0.97%*	+7.43%*	Only tender offers create value
Jarrell and Poulsen (1989)	770	1963-1986	[-20,10]	+28.99%*	+1.29%*	n.a.	Tender offers
Franks, Harris, and Titman (1991)	399	1975-1984	[-5,5]	+28.04%*	-1.02%	+3.9%*	Mergers and tender offers
Schwert (1996)	1814	1975-1991	[-42,126]	+26.3%*	+1.4%	n.a.	Mergers and tender offers
Eckbo and Thorburn (2000)	1846	1964-1983	[-40,0]	+7.45%*	- 0.3% + 1.71%*	n.a.	Canadian targets only. -0.3% bidder returns corresponds to American acquirers, while 1.71% corresponds to Canadian acquirers
Mulherin and Boone (2000)	657	1990-1999	[-1,1]	+21.2%*	-0.37%	n.a.	
Moeller et al. (2004)	12023	1998-2001	[-1,1]	n.a.	+1.1%*	n.a.	Looks only at acquiring firm returns

* Statistically significant returns, at least at the 10% level

Sources: Adapted from Bruner (2002) and Hamza (2011); individual research on these various papers

This representative sample confirms the general conclusions advanced above. That is, acquisitions seem to generate significantly positive returns for target shareholders, whereas the returns to bidding shareholders are less clear-cut: they are sometimes positive, sometimes negative, generally small in either direction, and significant in only about half of the studies mentioned. Indeed, according to Bruner, "[o]ne must conclude that in the aggregate, abnormal (or market-adjusted) returns to buyer shareholders from M&A activity are essentially zero […;] buyers essentially break even" (Bruner 2002, 56).

Of those studies that report returns to the combined firm, it appears that acquisitions generate significantly positive returns for the shareholders of the combined firm. However, given that there are only three studies in this sample that report evidence on returns to the combined firm, we cannot consider this conclusive. Based on an analysis of 20 previous event studies, Bruner provides more decisive evidence: "[a]lmost all of the studies report positive combined returns, with 11 of the 20 being significantly positive. [These findings] suggest that M&A *does* pay the investors in the combined buyer and target firms" (Bruner 2002, 56).

Many researchers have also focused on the determinants of value creation through M&A, considering a wide range of explanatory factors, and in particular those relating to transaction characteristics. As Sudarsanam explains, "deal structuring is not just atmospherics, full of sound and fury signifying nothing, as might be suggested by stories of takeover battles in newspapers. Deal characteristics do have a substantial impact on the success of acquisitions" (Sudarsanam 2003, 84).

Among these explanatory factors and deal characteristics are[8]: acquisition method of payment (cash vs. stock), horizontal vs. vertical merger, value vs. growth, merger vs. tender offer, relative size of acquirer and target, cross-border vs. domestic. The general consensus on each of these factors is summarized in **Table 2** below (adapted from Hamza 2011, 169 and Bruner 2002, 60).

[8] List not exhaustive

Table 2

Explanatory factor	Impact on value creation
Method of payment	Acquirers that pay with cash (vs. stock) earn greater abnormal returns
Horizontal vs. vertical	Horizontal mergers create more value
Value vs. growth	Mixed results, although it seems that value acquirers earn greater returns
Merger vs. tender offer	Tender offers create more value than mergers
Relative size of acquirer and target	Mixed results
Cross-border vs. domestic	Mixed results

Sources: Hamza (2011), Bruner (2002)

While informative and interesting to keep in mind, these considerations are beyond the scope of this study and therefore shall not be examined in further detail.

1.2. Accounting studies

As mentioned previously, the event study methodology is very popular. As such, it is not surprising that it has been used in many, if not most, academic studies of value creation. However, other researchers have employed alternative approaches to measuring value creation, including accounting studies. The accounting study literature is more limited in number than event studies, however there are four key studies that particularly stand out and are often cited by researchers. These four studies – Mueller (1980), Ravenscraft and Scherer (1987), Healy, Palepu and Ruback (1992) and Ghosh (2001) – are described below.

Mueller, in his 1980 book The Determinants and Effects of Mergers: An International Comparison, looked at evidence on post-merger profitability in seven countries (U.S. and Europe), using three measures of profitability: return on equity (ROE), return on assets (ROA) and net income margin. His primary finding was that "acquirers reported worse returns in the years after acquisition than their non-acquiring counterparts – but *not significantly* so" (Bruner 2002, 56-7). He thus concluded that "mergers have but modest effects, up or down, on the profitability of the merging firms in the three to five years following merger" (Mueller 1980, cited in Bruner 2002, 58).

Ravenscraft and Scherer (1987) studied a sample of 471 mergers that occurred between 1950 and 1977. The authors used the ratio of operating income (before interest, extraordinary items and taxes) to year-end fiscal assets (operating ROA) as their performance criterion. They found "[s]ignificant negative relationships between operating ROA and tender offer activity [, and that other] things being equal, firms with tender offer activity were 3.1% less profitable [nine years later on average] than firms without the activity" (Bruner 2002, 58). This negative result was statistically significant. Ravenscraft and Scherer attributed this negative post-merger performance primarily to "the writeup of asset values stemming from the payment of acquisition premiums" (Ravenscraft and Scherer 1987, 154). It should be noted, however, that this study has been criticized for one major drawback: the misalignment of the evaluation period with the merger year. As "Ravenscraft and Scherer […examined] the performance between 1974 and 1977 of mergers that occurred from 1950 to 1977 […], the period under observation was not the same number of years after merger from one observation to the next" (Bruner 2002, 59). Thus, "it is hard to know what to make of the performance comparisons" (Healy, Palepu and Ruback 1992, 141). Despite this limitation, it would seem that according to the findings of Ravenscraft and Scherer, mergers destroy value.

Healy, Palepu and Ruback's 1992 study is considered as "[p]erhaps the most notable study that analyzes changes in operating performance around acquisitions" (Ghosh 2001, 151).The authors studied the post-acquisition performance for the 50 largest mergers in the U.S. over the period 1979 to mid-1984. These mergers ranged across virtually all of the major industry classes and included both horizontal and vertical mergers. Healy *et al*. used pretax operating cash flow return on assets as their performance criterion, and controlled for industry median performance in their analysis. According to their findings, the median industry-adjusted

post-merger operating cash flow return on the market value of assets was up +2.8% for years 1 to 5 following the merger, significant at the 1% of level. Thus, they concluded "merged firms have significant improvements in operating cash flow returns after the merger, resulting from increases in asset productivity relative to their industries" (Healy, Palepu and Ruback 1992, 164). Further, they found that this increase in asset productivity did indeed result from superior operating performance – i.e. it was not achieved at the expense of long-term capital expenditure and R&D investments. Finally, they found a "strong positive relation between postmerger increases in operating cash flows and abnormal stock returns at merger announcements" and thus concluded "expectations of economic improvements underlie the equity revaluations of the merging firms" (Healy, Palepu and Ruback 1992, 135). According to the findings of Healy *et al*., it would thus seem that mergers create value.

Ghosh (2001) studied a sample of 315 acquiring and target firms involved in large acquisitions between 1981-1995. As with Healy *et al*., Ghosh used operating cash flow return on assets as his criterion for performance. However, instead of controlling for industry performance, he adjusted performance results for pre-bid performance and size. Indeed, he argued that previous studies that reported positive results might be biased because "acquiring firms undertake acquisitions following a period of superior performance and they are generally larger than industry-median firms" (Ghosh 2001, 151). Using this adjustment, Ghosh "[did] not find evidence of improvements in operating performance of merging firms following acquisitions" (Ghosh 2001, 152). According to the findings of Ghosh, it would thus seem that as mergers do not lead to significant operating improvements, they do not create value. However, they do not seem to destroy value either.

These four illustrative studies show that it is difficult to determine from accounting studies whether or not M&A creates value; we get much less of a consensus on the question than with event studies. Every study has a very specific context and contradictory findings, making it difficult to draw conclusions. One accounting study finds significantly negative performance, two conclude that there are no significant improvements, and one finds significantly positive performance (based on accounting and operating performance criteria). According to Sudarsanam, "[t]hese conflicting results highlight the need for choosing the benchmark correctly based on the right counter-factual assumptions about what would happen in the absence of the acquisition" (Sudarsanam 2003, 78). More generally, these conflicting results illustrate the

difficulty of assessing value creation through accounting indicators, as these studies are more prone to biases / less easy to control than event studies, which are rooted in statistical analysis. Despite these potential shortfalls, they nevertheless provide an interesting additional dimension from which to consider value creation.

1.3. Other studies

Beyond accounting studies and event studies, some researchers have employed yet other methodologies to assess value creation. These include, but are not limited to, executive surveys and case studies. As these types of studies tend to be extremely specific, they are not relevant in this assessment of overall general literature on value creation through M&A.

2. In the pharmaceutical industry

It is difficult to constitute a representative sample of literature on value creation through M&A in the pharmaceutical industry, as many studies focus on very specific subjects. The aim of this section will therefore be to describe and analyze a few selected studies, rather than summarize and draw conclusions from a wide sample of academic articles. I have chosen to consider two event studies – Higgins and Rodriguez (2006) and Kirchhoff and Schiereck (2011) – that I found particularly interesting, especially as the authors reached contradictory conclusions. I will also analyze a case study by Dermirbag, Ng and Tatoglu (2007), in which the authors considered the case of three pharmaceutical mega-mergers that occurred in the late 1990s/early 2000s.

2.1. Event studies

Higgins and Rodriguez (2006) studied a sample of 160 R&D-related acquisitions that occurred in the biopharmaceutical sector between 1994 and 2001. As with any standard event

study, the authors considered cumulative abnormal returns (CARs). They found that acquirers overall earned a significant +3.91% CAR (significant at the 1% level) over a three-day event window, while targets earned a return of +16%. [9] These findings indicate that acquisitions create value for both acquiring and target firms.

Higgins and Rodriguez further included "two industry-specific measures of success [:] improved product pipeline and new drug product sales" (Higgins and Rodriguez 2006, 358). The improved product pipeline criterion considered "the post-acquisition change in the research pipeline for the year following the acquisition" (Higgins and Rodriguez 2006, 358), which the authors quantitatively measured through a *Score* value. The new drug product sales criterion considered "the post-acquisition changes in revenues in the year following the acquisition" (Higgins and Rodriguez 2006, 358). Based on these two measures, Higgins and Rodriguez constructed a *Desperation Index* to measure the internal productivity of firms and assigned companies to four categories of "desperation" pre and post-acquisition (Category I being the "best" and Category IV being the "worst"). For example, Category I included "firms that [had] an increasing *Score* value and an increasing sales-weighted exclusivity horizon" (Higgins and Rodriguez 2006, 364). They found that while 60% of firms were included in Categories III or IV pre-acquisition, only 32% were in these bottom tiers post-acquisition (Higgins and Rodriguez 2006, 364). They found that "59% of the firms in [their] sample improved their level of desperation through the use of acquisitions […]. In other words, through the use of acquisitions, firms [were] able to increase either their score value or weighted sales or both" (Higgins and Rodriguez 2006, 378). Another 12% stayed in the same category post-acquisition. Thus, these acquisitions created or maintained value – based on the authors' industry-specific measures of success - for 71% of firms in the sample. The overarching message on value creation through M&A is thus positive, according to Higgins and Rodriguez.

Kirchhoff and Schiereck (2011) studied a sample of 104 transactions that occurred between pharmaceutical and biotechnological companies over the time frame 1996 – 2006, including both domestic and cross-border deals. The sample included primarily pharma-pharma

[9] Higgins and Rodriguez also included five explanatory factors in their CAR analysis: relatedness, financing, alliances, sales experience and research experience

deals[10] (58 transactions) and targets were primarily US-based companies (68 transactions). In their event study, the authors considered cumulative abnormal returns over a range of 13 event windows. They found that targets earned significantly positive CARs (significant at the 1% level) in all of the event windows considered, ranging from +16.13% on the announcement date and +29.87% over the [-20,+20] interval. Acquirers, on the other hand, "[lost] significant value in the course of the transactions" (Kirchhoff and Schiereck 2011, 35). Indeed, Kirchhoff and Schiereck found negative CARs to acquirers in all of the event windows, with statistically significant losses in 10 of the 13 event windows. These losses ranged from -3.17% (statistically significant at the 5% level) over the [-1,+1] interval to -1.35% (not significant) over the [10,+10] interval. Thus, "the data [showed] that in the past 10 years during M&A activities in the pharmaceutical and biotech industry, the targets could generate significant value gains, whereas the acquirers had to face slightly negative reactions" (Kirchhoff and Schiereck 2011, 35).

Kirchhoff and Schiereck also considered market-capitalization weighted abnormal returns to the combined firms. They found negative returns in 6 of the 13 event windows, none of which were statistically significant, and positive returns in the remaining 7 event windows, two of which were statistically significant at the 5% level. These results ranged from -0.74% on the announcement date to +2.11% (not statistically significant) over the [-20,+20] interval. Over the [-10,+10], the combined firms experienced a statistically significant abnormal return of 1.8%. The authors concluded that these inconsistent findings about combined firm returns "[suggest] that the value effects of the target and acquirer mutually neutralize themselves and the opinion of the stock market can therefore be interpreted as neutral" (Kirchhoff and Schiereck 2011, 35).

Finally, Kirchhoff and Schiereck conducted univariate and multivariate analyses based on company-specific and transaction-specific independent variables, so as to understand the factors driving abnormal returns. Company-specific independent variables, pertaining to both the target and acquirer, included: R&D intensity, liquidity, sales performance, profitability, individual cost efficiency, growth of total assets, equity, capital market valuation, and M&A experience (Kirchhoff and Schiereck 2011, 36). Transaction-specific variables included: strategic focus, geographical focus, transaction size, relative cost efficiency, and method of payment (Kirchhoff and Schiereck 2011, 37). The results of their univariate analysis showed that "R&D intensity,

[10] Deals in which both the acquirer and target were pharmaceutical companies (as opposed to biotechnology companies)

liquidity, and capital market valuation [had] the statistically strongest impact on the transaction success measured in abnormal returns" (Kirchhoff and Schiereck 2011, 40). In terms of explaining the CARs to acquiring companies, the multivariate analysis showed that "successful acquirers […have] outperformed their benchmark recently, [h]ave a low R&D ratio [of R&D to sales], [and t]ake over targets that dispose of sufficient cash flows" (Kirchhoff and Schiereck 2011, 41). One particularly interesting finding is that "[t]he level of cost efficiency [did] not have a statistically significant impact on the abnormal returns," which the authors interpreted "as an indicator that the stock markets do not believe in cost synergies as a motivation for a successful transaction in the pharma and biotech industry" (Kirchhoff and Schiereck 2011, 25). This is consistent with one of Bruner's key conclusions that "[s]ynergies, efficiencies and value-creating growth seem hard to obtain" (Bruner 2002, 65), such that these synergies are often overstated and subsequently over-discounted by the stock market.

In summary, both Higgins and Rodriguez (2006) and Kirchhoff and Schiereck (2011) agree that M&A creates significant value for target shareholders, consistent with the general (non-industry-specific) literature. However, they present contradictory findings about value creation for the acquirer: M&A creates value for acquiring firm shareholders, according to Higgins and Rodriguez, while it destroys shareholder value for acquirers, according to Kirchhoff and Schiereck.

2.2. Case study

Dermirbag *et al.* (2007) conducted a case study on three pharmaceutical mega-mergers in the late 1990s/early 2000s: Glaxo Wellcome's 2000 merger with SmithKlineBeecham, Pfizer's 2000 acquisition of Warner Lambert, and Zeneca Group's 1999 merger with Astra AB.[11] The authors employed three operating performance criteria (one KPI and two accounting measures) as measures of value creation: research productivity, return on investment (ROI), and profit margin. Research productivity "was measured by the ratio of the total number of NMEs [New

[11] Dates refer to year of merger completion date

Molecular Entities][12] developed over total R&D expenditures within a five-year time frame", multiplied by 10^8 "[t]o ease computation" (Dermirbag, Ng and Tatoglu 2007, 49). These criteria were evaluated over the pre-merger period (1995-1999) and post-merger period (2000-2004). The authors benchmarked the pre and post-M&A performance of acquiring companies to a sample of three independent pharmaceutical firms that had not undertaken any significant M&A activity over the period: Lilly & Co., Schering-Plough, and Merck & Co.

Dermirbag *et al.* found that R&D productivity declined for all firms – that is, both for the merging firms and for the benchmark non-M&A firms, suggesting that such a decline in R&D productivity was probably a symptom of industry-wide factors, rather than a consequence of the mergers specifically. However, they found that while both the case study sample and benchmark sample firms had, on average, similar rates of research productivity in the pre-merger period, merging firms suffered a sharper decline in research productivity in the post-merger period. According to the authors, "[t]his finding tends to partially confirm the view that the M&A activity does not provide merging firms with desired benefits in terms of research productivity" (Dermirbag, Ng and Tatoglu 2007, 53-4).

Concerning return on investment, Dermirbag *et al.* found that ROI decreased for all firms (merging firms and standalone firms). However, while the ROI of merging firms was lower on average than that of their non-M&A counterparts in the pre-merger period, it was higher in the post-M&A period. Although this relatively better performance cannot be attributed with certainty to the mergers, it is nonetheless interesting to bear in mind.

Finally, Dermirbag *et al*. found that profit margin decreased for the majority of the firms, except Pfizer, whose profit margin nearly doubled in the post-merger period from 17.9% to 32.3%, and Merck & Co., whose profit margin jumped by nearly 10 percentage points, from 24.7% to 34.2%. On average, profit margin increased for merging firms and decreased slightly for non-M&A firms in the post-merger period. Merging firms underperformed non-M&A firms in both periods, however the average increase in profit margin they experienced helped to close this gap. The authors advance the assumption "from this finding that the M&A activity has saved the merging pharmaceutical firms from experiencing a sluggish trend in the level of profit margin" (Dermirbag, Ng and Tatoglu 2007, 54).

[12] "An NME is defined as a medication containing an active substance that has never been approved before in any form in the United States" (Dermirbag, Ng and Tatoglu 2007, 48-9).

In summary, merging firms were worse off in the post-merger period in terms of research productivity and ROI. Except for Pfizer, the merging firms were also worse off in terms of profit margin. Therefore, Dermirbag *et al*. concluded "[n]o value creation was realized in the sample M&As" (Dermirbag, Ng and Tatoglu 2007, 41).

Dermirbag *et al.*'s study, as it focuses on pharmaceutical mega-mergers, provides a nice segue into the case study that will be subsequently presented in Part II: an analysis of Pfizer's 2009 mega-merger with Wyeth. Beyond its focus on pharmaceutical mega-mergers, I found the study particularly interesting, for it echoes the seemingly prevailing general opinion that mega-mergers in the pharmaceutical industry destroy value. Or rather, there seems to be a belief that while these mergers may create value in the short-term – particularly as measured by market returns[13] – they have failed to deliver value in the long-term.

In reacting to GlaxoWellcome and SmithKlineBeecham's 2000 merger announcement, *The Economist* opened its article with: "[i]n the past, mergers have been the pharmaceutical industry's equivalent of painkillers – good at relieving symptoms, but hopeless at curing the underlying disease" (The Economist, 20 January 2000). Just a few years later, Alex Grovesnor, an analyst at Wood MacKenzie, analyzed: "'[i]t's hard for [pharmaceutical] companies to justify mega-mergers […] They're a short-term fix. Companies can strip out cost savings, but evidence that they deliver growth is thin'" (Terrett, Investors Chronicle, 11 August 2006). A few years later again, when Pfizer announced its mega-merger with Wyeth in January 2009, the retrospectives on pharmaceutical mega-mergers were less than kind. According to Gary Pisano, professor at the Harvard Business School, "'[t]he record of big mergers and acquisitions in Big Pharma has just not been good. There's just been an enormous amount of shareholder wealth destroyed'" (Hensley, WSJ Health Blog, 23 January 2009). Sam Isaly, portfolio manager at OrbiMed Advisors, heartily agreed, as he "[believed] almost all mega-mergers in the past 15 years, including those by Pfizer, have failed to reward investors" (Berkrot and Pierson, Reuters News, 23 January 2009). Finally, according to the two American press giants, *The New York Times* and *The Wall Street Journal*, respectively, "[i]t remains an open question whether mergers

[13] Optimistic investors may drive up share prices at the prospect of short-term cost savings, such that when value creation is measured through a short-term event study, the results could be overstated.

in the pharmaceutical industry work at all" (Sorkin, The New York Times, 24 January 2009) and "[t]he history of pharmaceutical mergers is one of disaster after another" (Moore, WSJ Health Blog, 26 January 2009).

Pfizer was thus up against some tough odds when it announced its mega-merger with Wyeth. Part II will analyze whether or not this mega-merger has created value for Pfizer's shareholders. That is, has this transaction beaten the odds?

PART II: CASE STUDY

Part II is dedicated to presenting a detailed case study – a clinical study – on blockbuster deal evidence from a major transaction in the pharmaceutical industry: the 2009 mega-merger of Pfizer with Wyeth. I have chosen the case study approach because case studies "can pick a representative sample and analyze in detail the background, processes and outcomes of selected transactions" (Eisenhardt, 1989; and Kaplan *et al*., 1997, cited in Kirchhoff and Schiereck 2011, 46). As a reminder, "clinical studies are usually not tests of hypotheses; they aim to describe, rather than test" (Bruner 2002, 50). My intent here is not to generalize my findings, but rather to delve deep into the heart of a specific M&A transaction to understand why and how it happened, and more importantly, determine whether this transaction in particular created value for the acquiring company's shareholders, based on selected measures of value creation.

Part II is organized as follows. Chapter 1 provides an introduction to the case study, by addressing first the case study and benchmark sample selections, briefly describing the two companies involved, and finally detailing both the industrial and company-specific context that led to the mega-merger. Chapter 2 begins by presenting the transaction in terms of deal terms, transaction rationale and expected synergies, and then assesses the value created through this mega-merger, using both qualitative and quantitative analysis.

Chapter 1: Case study presentation

1. Sample selection

1.1. Case study sample

For reasons that will be detailed below, the pharmaceutical industry has undergone a wave of consolidation in the past four years. I was interested in studying the pharmaceutical industry based on my previous experience working in healthcare M&A, and wanted to focus on a

mega-merger because of the high visibility of these types of deals. Of the recent mega-mergers in the industry, I have selected to study Pfizer's $68 billion acquisition of Wyeth in 2009.

I have excluded from my case study sample four mega-merger deals that also made the headlines around this time. Most notably, I have excluded the mega-merger between Merck and Schering Plough, announced in March 2009. Although the deals bear several similarities – both occurred in 2009, both were pharma/pharma deals, and both were domestic U.S. deals – the Merck/Schering Plough transaction had one highly differentiating factor: it was structured as a reverse merger. As such, it was actually Schering-Plough that acquired Merck, with Schering Plough as the surviving company, but going by the name Merck. The reasoning behind the deal structure was to prevent the trigger of change-of-control clauses built into Schering Plough's agreements with Johnson & Johnson over an auto-immune & inflammatory franchise worth over $2 billion in sales (including *Remicade* and the yet-to-be launched *Simponi*) (PharmaWatch: Monthly Review 2009). Given the very particular situation related to this mega-merger, I have thus chosen to exclude it.

Secondly, I have excluded Roche's acquisition of Genentech for $46.8bn, announced in March 2009, as this was a pharma/biotechnology deal and a cross-border transaction (Switzerland/US). Further, Roche was already a majority shareholder in Genentech prior to the transaction, which changes the merger dynamics. In 2010, Sanofi announced its acquisition of Genzyme. This transaction was excluded for the same reasons as the Roche/Genentech transaction, i.e. it was a cross-border pharma/biotech deal. Finally, I have excluded Novartis' acquisition of the ophthalmological company Alcon, as this was a pharma/specialty pharma and OTC[14] transaction.

I have also excluded a number of other large transactions, such as Takeda/Millenium (2008), Abbott/Solvay (2009) and Eli Lilly/ImClone (2008), because deal values were less than $10bn. As I was interested in studying a mega-merger, I considered that these deals did not qualify as such and therefore decided not to include them in my case study sample.

[14] Over-the-counter, or non-prescription pharmaceuticals

1.2. Benchmark sample

I have defined a benchmark sample in order to control for industry performance (to assess whether the merged company has been worse off because of bad post-merger performance or because more generally pharmaceutical companies have been worse off). In particular, certain measures of value creation require comparison to a sample of comparable companies. I have considered the list of top pharmaceutical companies and have chosen to include ten in my sample. In the US, I have selected five companies: Abbott Laboratories, Bristol-Myers Squibb, Eli Lilly, Johnson & Johnson, and Merck & Co. In Europe, I have also selected five companies: AstraZeneca, GlaxoSmithKline, Novartis, Roche, and Sanofi. I have excluded Merck KGaA and Bayer because both companies derive a significant portion of their sales outside of pharmaceuticals (from chemicals). **Table 3** below summarizes the list of companies within my benchmark sample. It also provides detail on which companies have been involved in significant M&A activity over the period 2006-2012.[15]

Table 3

BENCHMARK SAMPLE - US BIG PHARMAS

Company	HQ	Significant M&A activity		
		2006-2008	2009	2010-2012
Abbott Laboratories	US	Acq. of Kos Pharma (2006): $3.7bn; Sale of diagnostics division (2007): $8.1bn	Acq. of Advanced Medical Optics: $2.8bn; Acq. of Solvay: €4.5bn	Acq. of Piramal (2010): $3.7bn; Spin-off of pharmaceutical division (2012)
Bristol-Myers Squibb	US	Sale of ConvaTec (2008): $4.1bn	Acq. of Medarex: $2.4bn; Spin off of nutrition business (Mead Johnson)	Acq. of Inhibitex (2012): $2.5bn; Acq. of Amylin Pharma (2012): $7bn
Eli Lilly	US	Acq. of ICOS (2006): $2.1bn; Acq. of ImClone (2008): $6.5bn	No	No
Johnson & Johnson	US	Acq. of Pfizer's Consumer Healthcare business: $16.6bn	No	Acq. of Crucell (82%, 2010): €1.8bn; Acq. of Synthes (2011): $19.7bn
Merck & Co.	US	No	Reverse merger with Schering-Plough: $41bn; Sale of 50% stake in Merial: $4bn	No

Sources: Merger Market, press

[15] Significant in this case is defined as deals valued at over $1 billion

BENCHMARK SAMPLE - EUROPEAN BIG PHARMAS

Company	HQ	Significant M&A activity		
		2006-2008	2009	2010-2012
AstraZeneca	UK	Acq. of MedImmune (2007): $15.6bn	No	Sale of AstraTech (2011): $1.8bn
GlaxoSmithKline	UK	Acq. of Reliant Pharma (2007): $1.65bn	Acq. of Stiefel Laboratories: $2.9bn	No
Novartis	Switz.	Sale of Novartis Medical Nutrition (2006) and Gerber Products (2007): $2.5bn and $5.5bn	No	Acq. of Alcon (2010): $41bn; Acq. of Fougera (2012): $1.5bn
Roche	Switz.	Acq. of Ventana Medical Systems (2007): $3.4bn	Acq. of Genentech: $46.8bn	No
Sanofi	France	Acq. of Zentiva (75%, 2006): $2.6bn	Acq. of Chattem: $1.9bn; Acq. of 50% stake in Merial: $4bn	Acq. of Genzyme (2010): $20.1bn

Sources: Merger Market, press

As per this table, the "non-acquirer" peer sample post-2009 includes four companies: Eli Lilly, Merck, GlaxoSmithKline, and Roche. However, as Merck and Roche were both involved in mega-mergers in 2009 as well, we can consider these as Pfizer's "mega-merger peers," while Eli Lilly and GlaxoSmithKline constitute the true "non-acquirer peers."

2. Background

2.1. Company descriptions

The following brief descriptions provide a snapshot of Pfizer and Wyeth before their 2009 mega-merger.

2.1.1. Pfizer

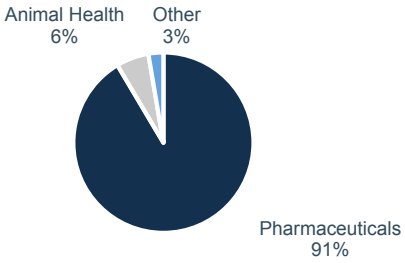
In 2008, Pfizer was a big pharmaceutical company operating through two main business segments: Pharmaceuticals and Animal Health. Pfizer was also active in manufacturing gelatin capsules (through the Capsugel entity), contract manufacturing and bulk pharmaceutical chemicals.

Pfizer's Pharmaceuticals business, with $44.2 billion in 2008 revenues, was the largest worldwide. With a focus on traditional small molecule drugs, Pfizer was active in eleven key therapeutic areas: cardiovascular and metabolic diseases, central nervous system (CNS), arthritis and pain, infectious and respiratory diseases, urology, oncology, ophthalmology, and endocrine

diseases. In 2008, Pfizer had nine blockbusters[16] in its marketed products portfolio, including the anti-cholesterol drug *Lipitor*, which recorded revenues of $12.4 billion in 2008.

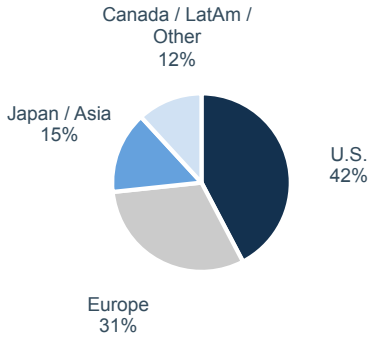
The charts below provide a summary of key segment information in 2008, as well as a snapshot of Pfizer's pipeline at September 30, 2008.

REVENUES BY BUSINESS SEGMENT



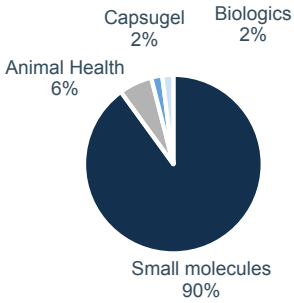
Source : Pfizer Form 10-K, 2008

REVENUES BY GEOGRAPHY



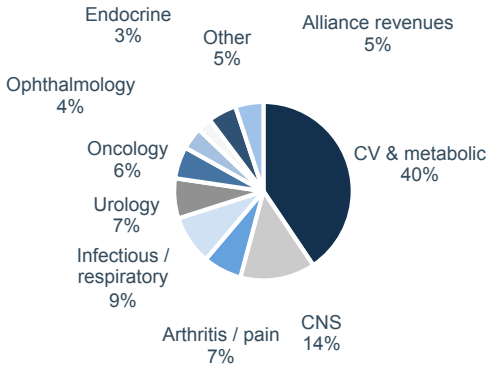
Source : Pfizer Form 10-K, 2008

REVENUES BY PLATFORM



Source : Pfizer Form 10-K, 2008

PHARMA REVENUES BY THERAPEUTIC AREA



Source : Pfizer Form 10-K, 2008

PIPELINE (AT 09.30.08)

Source : Pfizer 2009 J.P. Morgan Healthcare Conference Presentation

[16] Blockbusters are pharmaceutical products with annual sales exceeding $1 billion

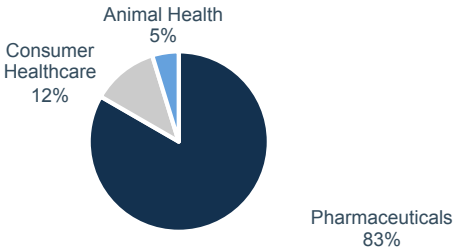
2.1.2. Wyeth

In 2008, Wyeth was a pharmaceutical company operating through three main business segments: Wyeth Pharmaceuticals, Wyeth Consumer Healthcare, and Fort Dodge Animal Health. Within its Pharmaceuticals business, which generated revenues of $19 billion in 2008, Wyeth was active across a number of product categories, including traditional branded small molecule prescription drugs, as well as biotechnology products, vaccines, and nutritional products. Its key therapeutic areas included neuroscience, musculoskeletal diseases, infectious diseases, hematology, women's health, gastroenterology, immunology, and oncology. Within its Consumer Healthcare segment, which generated revenues of $2.7 billion in 2008, Wyeth offered pain management therapies, cough, cold and allergy products, nutritional supplements and personal care products, with such well-recognized brands as *Advil*, *Centrum*, *Chapstick* and *Thermacare*.

In 2008, Wyeth had five blockbusters in its marketed products portfolio. The top three accounted for 28% of total Pharmaceutical sales, and included the anti-depressant *Effexor*, which recorded revenues of $3.9 billion in 2008, the vaccine *Prevnar*, with $2.7 billion in revenues, and the biopharmaceutical *Enbrel* for the treatment of autoimmune diseases, which recorded revenues of $2.6 billion. Clearly, Wyeth was not entirely dependent on traditional small molecule drugs, with non-traditional pharmaceutical products accounting for c. 40% of revenues (Loftus, Dow Jones Newswires, 23 January 2009).

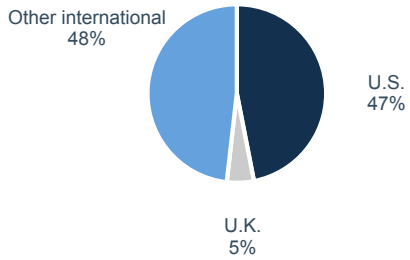
The charts below provide a summary of key segment information in 2008.

REVENUES BY BUSINESS SEGMENT



Source : Wyeth Form 10-K, 2008

REVENUES BY GEOGRAPHY



Source : Wyeth Form 10-K, 2008

2.2. Industrial and economic context

2.2.1. General dynamics of the pharmaceutical industry

> *"The pharmaceutical industry defies simple classification"* (Pisano 1997).

> *"The pharmaceutical industry displays several key characteristics that are critical to understanding its challenges"* (Ravenscraft and Long, Paths to Creating Value in Pharmaceutical Mergers 2000, 291).

> *"[P]harmaceuticals is an industry that doesn't lend itself to traditional market analysis"* (Pearlstein, The Washington Post, 28 January 2009).

The pharmaceutical industry is centered on innovation. A pharmaceutical company's Research & Development (R&D) activities and its product pipeline are the crux, the central elements around which these companies gravitate and from which they derive their meaning.

Innovation is the key source of competitive advantage for pharmaceutical companies: "new product development is the life-blood of any pharmaceutical firm, [and] companies that are unable to produce potential products internally could be at a competitive disadvantage" (Higgins and Rodriguez 2006, 376). As Pearlstein explains, "the real rivalry takes place 'upstream,' as companies compete to innovate, either by developing medicines in their labs or by buying up promising patents and biotech start-ups" (Pearlstein, The Washington Post, 28 January 2009). Thus, "the protection and health of a firm's research pipeline is of paramount importance" (Higgins and Rodriguez 2006, 381) and the pharmaceutical industry "is an industry that, when all else fails, would always rather buy a rival that compete against it" (Pearlstein, The Washington Post, 28 January 2009).

Innovation is also the root of value creation for pharmaceutical firms and their shareholders, as the product pipeline is "responsible for future revenue streams" (Kirchhoff and Schiereck 2011, 45). On the one hand, the "industry [is] dependent upon [its] research to be productive and generate revenues to finance future research" (Higgins and Rodriguez 2006, 379,381). Without this revenue-generating capacity, pharmaceutical firms would be unable to

create value in the long run, let alone survive: "[s]urvival in the pharmaceutical industry depends on top-line growth through innovative products" (Ravenscraft and Long, Paths to Creating Value in Pharmaceutical Mergers 2000, 315). On the other hand, these future revenues determine the pharmaceutical firm's cash flow profile, on which its value to shareholders is based.

However, the road to R&D success is long, risky and prohibitively expensive; the stakes of the development game are high, and developing a new drug is one of the most expensive bets around. The product approval value chain "is long and complex" (Heracleous and Murray 2001, 432). Before a product makes it to market, it must go through the following phases[17]: discovery, pre-clinical testing, clinical testing (Phase I, Phase II, Phase III), regulatory submission, and finally, approval by regulatory authorities.[18] DiMasi and Grabowski estimate that the cumulative probability that a traditional pharmaceutical company's product successfully makes it through Phase III clinical testing is 21.5% (DiMasi and Grabowski 2007, 473). They also estimate that the total capitalized time-adjusted cost of developing a traditional pharmaceutical product is $1,318m (in 2004 dollars) (DiMasi and Grabowski 2007, 476), and that total clinical development and approval times (from Phase I to approval) for these products is 90.3 months, or 7.5 years (DiMasi and Grabowski 2007, 473). The total time for a drug to get from discovery to FDA approval is 10-15 years on average (DiMasi 2001, cited in Higgins and Rodriguez 2006, 353).

Clearly, pharmaceuticals are "a highly risky business with long-term payoffs and lumpy outputs" (Ravenscraft and Long, Paths to Creating Value in Pharmaceutical Mergers 2000, 291). In order to make this development game worth it, pharmaceutical companies have traditionally relied on (and hoped for!) blockbuster drugs, or drugs that have over $1 billion in annual sales potential. According to Schweizer, blockbuster drugs are "required to offset the cost of expensive hit-or-miss clinical trial programs" (Schweizer 2002, 42). Further, "[e]ven for a large firm, it is not uncommon for one drug to account for almost half of its revenue" (Ravenscraft and Long, Paths to Creating Value in Pharmaceutical Mergers 2000, 291).

[17] Simplified. "Phase I involves safety testing, Phase II focuses on small-scale human efficacy trials, and Phase III focuses on large-scale human efficacy trials" (Higgins and Rodriguez 2006, 362)

[18] Such as the Food and Drug Administration (FDA) in the United States or the European Medicines Agency (EMA) in Europe

2.2.2. The pharmaceutical industry in the 2000s

In the early 2000's, the pharmaceutical industry was emerging from a wave of consolidation. A number of large pharmaceutical companies were busy digesting their mega-mergers, such as Glaxo Wellcome /SmithKline Beecham and Pfizer/Warner Lambert, both in 2000. This wave of consolidation had been prompted by a number of factors plaguing the pharmaceutical industry in the 1990s. As Gary Pisano explains, "[the] early 1990s were a watershed in the evolution of the pharmaceutical industry. After years of relatively stable growth, high profits, and an enviable record of innovations, pharmaceutical firms found themselves struggling against a tide of hostile forces" (Pisano 1997, 51). Such challenges included "[e]nhanced buyer power, increased competition from generic and 'me-too' drugs, the rise of biotechs as an alternative research approach, increased government pressure, rising research costs, and a rash of major patent expirations, [which] dramatically changed the growth and profit outlook of pharmaceutical companies" (Ravenscraft and Long, Paths to Creating Value in Pharmaceutical Mergers 2000, 288). In response to these challenges, a number of pharmaceutical companies opted for the M&A route. Indeed, "[a] 1996 McKinsey article explicitly urged pharmaceutical companies to merge in order to achieve cost synergies 'to create immediate value for companies, in a way that is relatively easier than pursuing traditional innovation'" (Pursche 1996, cited in Heracleous and Murray 2001, 435).

Despite this merger frenzy, pharmaceutical companies in the early 2000s still faced a number of the same challenges, as well as new challenges. These challenges posed a serious threat to the value of pharmaceutical companies, both present and future, as "drug companies were facing trends that could raise costs as well as compromise future earnings" (Heracleous and Murray 2001, 434). As Kirchhoff and Schiereck reflect in 2011, "[e]specially in the past decade, the pharmaceutical and biotechnological industry had to react to a large number of cost-driven challenges" (Kirchhoff and Schiereck 2011, 25). These challenges, described hereafter, included: R&D cost and productivity challenges, impending patent cliffs, price pressure, pressure from capital markets, and the general economic environment.

2.2.2.1. R&D cost and productivity challenges

In the 2000s, the pharmaceutical industry was faced with a massive R&D challenge: R&D expenditure was increasing, however, this increase in spending was not matched by an increase in R&D productivity. Instead, R&D productivity was declining.

The cost of developing a new drug increased from $231m in 1987 to $802m in 2000 (DiMasi, 2001, cited in Higgins and Rodriguez 2006, 353). As seen earlier, this cost increased past $1bn by the mid-2000s. Global pharmaceutical company R&D expenditure rose to $70bn in 2007, accounting for 10% of global pharmaceutical revenues of $712bn in that same year (Barton 2008, 23,25).

This rise in R&D expenditure was due in part to changes in the regulatory environment, as regulatory authorities worldwide "sharpened the test and approval procedures […leading to] a slower and more cost-intensive product development" (Kirchhoff and Schiereck 2011, 26).

The increase in R&D expenditure was also due to the growing complexity of R&D. Indeed, the traditional blockbuster big pharma model was beginning to be called into question. Whereas big pharma companies had traditionally relied on "random screening" for the "serendipitous" discovery of blockbuster drugs, new technologies appeared in the 1990s[19] that led "the way to a world where pharma pipelines are not constrained by a limited number of promising compounds" (Schweizer 2002, 44). Concomitantly, biotechnology and biopharmaceutical companies emerged as new and powerful innovators. This "growing complexity of R&D has made it more difficult [for big pharmas] to refill the product pipeline [that] is responsible for future revenue streams" (Kirchhoff and Schiereck 2011, 45).

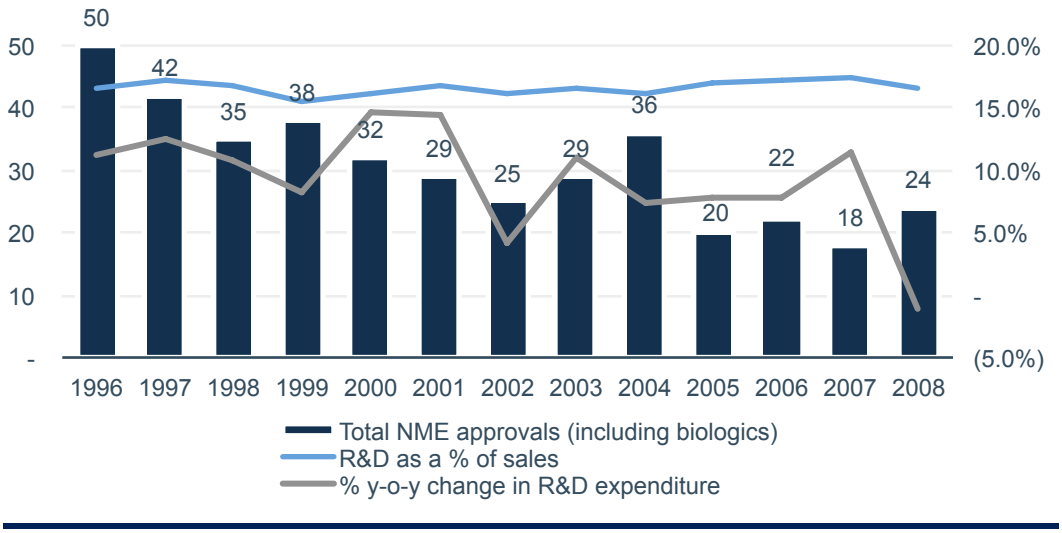
As R&D costs increased, R&D productivity decreased, and the gap between R&D expenditure (as a percentage of sales) and new molecular entity (NME) approvals widened. According to a 2008 Business Insights Report, "pipeline productivity has been in decline (based on the number of new molecular entities (NME) delivered over the past 5 years)" and "[o]n a factual basis the number of NMEs and the approval of priority review drugs has plateaued [even

[19] For example, genomics, combinatorial chemistry, and high throughput screening (Schweizer 2002, 44)

though] R&D budgets have continued to soar" (Barton 2008, 23-4). This trend was in continuation with developments from the late 1990s, when "[p]roductivity in the pharmaceutical industry (as reflected by the overall industry exclusivity and patent horizon) declined […], because more drugs were coming off exclusivity protection than were being replaced by new Food and Drug Administration (FDA)-approved products" (Higgins and Rodriguez 2006, 353). **Table 4** below illustrates the trends in R&D expenditure vs. NME approvals during the period 1996-2008.

Table 4

R&D EXPENDITURE VS. NME* APPROVALS - 1996-2008



Sources: fda.gov, PhRMA 2011 Pharmaceutical Industry Profile, Graham 2005
* NMEs including biologics
Note: R&D expenditure data relates to PhRMA members only (includes all big pharma companies as well as a number of other pharmaceutical companies)

Aside from the years 2003, 2004, 2006, and 2008, the number of total NME approvals over the period 1996-2008 was clearly downward trending. While R&D expenditure as a percentage of sales remained relatively stable, between15 and 17%, we can see that the percentage change in year-on-year R&D expenditure was positive in all years except 2008, thus confirming that absolute R&D expenditure was indeed increasing in the 2000s.

There are several potential explanations for this widening gap between R&D expenditure and R&D productivity, which mirror the reasons outlined above concerning increased R&D

costs. Firstly, the gap could have been due to increasingly stringent FDA regulations for drug approval. Another explanation is that the decline in R&D productivity was caused by the fact that "the easy drugs [had] already been developed" (Higgins and Rodriguez 2006, 353). Indeed, R&D was becoming more complex and "[m]any skeptics [argued] the industry [had] now exploited the majority of low risk high return opportunities and that this [had led] to strategies resulting in many me too products with incremental improvements. This [had also] now forced many to adopt higher risk and potentially higher return R&D projects" (Barton 2008, 28). Whatever the reason, this attrition of the industry's lifeblood did not bode well for its future, to say the least.

Faced with these R&D challenges, and given the "importance of a company's need to address the research gaps in a timely manner" (Chesbrough 2003, cited in Higgins and Rodriguez 2006, 355), it would not be surprising based on historical occurrences that M&A would ensue. For example, Higgins and Rodriguez "find evidence consistent with the proposition that deteriorating R&D productivity could be the motivation underlying the acquisition of research-intensive firms" (Higgins and Rodriguez 2006, 352). Or, in the more blunt terms of Henske and Van Biesen, "big merger announcements […] often serve as last-ditch efforts to fill sagging pipelines" (Henske and Van Biesen 2009).

2.2.2.2. Impending patent cliffs

Rising R&D costs combined with declining R&D productivity were but one of the battles pharmaceutical companies faced on the innovation front. Another battle loomed ahead: an impending industry-wide patent cliff, which refers to the threat posed by patent expiries. In the United States, the FDA grants patents for 20 years. On top of patent protection, a drug can also benefit from exclusivity (of varying lengths, depending on drug class), which refers to exclusive marketing rights, and is granted upon approval of the product. Patent protection and exclusivity may or may not run concurrently.[20] Given the long product development times, products may sometimes arrive to market with only several years of patent protection left. Exclusivity helps address this problem, and can also provide additional protection from generic medicine

[20] fda.gov

competition. Once a drug comes off patent, however, the floodgates open, and typically the market becomes inundated with much cheaper generic versions of the drug. According to Heracleous and Murray, "[a] patent expiry can reduce the innovator's sales by as much as 80 per cent" (Heracleous and Murray 2001, 434).

The pharmaceutical industry in the 2000s was bracing itself for a patent cliff that would significantly impact the top-line of many pharmaceutical giants. Heracleous and Murray cite *Business Week* data that estimated that "[d]uring the three year period 2001-3 inclusive, drugs with annual revenues of $44bn [would] lose their patent protection'' (Heracleous and Murray 2001, 434). A Business Insights report stated that "[m]ore than $100bn of US annual sales [would be] at risk of generic erosion between 2007 and 2012 due to exceptional patent expiration and rapid generification, leading to a reduction in the US' contribution to global revenues" (Barton 2008, 29). Yet another estimate from Bain & Co., cited by Henske and Van Biesen, reported that "[a]nnual cash flow of about $30 billion – roughly half of the $60 billion spent on R&D by the industry – [would] evaporate in the next four years [note: this article was published in 2009] as patents on big blockbuster drugs expire" (Henske and Van Biesen 2009). While these estimates vary in exact time frame and size, they are nevertheless telling. In the 2000s, the pharmaceutical industry had billions of dollars at stake in a dreadfully near future. This, combined, with unproductive pipelines, undoubtedly placed pharmaceutical executives between a rock and a hard place.

2.2.2.3. Price pressure

Additional top-line pressure on pharmaceutical companies came in the form of pressure on prices. While this was not new – governments and managed care organizations had been trying for decades to rein in drug prices – the election of Barack Obama in 2008 was expected to lead to additional price pressure for U.S. pharmaceutical firms. According to the President's healthcare policy: "'We will lower drug costs by allowing the importation of safe medicines from other developed countries, increasing the use of generics drugs in public programmes and taking on drug companies that block cheaper generic medicines from the market'" (Dawber, The Independent, 27 January 2009). This left the pharmaceutical industry with two choices: fight or adapt.

2.2.2.4. Pressure from capital markets

In light of the aforementioned challenges faced by the pharmaceutical industry, it is not difficult to imagine that investors in pharmaceutical companies might be feeling concerned. According to Schweizer, "pharmaceutical companies [in the early 2000s faced] daunting stock market expectations and short-term operating pressures on earnings" (Schweizer 2002, 43). Pharmaceutical firms would need to respond to investor unrest, and do so quickly. In such a situation, M&A could become an attractive solution "to plug strategic holes and accelerate operational improvements" (Schweizer 2002, 43).

2.2.2.5. General economic context

In 2007, the subprime crisis hit the United States. In 2008, Bear Stearns and Lehman Brothers collapsed. The latter half of the 2000s was thus marked by the onset of the global financial crisis. Because the pharmaceutical industry is non-cyclical by nature, it was less impacted by the financial crisis than others. In fact, the crisis even created opportunities for certain players in the pharmaceutical industry, as "[t]he global economic downturn […] created a buyer's market for cash-rich drugmakers" (Pierson and Hall, Reuters News, 23 January 2009).

2.2.2.6. Conclusion

Taking into consideration all of these contextual factors, we can conclude that the prognosis for the pharmaceutical industry was not good. Indeed, over the decade, the drug industry underwent a "wrenching contraction," "marked by patent losses, dry pipelines and pushback from insurers and governments over prices and the value of new medicines" (Hensley, WSJ Health Blog, 23 January 2009). As a result, pharmaceutical companies felt mounting pressure from capital markets. Given these constraints, companies would need to act in order to continue creating and delivering value to their shareholders.

2.3. Company specific concerns

Pfizer faced a number of the aforementioned industry-wide challenges, in addition to some company-specific challenges, which are detailed below.

In 2008, Pfizer's annual revenues were down very slightly, impacted in part by the loss of U.S. exclusivity on three drugs: *Norvasc* for blood pressure, (exclusivity lost in March 2007), the antihistamine *Zyrtec* (January 2008), and cancer drug *Camptosar* (February 2008). These products' revenues were down by 25%, 92% and 42%, respectively, between 2007 and 2008, representing a total dollar revenue loss of $2.6 billion.

This is nothing compared to what was coming next: by 2015, Pfizer faced patent expirations on a number of products, which would collectively wipe out over 70% of its 2007 revenues (Sorkin, The New York Times, 24 January 2009), representing a staggering expected revenue loss of $33.9 billion! Among Pfizer's biggest worries was the impending patent expiration on its best-selling cholesterol drug *Lipitor*, set to expire in November 2011. Accounting for $12.4 billion of revenues in 2008, *Lipitor* was not only Pfizer's best-selling drug, it was the world's best-selling prescription pharmaceutical. Other impending patent expirations included *Aricept* for Alzheimer's in 2010; the anti-cholesterol agent *Caduet*, antifungal *Vfend* and glaucoma treatment *Xalatan* in 2011; *Geodon* for schizophrenia, *Viagra* for erectile dysfunction, and *Detrol LA* for overactive bladder in 2012; the anti-arthritic *Celebrex* in 2014; and finally the anti-bacterial medicine *Zyvox* in 2015 (Pfizer 2008 10-K; Moore, WSJ Deal Journal, 23 January 2009).

Pfizer would need to find new sources of revenues to make up for these revenues set to vanish. As previously discussed, future revenues streams in the pharmaceutical industry are derived from a firm's pipeline. On this front, Pfizer faced another challenge. Although the company boasted 106 compounds in development at the end of 2008 (including 84 NMEs), and a 62.5% increase in its Phase III candidates from 16 to 26, it seemed that this would not be enough. Indeed, Pfizer was facing R&D challenges, as its "research pipeline [had failed] to yield many major new medicines" (Berkrot and Pierson, Reuters News, 23 January 2009). In fact, "its research labs [had] been so unproductive that it closed its mammoth research lab in Ann Arbor, [Michigan, in 2007] and [announced in January 2009 that it was] laying off 800 more research

staffers" (Johnson, Associated Press, 24 January 2009). In an industry where R&D is sacrosanct, these were surefire signs of trouble on the R&D front.

With inadequate R&D resources to meet its impending revenue meltdown, Pfizer needed to find a solution to deliver value to its shareholders in the coming years. It also needed to take action to regain the favor of its investors. Indeed, Pfizer had been involved in three large transactions in less than a decade: its $90 billion acquisition of Warner-Lambert in 2000, its $60 billion takeover of Pharmacia in 2003, and its $16.6 billion sale of its consumer healthcare operations to Johnson & Johnson in 2006. With relative hindsight, these transactions, and particularly the two mega-mergers, were deemed to be value destroying. They "proved to be short-term palliatives at best. Buying Warner-Lambert in 2000 gave [Pfizer] full control of blockbuster Lipitor, but at too high a price. Pfizer has shed two-thirds of its value since that deal. The purchase of Pharmacia in 2003 destroyed even more value after its blockbuster pain-reliever Celebrex suffered from safety concerns" (Financial Times, 24 January 2009). Pfizer thus had a less-than-stellar record of keeping its investors happy through judicious value-creating M&A operations. One consolation for its investors: "its industry-topping dividend" (Pierson and Hall, Reuters News, 23 January 2009). Indeed, according to Barron's, Pfizer's stock was "a favorite of value investors, who were collecting a hefty dividend […] while waiting for CEO Jeffrey Kindler to make a move to boost shareholder value" (Doherty, Barron's, 26 January 2009).

Given the challenges and constraints it was facing, Pfizer was "[u]nder pressure from big investors and analysts to make a bold move" (Johnson, Associated Press, 24 January 2009). According to Goldman Sachs analysts, " '[t]he imperative for radical change is higher than ever, and we believe that pressure is mounting on management to do something big and soon'" (Moore, WSJ Deal Journal, 23 January 2009). Cue the mega-merger card.

Chapter 2: Presentation and discussion of findings

1. Transaction overview

1.1. Transaction description

Table 5 below provides details on key elements relating to the Pfizer/Wyeth transaction.

Table 5

TRANSACTION SUMMARY - PFIZER / WYETH

General information

Acquirer	Pfizer Inc
Target	Wyeth
Date announced	January 26, 2009
Date completed	October 15, 2009

Deal terms

Purchase price

Pfizer agreed to acquire all outstanding shares of Wyeth in a cash and stock deal valuing Wyeth at $50.19 per share at announcement, or a total value of approximately $68 billion

Cash / stock mix

Cash component : $33 per share

Stock component : 0.985 shares of Pfizer for each share of Wyeth, valuing the stock component of the transaction at $17.19 per share based on Pfizer's closing share price of $17.45 on January 23, 2009 (and $17.4 per share upon closing, based on Pfizer's closing share price of $17.66 on October 14, 2009)

Based on this exchange ratio, Pfizer shareholders would hold c. 84% of the combined entity

Funding

Cash	$22.5 billion	
Debt	$22.5 billion	Debt financing provided by a consortium of five banks, providing $4.5 billion each : J.P. Morgan, Bank of America Merrill Lynch, Barclays, Citigroup, and Goldman Sachs
Equity	$23 billion	

Other

In connection with the transaction, Pfizer announced that it would cut its quarterly dividend to $0.16 per share, down 50% from $0.32 per share

Summary of transaction expectations

Time to accretion

Pfizer expected the transaction to be accretive to its adjusted (non-GAAP) diluted EPS by the second full year following closing

Synergies

Pfizer expected $4 billion in cost-savings (in addition to the $2 billion it had planned in stand-alone for 2009-2011), post closing in Q4 2009, of which:

- 50 % within the first 12 months (or by the end of 2010)
- 75% within 24 months (or by the end of 2011)
- 100% within 36 months (or by the end of 2012)

Sources of cost savings

- 50% from savings in selling, informational and administrative expenses (SI&A)
- 50% from savings in R&D and manufacturing

2012 financial targets

Total revenues of c. $70 billion (comparable to 2008 pro forma)
Adjusted operating margin: high 30% to low 40%
Adjusted diluted EPS comparable to Pfizer's 2008 result of $2.42
Operating cash flow greater than $20 billion
Net cash position
Portfolio diversification, with no single product accounting for more than 10% of revenues

Source : Pfizer transaction announcement presentation, "Creating the World's Premier Biopharmaceutical Company", 01.26.09

1.2. Transaction rationale

On January 26, 2009, Pfizer announced its decision to acquire Wyeth. The transaction announcement boasted the following:

> *"Pfizer to Acquire Wyeth, Creating the World's Premier Biopharmaceutical Company*
>
> *Diversification, Flexibility and Scale Position New Company for Success in Dynamic Global Health Care Environment*
>
> *Establishes Leadership in Human, Animal, and Consumer Health, including Primary and Specialty Care; in Vaccines, Biologics and Small Molecules; and Across Developed and Emerging Markets*
>
> *Unique and Flexible Business Model Features Focus and Agility of Smaller Enterprises Backed by Resources and Scale of Global Company*
>
> *Combination Strengthens Platform for Improved, Consistent, and Stable Earnings Growth and Sustainable Shareholder Value*
>
> *New Company Will Promote Health and Wellness and Respond More Effectively to Unmet Needs of Patients, Physicians, and Customers Around the World"*
>
> *- Pfizer press release, January 26, 2009*

The strategic considerations enumerated above collectively address Pfizer's aforementioned company-specific concerns: the impending patent cliff and resulting revenue loss, decline in R&D productivity, and mounting investor unrest. Indeed, we can summarize the key rationales driving the transaction as: diversification and stabilization of revenue sources, combined with a reinforcement of R&D capabilities, in order to drive a new business model apt to create value both in the short and long-term for Pfizer's shareholders.

As previously mentioned, Pfizer was heavily reliant on small molecule drugs (c. 90% of revenues in 2008) and was facing an important patent cliff, especially on its leading product *Lipitor*. Wyeth, on the other hand, had already begun diversifying away from traditional small molecule drugs (only c. 60% of revenues) and had established itself as a leading emerging biotechnology player. The appeal of this diversification strategy for a pharmaceutical company is

simple: it allows the company to better protect its pipeline, its key asset for creating value. Indeed, drugs such as vaccines and biologics/biopharmaceuticals do not "[face] the same level of patent pressures, because it is much more complicated and prohibitive to make generic versions of such drugs" (Sorkin, The New York Times, 24 January 2009). By protecting itself from, or at least minimizing its exposure to generic competition, Pfizer could smooth out its top-line; "[the] merger would add diversity and bring stability to Pfizer's drug sales" (Sorkin, The New York Times, 24 January 2009).

Not only did Wyeth boast a strong marketed biologics franchise – led by drugs such as *Enbrel* for autoimmune diseases, and the antihemophilics *Refacto, BeneFIX* and *Xyntha* – but it had also developed significant R&D capabilities in terms of biologic product development. According to Pfizer CEO Jeffrey Kindler, "'[w]ith [Enbrel] comes a robust pipeline of biopharmaceutical candidates, as well as Wyeth's world-class biopharmaceutical science capabilities and its high-quality and high-volume manufacturing plants, including the one in Grange Castle, Ireland – the largest integrated biotechnology manufacturing facility in the world'" (Hollis, Drug Industry Daily, 27 January 2009). In particular, Wyeth's pipeline included a number of mid- to late-stage monoclonal antibodies, such as bapinezumab for Alzheimer's Disease (Phase III), inotozumab ozogamicin for non-Hodgkin's lymphoma (Phase III) and anrukinzumab for asthma (Phase II).

As explained by Kindler, "Wyeth's biotechnology assets were a major attraction" (Hollis, Drug Industry Daily, 27 January 2009). However, there were further complementarities or advantages of this rapprochement to keep in mind. For example, both Pfizer and Wyeth could leverage their strong anti-infective franchises – Pfizer with *Zyvox* and *Vfend* and Wyeth with *Zosyn* and *Tygacil* – to increase their market share in this therapeutic area. We can also consider the addition of Wyeth's consumer healthcare franchise as strategic, insofar as this activity "could cushion the fluctuations in the prescription-drug sector" (Loftus, Dow Jones Newswires, 23 January 2009).

Pfizer's acquisition of Wyeth was thus motivated by a combination of strategic factors primarily related to revenues and pipeline. In pursuing diversification and stabilization of revenue streams and pipeline health through increased capabilities, Pfizer was in fact overhauling its traditional pharmaceutical business model in a play to deliver shareholder value in the long-term. Indeed, the mega-merger "would transform Pfizer almost overnight from

primarily a pure pharmaceutical company into a broadly diversified health care giant" (Johnson, Associated Press, 24 January 2009), ready to take on the industry's new challenges.

It should be noted that Wyeth did not come without its own set of troubles. As with all other pharmaceutical companies, Wyeth was also facing an impending patent cliff. EvaluatePharma estimates that "$8.71bn of Wyeth's 2008 sales [were] at risk of generic competition by 2012, a figure that is more than half the group's estimated prescription sales of $16bn for 2008," adding that "all you get by adding a cliff to a cliff is an even bigger cliff" (EP Vantage, 23 January 2009). Wyeth was also in the midst of several high profile legal battles. It "[faced] claims by 10,000 women who [contended] its hormone replacement drugs Prempro and Premarin [caused] breast cancer […and had] also set aside $21 billion to resolve a decade of litigation over its fen-phen diet pill, pulled off the market in 1997" (The Boston Globe, 26 January 2009).

While these potential setbacks clearly could not have constituted reasons for Pfizer to acquire Wyeth, it is important to have them in mind. We may even consider one potential upside of these woes, which is that they "contributed to a falling share price and made the company a cheaper takeover target" (Karnitschnig and Rubinstein, The Wall Street Journal, 24 January 2009), therefore potentially making Pfizer less prone to overpayment and potential exposure to the winner's curse.

1.3. Expected synergies

Beyond the strategic considerations described above, there was another key factor driving Pfizer's acquisition of Wyeth: expected synergies, and especially in the form of cost savings. Through its acquisition of Wyeth, Pfizer expected it could achieve $4 billion in cost savings within three years. Half of these savings would be achieved through cuts in selling, informational and administrative expenses, and the other half through cuts in R&D and manufacturing, as mentioned in the **Table 5** above. Not surprisingly, the actual sources of cost savings would be job cuts and plant closures. Pfizer's CFO Frank D'Amelio "told analysts on a conference call [on the announcement date] Pfizer would cut the combined work force by 15% […including] Pfizer's new plan to cuts its own workforce by 10%" (Loftus, Dow Jones Newswires, 26 January

2009). Based on a combined workforce of 129,500[21], this would lead to c. 19,000 job cuts. The job cuts would occur across all divisions, and a number of them would arise from redundancy due to synergies, as is often the case in mergers. Pfizer also planned to achieve cost savings by reducing its number of manufacturing sites from 46 to 41.

This search for cost savings was among the key motivations, if not the most important rationale, behind the transaction.[22] According to *The New York Times*, "[t]he negotiations between Pfizer and Wyeth appear to [have been] driven by costs savings as much as by sales and research opportunities" (Sorkin, The New York Times, 24 January 2009). In fact, Pfizer may not have even had much of a choice: "Pfizer CEO Jeff Kindler [had] cut costs and laid off thousands of employees since taking the New York drug giant's helm in the summer of 2006, but analysts and investors [considered] those cuts insufficient to make up for the pending loss of Lipitor" (Karnitschnig and Rubinstein, The Wall Street Journal, 24 January 2009). If Pfizer had indeed already cut everything it could on its own, then it would need to resort to an acquisition to achieve economies of scale (which cannot be achieved alone), lest it make unwise cuts that would endanger its future revenue-generating and innovative capacities. In other words, the cost-saving potential of the deal could potentially prevent Pfizer from making the crucial mistake of further stand-alone cost cuts that could lead to value destruction.

[21] 81,900 employees for Pfizer and 47,600 employees for Wyeth

[22] It could also potentially explain why Pfizer would choose to acquire Wyeth despite the latter's aforementioned troubles.

2. Assessment of value creation

Now that the context and description of the Pfizer-Wyeth mega-merger have been established, I will turn to an assessment of whether or not this deal has created value for Pfizer's shareholders. I will consider both a qualitative assessment based on analyst and industry reactions, as well as a quantitative assessment, based on a variety of selected indicators to be described in further detail below.

2.1. Qualitative assessment

2.1.1. Reactions

Pfizer's announcement to merge with Wyeth was met with mixed reactions, as the following selection of quotes demonstrates.

"Such an acquisition makes strategic and financial sense […]. This deal would instantly make [Pfizer] a top-tier biologics player and boost cash flow"
- Catherine Arnold, Credit Suisse

"[T]he addition of visible revs and eps in the cliff period, as well as the necessary elimination of excess capacity within the sector, could drive multiple expansion"
- Barbara Ryan, Deutsche Bank

"We really think it does make sense for Pfizer to purchase Wyeth, to try to gets some more growth and be more protected with the patent cliff coming up"
- Russell Croft, portfolio manager at Croft Leominster Inc.

"[Pfizer] would have to have unprecedented R&D success to overcome [its] future losses […] Buying another company like Wyeth may therefore be the only realistic solution"
- Tim Anderson, Sanford Bernstein

"Although we believe the addition of Wyeth's products to Pfizer's portfolio would improve the company's overall diversification and reduce its reliance on best-seller Lipitor, we believe that it would only modestly reduce the proportion of revenues exposed to generic competition through 2011"

- Standard & Poor's research note

The acquisition "is not transformational for the company – it doesn't restore [Pfizer] to a growth path & doesn't provide it with a robust enough R&D engine (which is what [Pfizer] needs the most)"

- Roopesh Patel, UBS

"There are certainly positives in this deal, most crucially that Pfizer is buying access to the important biologics and vaccines markets. However, by deciding that big is best, Pfizer is only delaying its current problems and buying a portfolio of products that are approaching the end of their patent lives"

- Jeremy Batstone-Carr, Charles Stanley

"I think it shows their desperation […] I don't think it's going to pay off for them […] Pfizer's problem was they were already too big, and so just making the company bigger doesn't solve the issue. The real issue is the R&D productivity is not there"

- Jon LeCroy, Natixis Bleichroeder

"This is a fix for the next 12 to 18 months. This still doesn't resolve the fundamental flaw in the large-pharma model […]. They're going to combine the two entities, eliminate redundancies and just focus on the bottom line earnings numbers, which doesn't work in the long run"

- Steve Brozak, WBB Securities

"[O]ne has to wonder if this is an act of desperation by Pfizer"

- Gregory Volokhine, Meeschaert New York

The global reaction can be qualified as lukewarm at best.[23] While a few analysts cheered the deal and a few analysts were extremely critical of it, the overwhelming majority seemed to feel neutral about it. There was an overall consensus that: (i) given the pressure it was under, Pfizer needed to do the deal, and (ii) while this mega-merger may not be the solution to all of Pfizer's problems, it would at least function as a palliative treatment to ease the pain of its troubles, at least in the short-term. Indeed, Pfizer was clearly at a crossroads where it needed to do something to create value for its shareholders, but there was no longer enough time to bet on in-house R&D to save the company from its patent cliff. Many analysts viewed the acquisition as a necessity but as "only a first step for Pfizer to get its house in order" (Moore, WSJ Deal Journal, 26 January 2009). According to the *Financial Times*, "Wyeth is clearly no miracle drug [, b]ut Pfizer is buying time until it can cure what ails it" (Financial Times, 24 January 2009). Thus, it seemed that analysts believed the acquisition of Wyeth was a step in the right direction, ensuring Pfizer's survival as it took the time to find a solution to create value in the long-term. Indeed, while the deal wouldn't "solve either company's long-term growth issues […] [i]nvestors, it seems, [were] content to leave that worry for another day" (Doherty, Barron's, 26 January 2009). This seems to explain the analysts' lukewarm reaction, which we can interpret as cautious optimism founded on short-term relief but complicated by an overshadowing unease over Pfizer's long-term prospects.

The following analysis, which tracks the evolution of analyst recommendations before and after the merger, shows that overall the merger restored Pfizer to analysts' good graces.

2.1.2. Analyst recommendations

As a proxy for market sentiment and investor confidence, this section looks at the evolution of analyst recommendations – buy, hold, or sell – of Pfizer over three different periods: (i) 2006 – 2012, (ii) the merger announcement date, and (iii) the merger completion date.

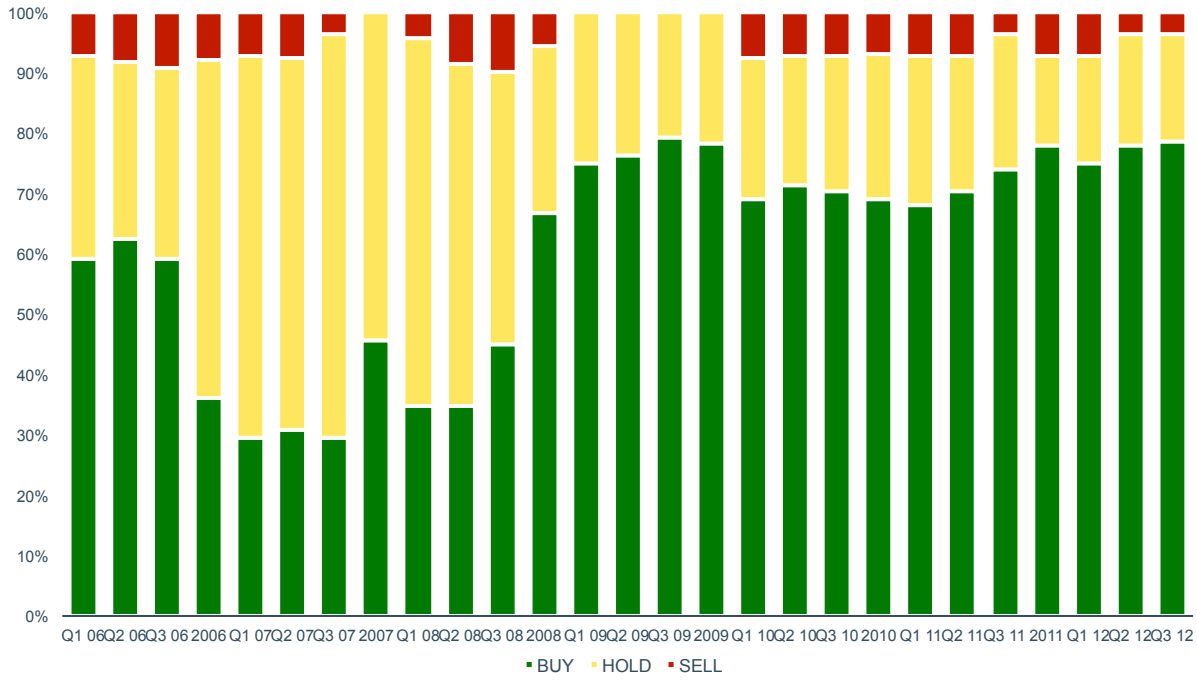
For the period 2006 – 2012, I have looked at analyst recommendations on the day following quarterly and annual earnings announcement. The overall period contains 27

[23] Some analysts were skeptical or dubious right off the bat, given Pfizer's previous mega-mergers with Pharmacia and Warner Lambert, which were overall ill-received by the analyst and investor community.

observations, and ranges from the day following Q1 2006 earnings to the day following Q3 2012 earnings (as 2012 full-year results will not be announced until February/March 2013). **Table 6** below presents the results of this analysis.

Table 6

PFIZER ANALYST RECOMMENDATIONS - QUARTERLY POST-EARNINGS ANNOUNCEMENTS (2006 - 2012)



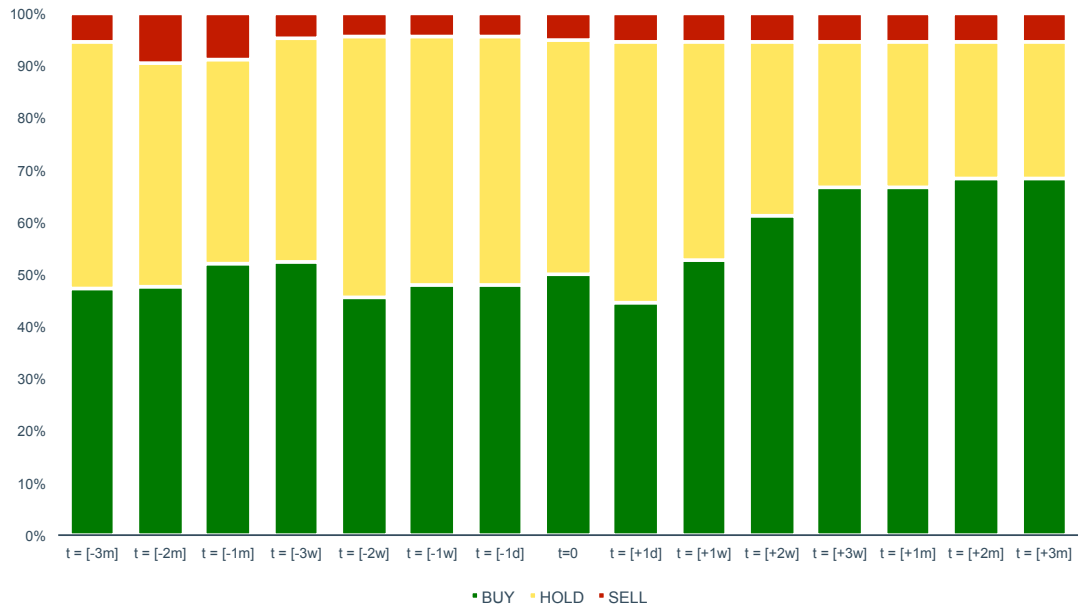
Source: Bloomberg

Firstly, this chart confirms that prior to the announcement of its merger with Wyeth in early 2009, analysts were not very optimistic about Pfizer's future prospects. Analyst recommendations especially took a hit in early 2007, upon the announcement of 2006 full-year results. Between early 2007 and early 2009, less than 50% of analysts recommended buying Pfizer stock. After the merger announcement, buy recommendations soared. There were no sell recommendations for the year following the merger announcement. Despite the reappearance of sell recommendations beginning in Q1 2010, there has been a consistently higher percentage of buy recommendations since the merger was announced than in the three-year period preceding the merger announcement. This suggests that analysts have been more confident about Pfizer's future prospects.

In order to confirm the merger's impact, I have also looked at two more narrow time periods: the 3 months preceding and following the merger announcement date (January 26, 2009) and the 3 months preceding and following the merger completion date (October 15, 2009). The results of this analysis are presented in **Table 7** and **Table 8** below.

Table 7

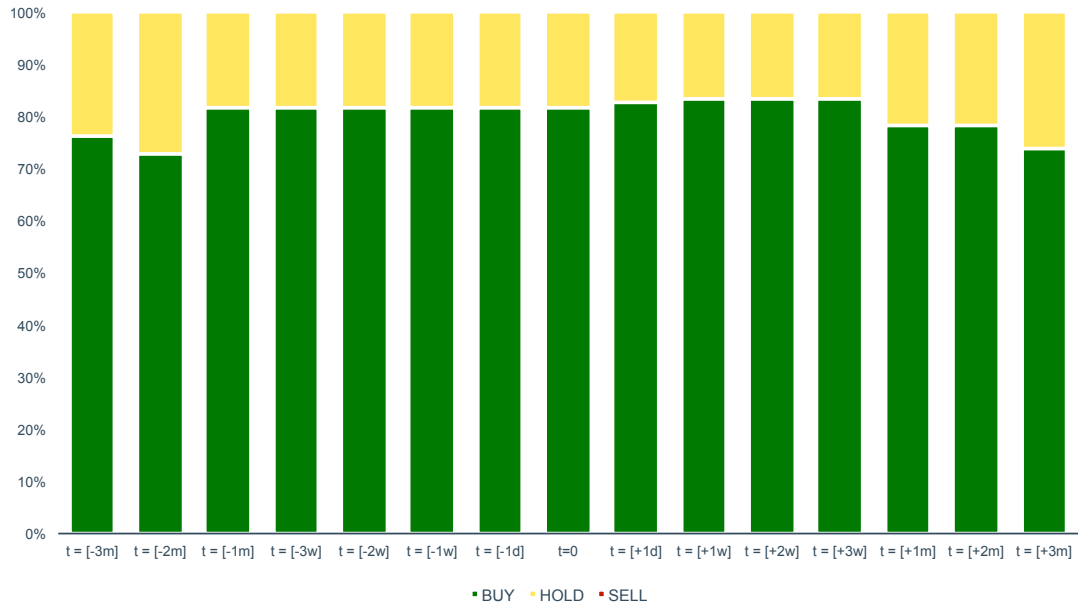
PFIZER ANALYST RECOMMENDATIONS - ON ANNOUNCEMENT DATE (t = 0) AND UP TO 3 MONTHS BEFORE AND AFTER



Source: Bloomberg
Note: m = month, w = week, d = day

Table 8

PFIZER ANALYST RECOMMENDATIONS - ON COMPLETION DATE (t = 0) AND UP TO 3 MONTHS BEFORE AND AFTER



Source: Bloomberg
Note: m = month, w = week, d = day

The increase and subsequent plateau in buy recommendations following the merger announcement suggest cautious optimism from the analyst community. This is further suggested by the persistence of sell recommendations over the same period. However, if we look at analyst recommendations surrounding the merger completion date, approximately 80% of analysts recommend buying Pfizer stock and none suggest selling it. This suggests a positive impact of the merger on analyst expectations.[24]

Overall, this analysis of analyst recommendations over the three different time periods shows that, in the eyes of analysts, Pfizer was more attractive as an investment after its merger with Wyeth than before. While we cannot attribute analysts' increased optimism wholly to the merger, it seems that the merger had a positive impact on analysts' expectations about Pfizer's future prospects or, in other words, its ability to create value.

[24] Note: the relative "flatness" of recommendations over the period surrounding the merger completion date and lack of reaction to the merger completion merely suggest that analysts were expecting the transaction to close, and therefore they had no new information to integrate into their recommendations.

2.2. Quantitative assessment

The following section presents a quantitative assessment of the value created through the Pfizer/Wyeth mega-merger, using a selection of measurement techniques defined in Part I, Chapter 1. As a whole, these various criteria will be used to determine whether this merger created value for the shareholders of Pfizer versus shareholders of other big pharma companies (the benchmark sample). These criteria will also be used to determine whether the merger has created value in the short and medium to long-term, as "[b]oth short-term and long-term wealth effects are germane to the assessment of success of mergers" (Sudarsanam 2003, 64).

I will consider firstly market indicators, including a single-observation "event study," share price performance, trading multiples, and TSR. The first analysis will help us assess short-term value creation, while the other measures will allow us to assess the evolution of value since the merger (with the caveat that any *ex post* performance improvements or deteriorations cannot be attributed with certainty to the merger.[25]

I will then look at accounting indicators, including a traditional P&L revenues and margin analysis, as a tool for tracking the implementation of synergies, a profit analysis considering EPS, and finally a profitability analysis considering ROE and ROCE.

Thirdly, I will consider the hybrid accounting/market indicator ROCE – WACC.

Finally, I will look at R&D productivity, a key performance indicator for the pharmaceutical industry. As it can take years before a pipeline yields a valuable compound, it is important to consider the evolution of a pipeline's value over time to determine whether or not value has been created. Although three years of post-merger pipeline data may not be sufficient, it's a good place to start.

[25] To the extent possible, I will identify potentially confounding events.

2.2.1. Stock market performance

2.2.1.1. Immediate / short-term performance

In order to assess the immediate / short-term performance of Pfizer's stock following the merger announcement, I have implemented the most popular methodology on a highly reduced scale, by conducting a single-observation event study on Pfizer's share price.[26]

I have applied the standard methodology, as it was described in Part I, Chapter 1. I have defined the event (t = 0) as the rumor date, or Friday January 23, 2009. Although the merger was not officially announced until the following Monday – January 26, 2009 – rumors of the merger spread through the press on the 23rd, such that it is highly likely that the prospect of the merger was incorporated into Pfizer's share price starting on this date. I defined the event period as the event date, plus or minus 20 trading days; that is, the event period = [-20,+20].

I estimated the expected returns for Pfizer by regressing Pfizer's returns on those of the S&P 500 for a period of 250 trading days prior to the event period (January 11, 2008 – December 26, 2008). This regression analysis yielded the following formula for Pfizer expected returns (t-statistics shown in parentheses):

$$E\left(R_{Pfizer,}\right) = \alpha_i + \beta_i * R_{S\&P\ 500} = \underset{(0.2887)}{0.000216} + \underset{(27.7031)}{0.805672} * R_{S\&P\ 500}$$

where $E\left(R_{Pfizer,}\right)$ = expected return on Pfizer stock

$R_{S\&P\ 500}$ = actual return on the S&P 500

The β coefficient is significant at the 1% level. I used this formula to calculate abnormal returns (AR) as follows:

$$AR_{Pfizer} = R_{Pfizer} - E(R_{Pfizer})$$

[26] As this case study focuses on value creation for Pfizer's shareholders, I have not conducted an analysis on Wyeth's performance. However, it should be noted that Wyeth's stock responded positively to news of the merger, as Wyeth shares were up 12.6% on January 23, 2009 (rumor date).

where AR_{Pfizer} = abnormal return of Pfizer stock

R_{Pfizer} = actual return on Pfizer stock

Cumulative abnormal returns (CARs) were then simply calculated by summing the abnormal returns over given time intervals within the event period.

Table 9 below displays the results of these calculations over the event period [-20,+20].

Table 9

PFIZER SHORT-TERM STOCK PRICE RETURNS ANALYSIS

Date	Relative to event	S&P 500 returns	Pfizer returns		
			Actual	Expected	Abnormal
20-Feb-09	+20	(3.5%)	(2.3%)	(2.8%)	0.5%
19-Feb-09	+19	(2.0%)	(0.9%)	(1.6%)	0.7%
18-Feb-09	+18	2.3%	(0.6%)	1.9%	(2.5%)
17-Feb-09	+17	1.0%	(2.3%)	0.8%	(3.1%)
16-Feb-09	+16	(2.0%)	-	(1.6%)	1.6%
13-Feb-09	+15	7.1%	(0.5%)	5.7%	(6.2%)
12-Feb-09	+14	(2.0%)	1.9%	(1.6%)	3.4%
11-Feb-09	+13	(1.3%)	2.2%	(1.0%)	3.2%
10-Feb-09	+12	2.1%	(4.4%)	1.7%	(6.1%)
09-Feb-09	+11	3.2%	(0.9%)	2.6%	(3.5%)
06-Feb-09	+10	(0.4%)	2.3%	(0.3%)	2.6%
05-Feb-09	+9	0.8%	(0.5%)	0.6%	(1.1%)
04-Feb-09	+8	4.1%	(4.1%)	3.3%	(7.4%)
03-Feb-09	+7	0.2%	2.1%	0.2%	1.9%
02-Feb-09	+6	6.4%	2.1%	5.2%	(3.0%)
30-Jan-09	+5	(1.0%)	(3.6%)	(0.8%)	(2.8%)
29-Jan-09	+4	0.1%	(2.1%)	0.1%	(2.2%)
28-Jan-09	+3	(4.3%)	(2.4%)	(3.4%)	1.0%
27-Jan-09	+2	2.4%	1.1%	1.9%	(0.8%)
26-Jan-09	+1	(0.6%)	(10.3%)	(0.5%)	(9.8%)
23-Jan-09	0	(4.7%)	1.4%	(3.7%)	5.1%
22-Jan-09	-1	(2.4%)	(1.5%)	(1.9%)	0.3%
21-Jan-09	-2	(1.6%)	1.6%	(1.2%)	2.9%
20-Jan-09	-3	(1.1%)	(1.7%)	(0.8%)	(0.9%)
19-Jan-09	-4	4.0%	-	3.3%	(3.3%)
16-Jan-09	-5	(3.5%)	0.6%	(2.8%)	3.4%
15-Jan-09	-6	(1.1%)	0.9%	(0.9%)	1.8%
14-Jan-09	-7	(1.2%)	(2.0%)	(0.9%)	(1.0%)
13-Jan-09	-8	(0.1%)	1.3%	(0.1%)	1.4%
12-Jan-09	-9	(4.6%)	(0.5%)	(3.6%)	3.2%
09-Jan-09	-10	-	(1.2%)	0.0%	(1.2%)
08-Jan-09	-11	(1.0%)	0.9%	(0.8%)	1.7%
07-Jan-09	-12	0.2%	(1.7%)	0.2%	(1.9%)
06-Jan-09	-13	0.8%	(2.0%)	0.7%	(2.6%)
05-Jan-09	-14	(4.9%)	(0.6%)	(3.9%)	3.3%
02-Jan-09	-15	0.1%	3.2%	0.1%	3.0%
01-Jan-09	-16	2.7%	-	2.2%	(2.2%)
31-Dec-08	-17	1.6%	(0.2%)	1.3%	(1.6%)
30-Dec-08	-18	(0.7%)	2.7%	(0.6%)	3.2%
29-Dec-08	-19	1.6%	1.1%	1.3%	(0.2%)
26-Dec-08	-20	(0.1%)	0.5%	(0.0%)	0.6%

Sources : Own calculations, based on Datastream

Table 10 below displays the cumulative abnormal expected returns (CARs) over given time intervals within the event period.

Table 10

CUMULATIVE ABNORMAL RETURNS (CARs)

Interval	CAR (%)
[-20,0]	15.1%
[-10,0]	11.7%
[-5,0]	7.6%
[-1,0]	5.5%
[0]	5.1%
[0,+1]	(4.7%)
[0,+5]	(9.5%)
[0,+10]	(16.6%)
[0,+20]	(28.5%)
[-20,+20]	(18.5%)
[-10,+10]	(10.1%)
[-5,+5]	(7.0%)
[-1,+1]	(4.4%)

Sources : Own calculations
Note : Intervals based on Kirchhoff and Schiereck (2011)

On the event date, Pfizer experienced an actual return of +1.4% and abnormal return of +5.1%. This performance suggests that Wall Street responded positively to the prospects of a merger with Wyeth. Indeed, opinions of the merger on the event date, January 23, were overwhelmingly positive. According to *The New York Times*, "[i]nvestors applauded the possibility of a deal […] Pfizer rose 1.4 percent to close at $17.45, a rare show of confidence by investors for a potential buyer during a merger" (Sorkin, The New York Times, 24 January 2009). Barron's attributed the share price increase to the fact that "investors concluded – probably correctly – that a Wyeth acquisition could help Pfizer weather the expiration of Lipitor's patent in 2011" (Doherty, Barron's, 26 January 2009). Overall, "[t]he market appeared to welcome the deal Friday" (Karnitschnig and Rubinstein, The Wall Street Journal, 24 January 2009).

Looking at cumulative abnormal returns following the announcement date paints a different and much bleaker picture. Indeed, abnormal returns were negative in 12 of the 20 observation dates. This echoes the sentiment of cautious optimism observed in the "Qualitative Assessment" section above.

However, it should be noted that there might have been other factors at play, affecting Pfizer's performance by putting downward pressure on its share price. Most notably, on January 26, 2009 – that is, on the official merger announcement date – Pfizer also announced its fourth quarter and full year 2008 results and released its guidance for 2009. Revenues were down 4% quarter-on-quarter and reported net income was down a staggering 90%! This was primarily due to a $2.3 billion charge related to litigation over its non-steroidal anti-inflammatory drug *Bextra*. According to *The New York Times*, "[o]n any other day, the Bextra settlement might have been big news for Pfizer – which is why some analysts said the company had probably decided to disclose it [concomitantly with the merger announcement] on Monday" (Wilson, The New York Times, 27 January 2009). Share prices typically react upon earnings announcements. It is thus possible that Pfizer shares dropped on January 26 because of the earnings announcement rather than the merger announcement. Unfortunately, it is not possible to extricate the individual impact of each announcement, making the negative abnormal return on that date a difficult result to interpret. It is also difficult to interpret the subsequent abnormal returns, as it is likely that there was a "lag" effect as markets digested the two announcements.

The merger announcement may have also been overshadowed by the general economic context. Pfizer's announcement that it would finance part of the acquisition with $22.5 billion of debt was a big deal – literally – as it was the first of its kind since liquidity had all but dried up in the wake of the subprime crisis and the Lehman collapse. It is difficult to assess the impact of this financing choice. Some investors may have breathed a sigh of relief and hoped this would stimulate liquidity and unclog the financial system, thus welcoming the merger announcement. Others may have been concerned that such a large amount of debt financing given economic conditions would prevent the mega-merger from happening at all, thereby tempering their expectations. Finally, the political implications of this financing choice – obtaining debt from banks that had been bailed out by the government using taxpayer dollars, in order to merge two companies and fire a significant number of employees in the midst of an unemployment crisis (Kamp, Dow Jones Newswires, 26 January 2009) – could have had a negative impact on Pfizer's share price.

Given these potentially confounding factors, the abnormal returns following the event date seem much less reliable than those on January 23, 2009. Given the positive abnormal return

on this date, it would seem that investors were optimistic – at least instinctually – about the merger's ability to create value for Pfizer's shareholders.

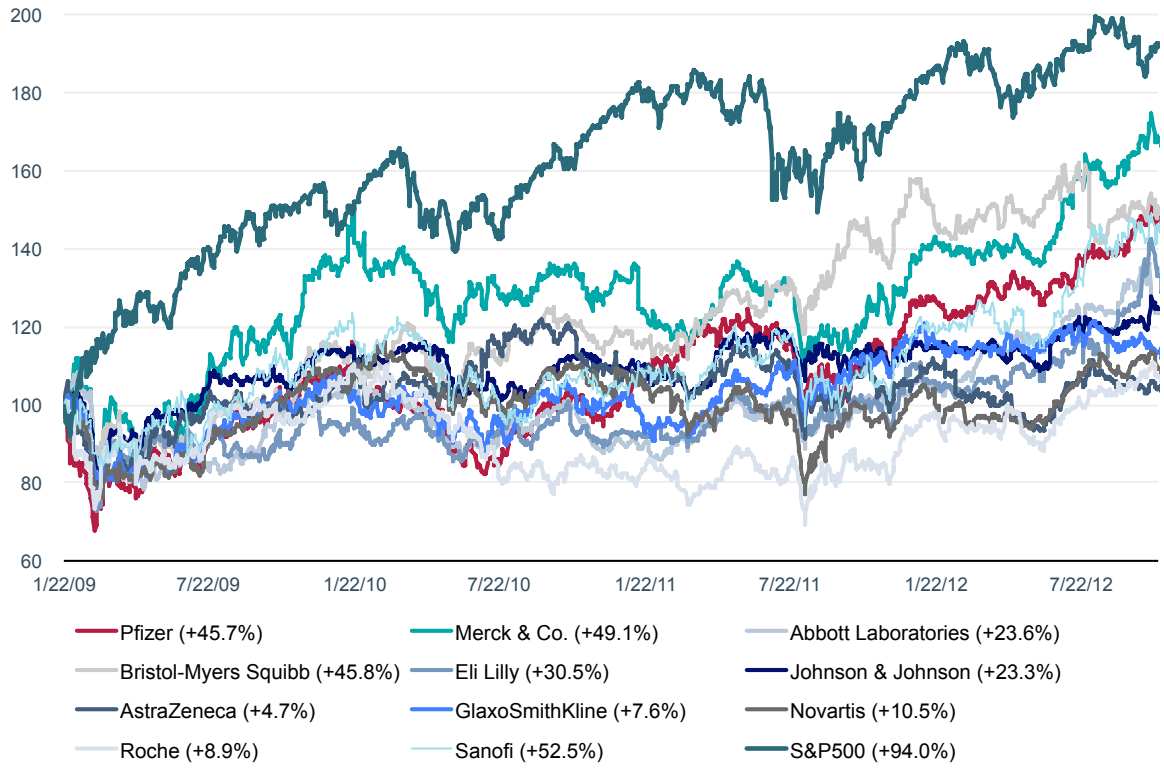
2.2.1.2. Long-term performance

2.2.1.2.1. Share price performance

Table 11 below illustrates the share price performance of Pfizer versus that of its peers and that of the S&P 500 over the period January 22, 2009 (pre-rumor date) to December 31, 2012. All observations have been rebased to 100 at January 22, 2009, so as to show the relative evolution of each since that date.

Table 11

LONG-TERM SHARE PRICE PERFORMANCE VS. PEERS - JANUARY 22, 2009 TO DECEMBER 31, 2012



Source : Datastream

The first observation we can make is that all pharmaceutical firms have underperformed the market, as measured by the performance of the S&P 500. Note that this is most relevant for the U.S. companies, as this a U.S.-based index. It also seems that overall the performance of pharmaceutical companies' share prices is correlated. For example, all companies dipped more or less severely around July 2011.

If we look specifically at the long-term performance of Pfizer, we note that the stock is up +45.7% since January 22, 2009. Pfizer has outperformed the majority of its peers (7 out of 10). Most notably, it has outperformed its non-acquirer counterparts, Eli Lilly and GlaxoSmithKline, whose stock is up +30.5% and +7.6%, respectively. It has also outperformed its European mega-merger peer Roche, whose share price is up +8.9%. However, Pfizer has slightly underperformed its U.S. mega-merger peer Merck, whose share price is up +49.1%. The other two companies who have outperformed Pfizer are Bristol-Myers Squibb, up just 10 basis points above Pfizer at +45.8%, and Sanofi, at +52.5%. Overall, this evidence supports the conclusion that there has been value creation for Pfizer's shareholders in the post-merger period to date.

2.2.1.2.2. Multiples

The following section traces the evolution of key multiples over the period 2006 to 2012e, in order to assess the evolution of Pfizer's valuation before and after the merger, and in comparison to its peers. The section includes both enterprise value multiples – EV/Sales, EV/EBITDA, and EV/EBIT – as well as equity value multiples – price/earnings (P/E) and price/book (P/B). The enterprise value and fully diluted market capitalizations used to compute the EV and equity value multiples, respectively, are shown in **Table 12** below. Note that 2012 multiples are based on mean broker consensus estimates in all cases except for P/B, which is based on the latest available shareholders' equity (at 3Q 2012 in most cases, except for Roche and Sanofi, for which the latest available published financials are H1 2012). Details of enterprise value calculations are available in *Appendix A*.

Table 12

ENTERPRISE VALUE

Company	Curr.	Enterprise value						
		2006	2007	2008	2009	2010	2011	2012e
Pfizer Inc.	USD	168,879	145,594	113,352	151,335	157,881	182,974	205,691
Abbott Laboratories	USD	46,853	51,351	46,260	46,740	49,225	49,574	55,176
Bristol-Myers Squibb Co.	USD	55,088	56,557	44,918	47,734	43,800	57,176	59,734
Eli Lilly & Co.	USD	56,481	58,411	48,614	41,389	38,940	46,380	55,846
Johnson & Johnson	USD	197,994	194,366	168,697	174,762	161,602	169,370	193,711
Merck & Co Inc	USD	95,913	127,345	68,380	93,554	120,555	121,613	129,920
AstraZeneca PLC	USD	77,936	73,966	66,514	65,243	62,225	60,580	63,959
GlaxoSmithKline PLC	GBP	79,320	77,548	77,688	77,581	73,304	84,830	81,049
Novartis AG	USD	135,468	121,134	115,371	120,531	155,819	153,121	168,828
Roche Holding AG	CHF	179,629	159,231	132,574	176,927	138,759	153,432	176,745
Sanofi S.A.	EUR	101,059	89,676	61,500	76,378	64,583	86,775	106,820

Sources : Company filings, Bloomberg, Datastream

Notes :

AstraZeneca and Novartis are listed in GBP and CHF, respectively, on their home exchanges. However, they publish their financials in USD. Market capitlization and EV have thus been converted to USD (using the exchange rate at the end of each year)

Net debt, minority interests and preferred equity as at 3Q 2012 for 2012e (as at H1 2012 for Roche and Sanofi)

MARKET CAPITALIZATION

Company	Curr.	Market capitalization (diluted)						
		2006	2007	2008	2009	2010	2011	2012e
Pfizer Inc.	USD	188,397	157,723	119,543	128,149	141,376	170,307	189,349
Abbott Laboratories	USD	35,816	41,913	39,856	40,173	35,670	42,170	49,861
Bristol-Myers Squibb Co.	USD	51,666	52,510	46,477	49,945	45,731	60,507	55,305
Eli Lilly & Co.	USD	56,658	58,235	44,075	39,223	38,748	46,296	57,234
Johnson & Johnson	USD	195,485	194,144	169,654	179,646	172,487	182,004	196,631
Merck & Co Inc	USD	95,384	127,429	65,217	83,063	112,445	116,644	125,972
AstraZeneca PLC	GBP	84,361	64,713	59,029	67,211	65,356	62,845	59,639
GlaxoSmithKline PLC	GBP	76,608	71,202	67,128	67,400	63,587	75,032	66,376
Novartis AG	CHF	135,941	128,368	113,975	123,917	134,393	137,871	153,666
Roche Holding AG	CHF	188,347	168,607	139,913	151,012	117,409	135,479	156,952
Sanofi S.A.	EUR	95,048	85,269	59,515	71,985	62,597	75,290	94,799

Note : AstraZeneca and Novartis are listed in GBP and CHF, respectively, on their home exchanges. However, they publish their financials in USD. Market capitalization and EV have thus been converted to USD (using the exchange rate at the end of each year)

2.2.1.2.2.1. Enterprise value multiples

Note: underlying aggregates (Sales, EBITDA, and EBIT) are available in Appendix B.

Table 13 below presents EV/Sales multiples for Pfizer and its peers over the period 2006-2012e.

Table 13

EV/SALES

Company	EV/Sales						
	2006	2007	2008	2009	2010	2011	2012e
Pfizer Inc.	3.5x	3.0x	2.3x	3.0x	2.3x	2.7x	3.5x
Abbott Laboratories	2.1x	2.0x	1.6x	1.5x	1.4x	1.3x	1.7x
Bristol-Myers Squibb Co.	3.2x	3.6x	2.5x	2.5x	2.2x	2.7x	3.4x
Eli Lilly & Co.	3.6x	3.1x	2.4x	1.9x	1.7x	1.9x	2.5x
Johnson & Johnson	3.7x	3.2x	2.6x	2.8x	2.6x	2.6x	2.9x
Merck & Co Inc	4.2x	5.3x	2.9x	3.4x	2.6x	2.5x	2.8x
AstraZeneca PLC	2.9x	2.5x	2.1x	2.0x	1.9x	1.8x	2.3x
GlaxoSmithKline PLC	3.4x	3.4x	3.2x	2.7x	2.6x	3.1x	3.0x
Novartis AG	3.9x	3.2x	2.8x	2.7x	3.1x	2.6x	3.0x
Roche Holding AG	4.3x	3.5x	2.9x	3.6x	2.9x	3.6x	3.9x
Sanofi S.A.	3.6x	3.2x	2.2x	2.6x	2.1x	2.6x	3.1x
Average	**3.5x**	**3.3x**	**2.5x**	**2.6x**	**2.3x**	**2.5x**	**2.9x**
Median	**3.6x**	**3.2x**	**2.5x**	**2.7x**	**2.3x**	**2.6x**	**3.0x**
High	**4.3x**	**5.3x**	**3.2x**	**3.6x**	**3.1x**	**3.6x**	**3.9x**
Low	**2.1x**	**2.0x**	**1.6x**	**1.5x**	**1.4x**	**1.3x**	**1.7x**

Note : 2012e multiples based on mean broker consensus estimates for underlying aggregate

In terms of EV/Sales valuation, Pfizer seems to have followed a "mirror path" centered on the acquisition year. That is, its valuation declined steadily from 3.5x to 2.3x Sales from 2006 to 2008, reached 3.0x sales in 2009, and then increased from 2.3x to 3.5x Sales from 2010 to 2012e.

Pfizer's pre-merger valuation decline and underperformance relative to its peers (except in 2006) support the assertion presented earlier that Pfizer was under pressure from its investors and markets to do something, lest its valuation keep declining.

The increase to 3.0x Sales in 2009 was driven primarily by an increase in EV, which itself was the result of an increase in market capitalization and of an increase in net debt (due to the use of debt to fund part of the acquisition). Indeed, between 2008 and 2009, Pfizer went from a net cash to a net debt position.

The dip in valuation between 2009 and 2010, from 3.0x Sales to 2.3x Sales can be explained by the sharp increase in sales in that period. Indeed, as the acquisition closed in October 2009, its impact on Pfizer's accounts was minimal in that year. However, between 2009 and 2010, sales increased by +36%. As Pfizer's EV between 2009 and 2010 was relatively stable (+4.3%), it is not surprising that such a relatively large increase in the denominator would drive the multiple down.

In 2011, the increase in Pfizer's EV/Sales multiple was driven by increases in both EV and sales. However, in 2012e, analysts have forecasted a double-digit decline in sales (-13.4%). Thus, although EV has also increased from 2011 to 2012e, the drop in sales might be driving an artificially high multiple. Despite this negative sales trend in 2012e, the positive impact in 2009 and upward evolution of Pfizer's EV/Sales multiple from 2010 to 2012e suggest overall that the mega-merger has had a favorable impact on valuation and thus on value creation. However, since Pfizer returned to its valuation level of 2006, it might be argued that the acquisition restored value more than it created new value.

Since the merger year, Pfizer has also outperformed its peers on average in all years except 2010, during which it is in line with its peers' performance, at an average of 2.3x Sales. In particular, Pfizer has performed relatively better than all of its U.S. peers (with Bristol-Myers Squibb a close second). Pfizer's performance vs. its European peers is more mixed, although it seems that as the years have advanced, Pfizer has outperformed more and more companies in this group (Pfizer outperformed only 2 companies in 2010, then 3 in 2011, and now 4 in 2012e). Although we cannot fully isolate the effects of the mega-merger, Pfizer's strong performance versus its peers suggests that perhaps its mega-merger with Wyeth was an appropriate response to the challenges faced by the pharmaceutical industry.

Table 14 and **Table 15** below present EV/EBITDA and EV/EBIT multiples, respectively, for Pfizer and its peers over the period 2006 – 2012e.

Table 14

EV/EBITDA

Company	EV/EBITDA						
	2006	2007	2008	2009	2010	2011	2012e
Pfizer Inc.	7.2x	6.4x	4.6x	6.2x	4.5x	5.2x	6.8x
Abbott Laboratories	8.3x	8.0x	5.6x	5.1x	5.5x	5.2x	5.5x
Bristol-Myers Squibb Co.	18.4x	16.7x	10.3x	8.5x	6.5x	7.7x	11.5x
Eli Lilly & Co.	11.5x	10.0x	7.3x	5.4x	4.8x	6.0x	9.0x
Johnson & Johnson	12.5x	10.8x	8.9x	9.0x	8.3x	8.8x	9.1x
Merck & Co Inc	12.8x	16.0x	8.5x	12.8x	10.8x	7.1x	6.4x
AstraZeneca PLC	8.2x	6.8x	5.7x	4.9x	4.4x	4.4x	5.9x
GlaxoSmithKline PLC	9.2x	8.9x	8.5x	7.0x	10.6x	8.6x	8.4x
Novartis AG	14.0x	12.0x	9.6x	9.8x	9.8x	8.6x	9.8x
Roche Holding AG	12.7x	9.4x	8.0x	10.0x	8.7x	9.7x	9.9x
Sanofi S.A.	9.5x	8.4x	6.2x	6.0x	4.9x	6.9x	8.2x
Average	**11.3x**	**10.3x**	**7.6x**	**7.7x**	**7.2x**	**7.1x**	**8.2x**
Median	**11.5x**	**9.4x**	**8.0x**	**7.0x**	**6.5x**	**7.1x**	**8.4x**
High	**18.4x**	**16.7x**	**10.3x**	**12.8x**	**10.8x**	**9.7x**	**11.5x**
Low	**7.2x**	**6.4x**	**4.6x**	**4.9x**	**4.4x**	**4.4x**	**5.5x**

Note : 2012e multiples based on mean broker consensus estimates for underlying aggregate

Table 15

EV/EBIT

Company	EV/EBIT						
	2006	2007	2008	2009	2010	2011	2012e
Pfizer Inc.	9.3x	8.3x	5.8x	7.7x	6.0x	6.9x	8.6x
Abbott Laboratories	11.6x	11.2x	7.1x	6.6x	7.7x	7.7x	7.4x
Bristol-Myers Squibb Co.	26.7x	22.6x	12.6x	9.7x	7.3x	8.6x	13.2x
Eli Lilly & Co.	13.7x	12.2x	8.8x	6.5x	5.7x	7.3x	11.6x
Johnson & Johnson	14.4x	12.8x	10.4x	10.5x	9.8x	10.5x	11.0x
Merck & Co Inc	18.3x	21.3x	10.6x	19.7x	31.9x	12.7x	8.3x
AstraZeneca PLC	9.5x	8.2x	7.4x	5.9x	5.4x	5.4x	6.9x
GlaxoSmithKline PLC	10.4x	10.1x	9.9x	8.1x	14.0x	10.1x	9.9x
Novartis AG	17.4x	16.7x	12.4x	12.0x	12.5x	12.7x	13.1x
Roche Holding AG	15.3x	11.0x	9.5x	11.8x	10.3x	11.4x	11.5x
Sanofi S.A.	17.6x	14.7x	9.5x	9.8x	8.2x	11.6x	9.5x
Average	**14.9x**	**13.5x**	**9.5x**	**9.8x**	**10.8x**	**9.5x**	**10.1x**
Median	**14.4x**	**12.2x**	**9.5x**	**9.7x**	**8.2x**	**10.1x**	**9.9x**
High	**26.7x**	**22.6x**	**12.6x**	**19.7x**	**31.9x**	**12.7x**	**13.2x**
Low	**9.3x**	**8.2x**	**5.8x**	**5.9x**	**5.4x**	**5.4x**	**6.9x**

Note : 2012e multiples based on mean broker consensus estimates for underlying aggregate

In terms of EV/EBITDA and EV/EBIT valuation, Pfizer seems to have followed a path similar to that for EV/Sales valuation. That is, its valuation declined steadily from 2006 to 2008, rose in 2009, and then dipped again in 2010 to increase from 2010 to 2012e. The underlying dynamics are much the same as in the case of EV/Sales.

Again, Pfizer's pre-merger valuation decline and stark underperformance relative to its peers support the assertion presented earlier that Pfizer was under pressure from its investors and markets to do something. The increase in 2009 was driven primarily by an increase in EV, as both EBITDA and EBIT remained relatively stable between 2008 and 2009. The dip in valuation between 2009 and 2010 can be explained by the sharp increase in EBITDA and EBIT in that period.

In 2011, the increase in Pfizer's EV/EBITDA and EV/EBIT multiples was driven by increases in EV and EBITDA and EBIT. However, in 2012e, analysts have forecasted a decline in both EBITDA (-14.5%) and EBIT (-9.6%). This is clearly driven in part by the forecasted decline in sales. The fact the drop in EBITDA is greater than the decline in sales is a negative sign, however it is somewhat offset by the fact that the drop in EBIT is lower than the decline in sales. Overall, it should be noted that although Pfizer's valuation, as measured by EV/EBITDA and EV/EBIT has increased in the post-merger period, it has not fully recovered to its pre-merger highs of 7.2x EBITDA and 9.3x EBIT in 2006. Therefore, it seems that although the merger has created value – as indicated by the positive revaluation post-merger – it has not fully restored Pfizer to prior valuation levels.

Since the merger year, Pfizer has continued to underperform its peers on average. This is in clear contrast with the outperformance observed with EV/Sales. This suggests that while Pfizer's mega-merger with Wyeth responded to top-line imperatives, it perhaps did not properly address the number of cost-driven challenges faced by the pharmaceutical industry. Indeed, this relative underperformance suggests that investors were less optimistic about Pfizer's capacity to generate profits relative to its peers, and to ultimately create value (if profit is used as the measure of value creation).

2.2.1.2.2.2. Equity value multiples

Table 16 below presents P/E multiples for Pfizer and its peers over the period 2006-2012e.

Table 16

P/E

Company	P/E						
	2006	2007	2008	2009	2010	2011	2012e
Pfizer Inc.	12.6x	10.4x	7.3x	9.0x	7.9x	9.3x	14.9x
Abbott Laboratories	20.9x	11.6x	8.2x	7.0x	7.7x	8.9x	8.4x
Bristol-Myers Squibb Co.	32.6x	24.3x	8.9x	4.7x	14.7x	16.3x	18.4x
Eli Lilly & Co.	21.3x	19.7x	(21.3x)	9.1x	7.6x	10.6x	14.8x
Johnson & Johnson	17.7x	18.4x	13.1x	14.6x	12.9x	18.8x	15.3x
Merck & Co Inc	21.5x	38.9x	8.4x	6.4x	130.6x	18.6x	13.5x
AstraZeneca PLC	14.0x	11.6x	9.7x	8.9x	8.1x	6.3x	9.5x
GlaxoSmithKline PLC	14.2x	13.7x	14.6x	12.2x	38.9x	14.3x	12.6x
Novartis AG	18.9x	10.7x	13.9x	14.8x	13.7x	15.1x	15.8x
Roche Holding AG	23.9x	17.3x	15.6x	19.4x	13.5x	14.5x	15.1x
Sanofi S.A.	23.7x	16.2x	15.5x	13.7x	11.5x	13.2x	16.7x
Average (excluding outliers*)	**20.1x**	**15.4x**	**11.5x**	**10.9x**	**13.7x**	**13.3x**	**14.1x**
Median (excluding outliers*)	**20.9x**	**14.9x**	**11.4x**	**9.1x**	**12.2x**	**14.3x**	**14.9x**
High	**32.6x**	**38.9x**	**15.6x**	**19.4x**	**130.6x**	**18.8x**	**18.4x**
Low	**12.6x**	**10.4x**	**(21.3x)**	**4.7x**	**7.6x**	**6.3x**	**8.4x**

Note : 2012e multiples based on mean broker consensus estimates for underlying aggregate
* Outliers include Merck in 2007 and 2010 and Eli Lilly in 2008

As with the enterprise value multiples analyzed above, Pfizer's valuation as measured by P/E has evolved downwards in the pre-merger period, increased in 2009, dropped in 2010, and subsequently evolved upwards in the post-merger period. These upward and downward trends are driven by similar factors as those described in the enterprise value multiples section.[27]

Pfizer has underperformed its peers on average for the whole period except for 2012e. Pfizer's 2012e P/E is also higher than any of its pre-merger P/E multiples. However, in 2012e, it is difficult to interpret the increase in P/E. On the one hand, it is due to an increase in equity value (fully diluted market capitalization, +11.2%). Yet, it is driven on the other hand by a decline in estimated net income (-30.3%).

Overall, looking at P/E multiples leads to similar conclusions as those reached by looking at EV/EBITDA and EV/EBIT: they suggest that Pfizer has restored value to its own shareholders through the mega-merger, however, investors are less optimistic about Pfizer's ability to generate profits relative to its peers.

[27] As might be expected, as the denominators in each case are drawn from the P&L.

Table 17 below presents P/B multiples for Pfizer and its peers over the period 2006-2012e.

Table 17

P/B

Company	P/B						
	2006	2007	2008	2009	2010	2011	2012e
Pfizer Inc.	2.6x	2.4x	2.1x	1.4x	1.6x	2.1x	2.3x
Abbott Laboratories	2.5x	2.4x	2.3x	1.8x	1.6x	1.7x	1.8x
Bristol-Myers Squibb Co.	5.2x	5.0x	3.8x	3.4x	2.9x	3.8x	4.0x
Eli Lilly & Co.	5.2x	4.3x	6.5x	4.1x	3.1x	3.4x	3.6x
Johnson & Johnson	5.0x	4.5x	4.0x	3.6x	3.0x	3.2x	3.1x
Merck & Co Inc	5.4x	7.0x	3.5x	1.4x	2.1x	2.1x	2.3x
AstraZeneca PLC	5.5x	4.4x	3.7x	3.3x	2.8x	2.7x	2.7x
GlaxoSmithKline PLC	8.2x	7.4x	8.5x	6.7x	7.2x	9.3x	10.7x
Novartis AG	3.3x	2.6x	2.3x	2.2x	2.1x	2.1x	2.3x
Roche Holding AG	4.8x	3.7x	3.1x	20.5x	12.4x	11.2x	16.3x
Sanofi S.A.	2.1x	1.9x	1.3x	1.5x	1.2x	1.3x	1.7x
Average (excluding outliers*)	**4.2x**	**3.8x**	**3.3x**	**2.5x**	**2.3x**	**2.5x**	**2.6x**
Median (excluding outliers*)	**4.9x**	**4.0x**	**3.3x**	**2.2x**	**2.1x**	**2.1x**	**2.3x**
High	**8.2x**	**7.4x**	**8.5x**	**20.5x**	**12.4x**	**11.2x**	**16.3x**
Low	**2.1x**	**1.9x**	**1.3x**	**1.4x**	**1.2x**	**1.3x**	**1.7x**

Note: 2012e multiples based on shareholders' equity at 3Q 2012 (H1 2012 for Roche and Sanofi)
* Outliers include GlaxoSmithKline (all years) and Roche (2009-2012e)

Pfizer's P/B has evolved downwards in the pre-merger period, as in the case of the EV multiples and P/E multiple. However, as the acquisition was closed in 2009, its effects on the balance sheet were felt in that same year. In particular, Pfizer paid the stock portion of the acquisition through the issuance of 1.3 billion shares of Pfizer common stock, previously held as treasury shares, to Wyeth's shareholders. Thus, Pfizer greatly reduced the value of its treasury shares (and increased the value of its shareholder's equity). Indeed, shareholders' equity was up by +56.4% between 2008 and 2009 (vs. a market capitalization value increase of just +7.2%). It is therefore not surprising that P/B dropped significantly in 2009. In the post-merger period, Pfizer's P/B multiple has inched back up, although it has not reached its pre-merger levels.

Pfizer underperformed its peers on average over the whole period. However, in 2011 and 2012e, its performance is in line with the median peer group performance. It is interesting to note that its post-merger performance has been most similar to that of its U.S. mega-merger peer Merck. Despite this overall relative underperformance, the fact that Pfizer's P/B multiple is higher than 1 in all years is nevertheless positive, as a P/B > 1 indicates that return on equity is above the required rate of return (Vernimmen, et al. 2011, 423).

2.2.1.3. Financial indicators

2.2.1.3.1. Total Shareholder Return (TSR)

This section presents an analysis of Total Shareholder Return, calculated for Pfizer as well as all companies within the benchmark sample. The data has been calculated over a 10-year period (2003 – 2012) to eliminate the impact of any extreme intra-annual market swings. **Table 18** below summarizes the results over three different time periods: (i) 10 years (2003 – 2012), (ii) the three years preceding the mergers (2006 – 2008), and (iii) the three years following the mergers (2010 – 2012).[28]

Table 18

TOTAL SHAREHOLDER RETURN ANALYSIS

Company	TSR 2003 - 2012	TSR 2006 - 2008	TSR 2010 - 2012
Pfizer	**10.3%**	**(9.5%)**	**51.1%**
Abbott Laboratories	153.8%	55.7%	43.0%
Bristol-Myers Squibb	92.8%	16.3%	44.8%
Eli Lilly	4.9%	(19.7%)	54.6%
Johnson & Johnson	61.9%	7.7%	19.3%
Merck & Co.	5.0%	9.9%	25.1%
AstraZeneca	78.3%	8.5%	17.2%
GlaxoSmithKline	58.2%	(2.0%)	17.1%
Novartis	47.5%	(16.5%)	13.5%
Roche	138.0%	(11.0%)	16.2%
Sanofi	55.1%	(31.7%)	43.8%
Average	**64.2%**	**0.7%**	**31.4%**
Median	**58.2%**	**(2.0%)**	**25.1%**
Maximum	**153.8%**	**55.7%**	**54.6%**
Minimum	**4.9%**	**(31.7%)**	**13.5%**

Sources : Own calculations, based on Datastream, Yahoo Finance, Companies

Note : for Novartis, Roche and Sanofi, the 2012 dividend has not been published as of January 2013. Based on these companies' payout history of annual dividend increases, I have made the conservative assumption that the 2012 dividend will at least be equal to the 2011 dividend.

Over the 10-year period, Pfizer underperformed its peers, at 10.3% TSR, versus an average of 64.2%. It is interesting to note Pfizer's negative TSR over the period 2006 – 2008,

[28] None of the firms underwent a stock split in the overall time frame concerned (2003 – 2012)

which at (9.5%) was well below the industry average of 0.7%. This underscores the need for Pfizer to take action to restore wealth to its shareholders.

Since the merger, Pfizer has outperformed its peers, at 51.1% TSR, versus an average of 31.4%. While Pfizer has slightly underperformed its U.S. non-acquirer counterpart, Eli Lilly, it has outperformed its European non-acquirer peers (GlaxoSmithKline and Roche). It would seem that over the period 2010 - 2012, US companies have also fared better than European companies on average. This could possibly have had a positive influence on Pfizer's performance.

Overall, the data presented above suggests that Pfizer's merger with Wyeth created value for Pfizer's shareholders, as TSR increased following the merger. To confirm this, **Table 19** below presents the yearly individual TSR for Pfizer over the period 2003 – 2012.[29]

Table 19

PFIZER

Year	Currency	Share price		Dividends	TSR
		Beg. of period	End of period		
2012	USD	21.64	25.08	0.88	20.0%
2011	USD	17.68	21.64	0.80	26.9%
2010	USD	18.19	17.51	0.72	0.2%
2009	USD	17.71	18.19	0.80	7.2%
2008	USD	22.73	17.71	1.28	(16.5%)
2007	USD	25.90	22.73	1.16	(7.8%)
2006	USD	23.32	25.90	0.96	15.2%
2005	USD	26.45	23.32	0.76	(9.0%)
2004	USD	35.33	26.89	0.68	(22.0%)
2003	USD	30.57	35.33	0.60	17.5%
TSR over 10 years (2003-2012)					**10.3%**
TSR 2006-2008					**(9.5%)**
TSR 2010 - 2012					**51.1%**

Sources : own calculations, based on Datastream, Yahoo Finance, Pfizer

Prior to its mega-merger with Wyeth, Pfizer experienced a mix of positive and negative yearly TSR, with a negative TSR in 4 out of the 6 years between 2003 and 2008. In particular, Pfizer had a negative TSR in 2008, the year preceding the merger. Since 2009, inclusive, Pfizer has enjoyed positive TSR, suggesting that the merger succeeded in creating value for its shareholders.

[29] Individual TSRs over the ten-year period for each company within the benchmark sample can be found in Appendix C.

2.2.2. Ex post measures of performance

2.2.2.1. Accounting indicators

2.2.2.1.1. Key P&L aggregates and metrics / profit indicators

This section considers the evolution of key P&L aggregates and metrics, including revenue growth, EBITDA and EBIT margins, and EPS. As was explained in Part I, Chapter 1, accounting indicators must be used with caution when considering them as measures of value creation. This section thus relates more to performance measurement, which is related to value creation but is not a definite measure of value creation. It is especially interesting to look at the P&L to understand the evolution of revenues and margins, which should both increase through the implementation of merger-related synergies. EPS will be addressed, as it is a very popular indicator, but it should be kept in mind that this aggregate in particular is a poor and unreliable indicator of value creation.

2.2.2.1.1.1. Revenue growth

Table 20 below shows revenues and revenue growth for Pfizer and the companies in its benchmark sample over the period 2006 – 2012e.

Table 20

REVENUES (in millions, local currency)

Company	Curr.	Revenues						
		2006	2007	2008	2009	2010	2011	2012e
Pfizer Inc.	USD	48,371	48,209	48,341	49,934	67,791	67,425	58,412
Abbott Laboratories	USD	22,476	25,914	29,528	30,765	35,167	38,851	32,687
Bristol-Myers Squibb Co.	USD	17,256	15,617	17,715	18,808	19,484	21,244	17,584
Eli Lilly & Co.	USD	15,691	18,634	20,378	21,836	23,076	24,287	22,397
Johnson & Johnson	USD	53,324	61,095	63,747	61,897	61,587	65,030	67,297
Merck & Co Inc	USD	22,636	24,198	23,860	27,428	45,987	48,047	47,013
AstraZeneca PLC	USD	26,475	29,559	31,601	32,804	33,269	33,591	28,157
GlaxoSmithKline PLC	GBP	23,225	22,716	24,352	28,368	28,392	27,387	26,720
Novartis AG	USD	34,393	38,072	41,459	44,267	50,624	58,566	56,744
Roche Holding AG	CHF	42,041	46,133	45,617	49,051	47,473	42,531	45,380
Sanofi S.A.	EUR	28,373	28,052	27,568	29,306	30,384	33,389	34,889

Sources : Company annual reports, Bloomberg

REVENUE GROWTH

Company	Revenue growth						
	2006	2007	2008	2009	2010	2011	2012e
Pfizer Inc.	--	(0.3%)	+0.3%	+3.3%	+35.8%	(0.5%)	(13.4%)
Abbott Laboratories	--	+15.3%	+13.9%	+4.2%	+14.3%	+10.5%	(15.9%)
Bristol-Myers Squibb Co.	--	(9.5%)	+13.4%	+6.2%	+3.6%	+9.0%	(17.2%)
Eli Lilly & Co.	--	+18.8%	+9.4%	+7.2%	+5.7%	+5.2%	(7.8%)
Johnson & Johnson	--	+14.6%	+4.3%	(2.9%)	(0.5%)	+5.6%	+3.5%
Merck & Co Inc	--	+6.9%	(1.4%)	+15.0%	+67.7%	+4.5%	(2.2%)
AstraZeneca PLC	--	+11.6%	+6.9%	+3.8%	+1.4%	+1.0%	(16.2%)
GlaxoSmithKline PLC	--	(2.2%)	+7.2%	+16.5%	+0.1%	(3.5%)	(2.4%)
Novartis AG	--	+10.7%	+8.9%	+6.8%	+14.4%	+15.7%	(3.1%)
Roche Holding AG	--	+9.7%	(1.1%)	+7.5%	(3.2%)	(10.4%)	+6.7%
Sanofi S.A.	--	(1.1%)	(1.7%)	+6.3%	+3.7%	+9.9%	+4.5%
Average		**+6.8%**	**+5.5%**	**+6.7%**	**+13.0%**	**+4.3%**	**(5.8%)**
Median		**+9.7%**	**+6.9%**	**+6.3%**	**+3.7%**	**+5.2%**	**(3.1%)**
High		**+18.8%**	**+13.9%**	**+16.5%**	**+67.7%**	**+15.7%**	**+6.7%**
Low		**(9.5%)**	**(1.7%)**	**(2.9%)**	**(3.2%)**	**(10.4%)**	**(17.2%)**

Sources : Company annual reports, Bloomberg

Prior to the merger, Pfizer's sales were relatively flat. As would be expected, revenues jumped in 2010, the first full year of the integration of Wyeth in Pfizer's accounts. Since 2010 however, revenues have been on a downward trend, with a slight decrease in 2011 and a much larger expected decrease in 2012. The decrease in 2011 was "due to the favorable impact of foreign exchange, which increased revenues by approximately $1.9 billion, or 3%, and the inclusion of revenues of $1.3 billion or 2% from [Pfizer's] acquisition of King [Pharmaceuticals in January 2011, partially offset by a net operational decline of $2.9 billion, or 4%, primarily due to the loss of exclusivity of certain products" (Pfizer 10-K 2011, 3). This last point – loss of exclusivity – is particularly interesting. While its impact was relatively limited in 2011, the double-digit drop in expected 2012 revenues is primarily driven by the loss of exclusivity on Pfizer's mega-blockbuster *Lipitor*, which occurred in November 2011. Based on 9-month revenues at Q3 2012, sales of *Lipitor* were down 55.6% vs. the same period in 2011. If we extrapolate this decrease to full year sales[30], we arrive at a revenue loss of $5.3bn for 2012 from *Lipitor* alone.

One of the main drivers behind Pfizer's decision to acquire Wyeth, as discussed earlier, was to take preventive action against the anticipated *Lipitor* revenue loss. However, Pfizer also said in its merger announcement that among its 2012 financial targets was to reach c. $70 billion in sales, an amount approximately equivalent to 2008 pro forma sales. If Pfizer had reached this

[30] This is a conservative estimate, as sales of *Lipitor* have increasingly deteriorated each quarter.

level of sales, then indeed we could consider that the merger had provided the necessary protection against loss of exclusivity. Although 2010 and 2011 revenues suggested that Pfizer was inching up towards that goal, its expected 2012e revenues of $58.4 billion are completely off the mark, suggesting that the merger has not delivered the value – as measured by top-line performance – that was expected of it.

If we consider Pfizer's revenue performance as compared to the benchmark sample, it has underperformed its peers on average in all years except 2010, when its revenue growth was exceptionally high due to the addition of Wyeth. In 2011, only two companies experienced lower revenue growth than Pfizer: GlaxoSmithKline and Roche. In 2012e, there seems to be a general deterioration in big pharma revenues, with an average growth rate of (5.8%) and only three companies expected to deliver positive revenue growth. Indeed, many of these companies faced patent cliffs over this period, as in the case of Pfizer. The fact that Pfizer has underperformed its peer sample on average suggests that perhaps its mega-merger with Wyeth was not the most appropriate antidote against revenue – and subsequently value – erosion. However, as was noted earlier, one of the key motivations behind the acquisition of Wyeth was the pursuit of cost synergies, much more so than revenue synergies. As such, the next section analyzes the evolution of Pfizer's EBITDA and EBIT margin.

2.2.2.1.1.2. Margins

Table 21 below shows EBITDA and EBIT margins for Pfizer and the companies in its benchmark sample over the period 2006 – 2012e.[31]

[31] Details of aggregates are available in Appendix A.

Table 21

EBITDA MARGIN

Company	EBITDA margin						
	2006	2007	2008	2009	2010	2011	2012e
Pfizer Inc.	48.5%	47.4%	51.1%	49.0%	51.2%	52.6%	51.9%
Abbott Laboratories	25.0%	24.8%	28.2%	29.9%	25.7%	24.4%	30.7%
Bristol-Myers Squibb Co.	17.3%	21.7%	24.7%	30.0%	34.5%	35.1%	29.5%
Eli Lilly & Co.	31.4%	31.4%	32.6%	35.1%	35.1%	31.7%	27.8%
Johnson & Johnson	29.8%	29.4%	29.8%	31.4%	31.6%	29.7%	31.7%
Merck & Co Inc	33.2%	32.9%	33.8%	26.7%	24.3%	35.4%	43.1%
AstraZeneca PLC	36.1%	36.9%	36.9%	40.3%	42.6%	41.2%	38.7%
GlaxoSmithKline PLC	37.1%	38.4%	37.4%	39.2%	24.4%	35.9%	36.2%
Novartis AG	28.2%	26.6%	28.9%	27.8%	31.3%	30.4%	30.2%
Roche Holding AG	33.7%	36.9%	36.3%	36.1%	33.8%	37.2%	39.5%
Sanofi S.A.	37.5%	38.0%	36.1%	43.7%	43.3%	37.7%	37.2%
Average	**32.5%**	**33.1%**	**34.2%**	**35.4%**	**34.3%**	**35.6%**	**36.0%**
Median	**33.2%**	**32.9%**	**33.8%**	**35.1%**	**33.8%**	**35.4%**	**36.2%**
High	**48.5%**	**47.4%**	**51.1%**	**49.0%**	**51.2%**	**52.6%**	**51.9%**
Low	**17.3%**	**21.7%**	**24.7%**	**26.7%**	**24.3%**	**24.4%**	**27.8%**

Sources : Company annual reports, Bloomberg

EBIT MARGIN

Company	EBIT margin						
	2006	2007	2008	2009	2010	2011	2012e
Pfizer Inc.	37.6%	36.6%	40.6%	39.5%	38.7%	39.2%	40.9%
Abbott Laboratories	18.0%	17.7%	21.9%	23.2%	18.2%	16.5%	22.8%
Bristol-Myers Squibb Co.	12.0%	16.0%	20.1%	26.3%	30.7%	31.3%	25.7%
Eli Lilly & Co.	26.3%	25.8%	27.1%	29.2%	29.3%	26.0%	21.4%
Johnson & Johnson	25.7%	24.9%	25.4%	26.9%	26.8%	24.8%	26.2%
Merck & Co Inc	23.2%	24.7%	27.0%	17.3%	8.2%	20.0%	33.1%
AstraZeneca PLC	31.0%	30.7%	28.6%	34.0%	34.4%	33.6%	33.0%
GlaxoSmithKline PLC	32.9%	33.9%	32.4%	33.7%	18.5%	30.8%	30.5%
Novartis AG	22.6%	19.1%	22.5%	22.6%	24.6%	20.5%	22.8%
Roche Holding AG	27.9%	31.4%	30.5%	30.6%	28.4%	31.6%	33.9%
Sanofi S.A.	20.2%	21.8%	23.4%	26.7%	26.0%	22.5%	32.2%
Average	**25.2%**	**25.7%**	**27.2%**	**28.2%**	**25.8%**	**27.0%**	**29.3%**
Median	**25.7%**	**24.9%**	**27.0%**	**26.9%**	**26.8%**	**26.0%**	**30.5%**
High	**37.6%**	**36.6%**	**40.6%**	**39.5%**	**38.7%**	**39.2%**	**40.9%**
Low	**12.0%**	**16.0%**	**20.1%**	**17.3%**	**8.2%**	**16.5%**	**21.4%**

Sources : Company annual reports, Bloomberg

Pfizer's EBITDA and EBIT margins have remained relatively stable over the period 2006-2012e, with EBITDA margin ranging from 47.4% to 51.9% and EBIT margin ranging from 36.6% to 40.9%. Pfizer's EBITDA margin has increased slightly post-merger, while its EBIT margin dipped slightly in 2010 but has increased steadily since to reach its highest point at 40.9% in 2012e. The increase in EBIT margin indicates that Pfizer has managed to reduce costs

in the post-merger period, supporting the conclusion that Pfizer has achieved its goal of implementing cost synergies. Indeed, according to Pfizer's 2011 annual report:

> *"With respect to the January 26, 2009 announcements, and our acquisition of Wyeth on October 15, 2009, in the aggregate, we set a goal to generate cost reductions, net of investments in the business, of approximately $4 billion to $5 billion, by the end of 2012, at 2008 average foreign exchange rates […]. We achieved this goal by the end of 2011, a year earlier than expected"* (Pfizer 10-K 2011, 32).

These cost synergies were achieved through a mix of headcount reductions, manufacturing site closings, and optimization within R&D activities. This is in line with the sources of cost savings Pfizer had announced when it announced its acquisition of Wyeth. The EBIT margin is also in line with the 2012 financial targets Pfizer had set in its merger announcement, namely an adjusted operating profit margin in the high 30s to low 40s. Pfizer has landed right in this "sweet spot."

Assuming that the premium Pfizer paid for Wyeth – 29.3% pre-rumor premium[32] – was lower than the present value at merger announcement time of the synergies (net of integration costs), the fact that Pfizer has achieved the expected cost synergies suggests that the mega-merger with Wyeth has created value for Pfizer.

It is striking to note from these tables that Pfizer has the highest EBITDA and EBIT margins among its peer group. This further supports the view that Pfizer has successfully managed to rein in its costs. However, as Pfizer's margins are consistently higher over the entire period – that is, from 2006 to 2012e – this outperformance cannot be directly attributed to the merger.

2.2.2.1.1.3. EPS

Table 22 below shows the evolution of diluted EPS in USD for Pfizer and the companies in its benchmark sample over the period 2006 – 2012e.

[32] Implied valuation: $50.19 per share of Wyeth, or +29.2% over Wyeth's closing share price of $38.83 on January 22, 2009

Table 22

DILUTED EPS

Company	Curr.	Diluted EPS						
		2006	2007	2008	2009	2010	2011	2012e
Pfizer Inc.	USD	2.06	2.18	2.42	2.02	2.23	2.31	1.68
Abbott Laboratories	USD	1.12	2.31	3.13	3.69	2.97	3.02	3.73
Bristol-Myers Squibb Co.	USD	0.81	1.09	2.62	5.37	1.80	2.16	1.77
Eli Lilly & Co.	USD	2.45	2.71	(1.89)	3.94	4.58	3.90	3.32
Johnson & Johnson	USD	3.73	3.63	4.57	4.40	4.78	3.49	4.58
Merck & Co Inc	USD	2.03	1.49	3.64	5.67	0.28	2.03	3.03
AstraZeneca PLC	USD	3.85	3.73	4.20	5.19	5.57	7.30	4.95
GlaxoSmithKline PLC	USD	1.74	1.87	1.63	1.70	0.49	1.65	1.68
Novartis AG	USD	3.04	5.13	3.59	3.69	4.26	3.78	3.98
Roche Holding AG	USD	7.30	9.44	9.65	8.37	9.72	12.42	12.97
Sanofi S.A.	USD	3.70	5.33	4.32	5.61	5.55	5.97	5.50
Average (excl. Roche; excl. Eli Lilly in 2008)		**2.45**	**2.95**	**3.35**	**4.13**	**3.25**	**3.56**	**3.42**
Median (excl. Roche; excl. Eli Lilly in 2008		**2.25**	**2.51**	**3.59**	**4.17**	**3.61**	**3.25**	**3.53**
High		**7.30**	**9.44**	**9.65**	**8.37**	**9.72**	**12.42**	**12.97**
Low		**0.81**	**1.09**	**(1.89)**	**1.70**	**0.28**	**1.65**	**1.68**

Sources : Company annual reports, Bloomberg, Oanda

Notes : GlaxoSmithKline, Roche and Sanofi EPS converted to USD using average full-year exchange rates

In the pre-merger period, Pfizer's diluted EPS – based on adjusted (non-GAAP) figures – was steadily increasing. As seen earlier, sales were relatively flat at c. $48 billion over this period. EBIT margin decreased slightly in 2007 but improved significantly in 2008. Over the period 2006 – 2008, Pfizer was in a net cash position. Therefore, the company was earning net interest income. Its provisions for taxes on income were relatively stable over this period. Therefore, the increase in earnings – and EPS – was driven by net interest income and, in 2008, an improved EBIT. In 2009, Pfizer's EPS dropped, partly due to a drop in earnings and due to an increase in diluted shares outstanding. Indeed, Pfizer's net interest income became a net interest expense, and its provisions for taxes on income increased, leading to a reduction in earnings. As the acquisition was funded partly in stock, with Pfizer issuing 1.3 billion shares of common stock, the number of shares outstanding. It should be noted that diluted EPS has been calculated based on the weighted average number of shares outstanding. As the Wyeth acquisition was completed in October 2009, the issuance of new shares had a smaller impact on the weighted average NOSH outstanding in 2009 than in 2010. The increase in EPS in 2010 was driven primarily by an increase in earnings, due to the first full-year combination of Pfizer and Wyeth. However, the increase in 2011 EPS was driven both by an earnings increase and a reduction in

the weighted average diluted NOSH outstanding, as Pfizer bought back 459 million shares for approximately $9 billion. These consecutive increases in EPS led to EPS levels higher than those achieved in 2006 and 2007, but did not reach the level achieved in 2008. This upward trend in EPS was also not continued in 2012e, but instead was brutally interrupted, with a sharp drop in EPS driven primarily by the decline in expected adjusted net income. At $1.68, adjusted diluted EPS in 2012e was far off from Pfizer's announcement at the time of the merger of a 2012 EPS target of $2.42, comparable to the level achieved in 2008. It thus seems overall that Pfizer has been performing more poorly in the post-merger period – despite EPS increases in 2010 and 2011.

Pfizer has underperformed its peers on average in value terms over the entire period. In terms of average EPS accretion/dilution, Pfizer was in line with the evolution of its peers in 2007 and 2008. In 2009, as average EPS increased, Pfizer's EPS decreased. However, in 2010, it was the contrary, as Pfizer's EPS increased and average EPS decreased. In 2011, both average and Pfizer's EPS increased, while in 2012e, Pfizer's EPS decreased significantly as average EPS increased. Given these mixed results, it is thus difficult to draw conclusions about Pfizer's performance relative to its peers. Inasmuch as EPS can be an unreliable criterion for evaluating performance on a stand-alone basis, it may be even more so for a cross-sample comparison. Therefore, Pfizer's EPS performance relative to its peers is presented for information purposes, but does not constitute an integral part of this value creation analysis.

2.2.2.1.2. Profitability measures (ROE, ROCE)

Table 23 below presents a summary of the evolution of Pfizer's profitability, as measured by return on equity (ROE) and return on capital employed (ROCE) over the period 2006 to 2011 (accounting data not yet available for 2012). Note that all P&L aggregates used to calculate these two ratios are based on non-GAAP financials. Pfizer's P&L and balance sheet are available in Appendix D.

Table 23

PFIZER PROFITABILITY ANALYSIS

in $ millions, at 12/31	2006	2007	2008	2009	2010	2011
ROE	**21.0%**	**23.2%**	**28.4%**	**15.8%**	**20.5%**	**22.2%**
Net income	14,982	15,113	16,366	14,202	17,983	18,217
Shareholders' equity	71,358	65,010	57,556	90,014	87,813	82,190
ROCE	**18.6%**	**16.8%**	**22.3%**	**9.1%**	**12.8%**	**13.5%**
After-tax operating profit margin	**24.4%**	**23.8%**	**26.4%**	**25.7%**	**25.2%**	**25.5%**
Sales	48,371	48,209	48,341	49,934	67,791	67,425
EBIT	18,180	17,637	19,626	19,709	26,249	26,442
Normative tax rate	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%
Asset turnover	0.8x	0.7x	0.8x	0.4x	0.5x	0.5x
Sales	48,371	48,209	48,341	49,934	67,791	67,425
Capital employed	63,700	68,196	57,278	140,411	133,193	127,584
Adjusted ROCE (excluding goodwill)	**27.6%**	**24.5%**	**35.6%**	**13.1%**	**19.1%**	**20.8%**
After-tax operating profit margin	**24.4%**	**23.8%**	**26.4%**	**25.7%**	**25.2%**	**25.5%**
Sales	48,371	48,209	48,341	49,934	67,791	67,425
EBIT	18,180	17,637	19,626	19,709	26,249	26,442
Normative tax rate	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%
Asset turnover	1.1x	1.0x	1.3x	0.5x	0.8x	0.8x
Sales	48,371	48,209	48,341	49,934	67,791	67,425
Adjusted capital employed (excluding goodwill)	42,824	46,814	35,814	98,035	89,246	82,517

Sources : Pfizer annual reports and 8-K filings (non-GAAP financials)

Note:P&L aggregates based on non-GAAP financials

ROE is calculated by dividing net income (excluding extraordinary items) by shareholders' equity. In the pre-merger period, ROE was steadily increasing from 21% in 2006 to 28.4% in 2008. As Pfizer was in a net cash position over this period, we can rule out a ROE increase caused by an artificial leverage-induced boost. If we look at the underlying components of the ratio, the increase seems to be driven by a simultaneous increase in the numerator (net income) and decrease in the denominator (shareholders' equity). In 2009, the acquisition year, shareholders' equity jumped up. As seen earlier, this was a result of Pfizer paying the stock portion of the Wyeth acquisition through the issuance of 1.3 billion shares of Pfizer common stock, previously held as treasury shares. Post-acquisition, ROE has bounced back. Given the fact that Pfizer took on $22.5 billion of debt to fund the acquisition and the fact that it has been in a net debt position since the acquisition, it is possible that the leverage effect has influenced post-acquisition ROE. While it will be interesting to see if the upward trend in ROE continues in 2012 and going forward, it seems that post-acquisition profitability, as measured by ROE, is currently lower on average than pre-acquisition profitability.

ROCE is measured by multiplying the after tax operating profit margin by asset turnover. I have calculated both ROCE and adjusted ROCE (excluding goodwill). I have assumed a

normative tax rate of 35%.[33] Over the period 2006 – 2011, the after-tax operating profit margin has remained relatively stable, fluctuating around an average value of 25.1%. Therefore, changes in ROCE have been driven primarily by changes in asset turnover. Indeed, in 2009, asset turnover dropped significantly from its pre-acquisition level. This is primarily due to a substantial increase in intangible fixed assets and goodwill between 2008 and 2009, driving up the fixed assets component of capital employed. Adjusted goodwill adjusts for the increase in goodwill by excluding it, however, the increase in intangible assets still has a significant impact on asset turnover. While ROCE (both unadjusted and adjusted) has increased since 2009, it has not reached its pre-acquisition levels, suggesting that the acquisition has lowered profitability (and thus value, if it is measured according to this criterion).

While both indicators of profitability – ROE and ROCE – seem to indicate that Pfizer has been worse off since the mega-merger, it is important to remember one of the biggest drawbacks of accounting indicators of value creation: they do not take into account risk. As such, the next section considers ROCE again, but this time against the WACC.

2.2.2.2. Hybrid accounting/financial indicators

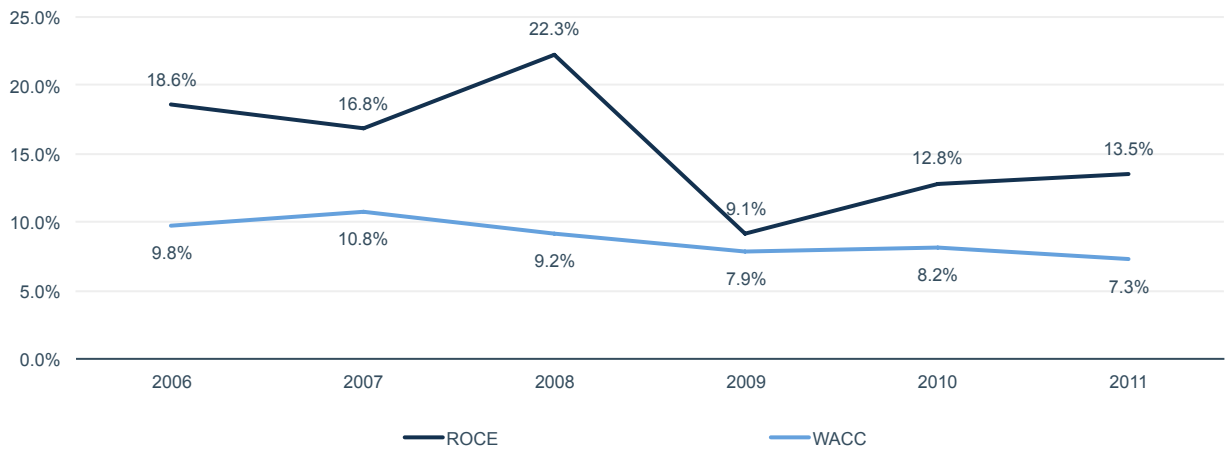
2.2.2.2.1. ROCE – WACC

Table 24 below charts the evolution of unadjusted ROCE versus Pfizer's WACC over the period 2006 to 2011.

[33] Based on the statutory U.S. corporate income tax rate

Table 24

ROCE vs. WACC, 2006 - 2011



Sources : own calculations (ROCE), Bloomberg (WACC)

This analysis clearly shows the importance of not using accounting indicators on a standalone basis. Indeed, if we had just considered Pfizer's ROCE on a standalone basis as a measure of value creation, as we did above, we would have concluded that the decrease in ROCE in the period 2009-2011 as compared with 2006-2008 indicates value destruction. However, when we take into consideration risk, as measured by the WACC, we get an entirely different picture.

In 2009, ROCE declined sharply. However, the WACC also declined, from 9.2% to 7.9%. At 9.1%, Pfizer's ROCE was thus still higher than its WACC in 2009. In the period following the merger, ROCE has been increasing, while WACC has declined overall (slight increase in 2010). While it is true that the difference between ROCE and WACC was smaller in the post-acquisition period, it was nonetheless still positive. Therefore, it would seem that Pfizer's mega-merger with Wyeth has created value, as Pfizer has kept making investments that yield more than they cost.

2.2.3. R&D productivity

R&D and pipeline considerations were among the primary strategic reasons driving Pfizer's acquisition of Wyeth. Post-merger, Pfizer planned to focus on six key "Invest to Win" areas: oncology, pain, inflammation, Alzheimer's diseases, psychoses and diabetes.[34]

This section assesses Pfizer's pre and post-merger R&D performance in order to evaluate whether or not Pfizer has improved its R&D productivity – a key performance indicator in the pharmaceutical industry.

Table 25 below considers R&D productivity based on the number of New Molecular Entities (NMEs) in development, which corresponds to the metric used in Dermirbag, Ng, and Tatoglu (2007). R&D productivity is calculated as NMEs in development divided by R&D expenses[35]. I multiplied results by 1,000, so as to facilitate their reading. It should be noted that historical information regarding the total number of NMEs in development was only available for Pfizer, Eli Lilly, AstraZeneca, and Roche. While all firms within the sample publish their pipeline, some only focus on the key compounds, and it seems that not all companies systematically disclose the number of NMEs in development. The number of NMEs in development for Pfizer in 2009 was also not available. Although the Company communicated at the time on the number of NMEs in its late-stage pipeline (34 NMEs), it seemingly did not communicate on the total number of NMEs in development.

[34] Pfizer acquisition announcement press release.
[35] Based on non-GAAP financials.

Table 25

R&D PRODUCTIVITY

Company	R&D productivity by NMEs in development					
	2006	2007	2008	2009	2010	2011
Pfizer Inc.	23.56	20.02	11.22	n.a.	9.85	8.53
Abbott Laboratories	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Bristol-Myers Squibb Co.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Eli Lilly & Co.	n.a.	12.62	15.62	14.79	13.92	13.34
Johnson & Johnson	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Merck & Co Inc	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
AstraZeneca PLC	11.79	13.75	14.48	20.19	14.10	11.41
GlaxoSmithKline PLC	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Novartis AG	n.a.	n.a.	n.a.	n.a.	n.a.	6.89
Roche Holding AG	6.52	6.80	7.01	5.98	6.18	9.49
Sanofi S.A.	n.a.	n.a.	n.a.	n.a.	n.a.	12.47
Average	**13.96**	**13.30**	**12.08**	**13.65**	**11.02**	**10.36**
Median	**11.79**	**13.19**	**12.85**	**14.79**	**11.89**	**10.45**
High	**23.56**	**20.02**	**15.62**	**20.19**	**14.10**	**13.34**
Low	**6.52**	**6.80**	**7.01**	**5.98**	**6.18**	**6.89**

Source: own calculations
Note: all figures divided by 1,000

In the pre-merger period, Pfizer's R&D productivity declined between 2006 and 2007, and then dropped sharply between 2007 and 2008. Despite the decrease between 2006 and 2007, Pfizer nevertheless was above its peers on average. In 2008, however, Pfizer dropped below its peers in terms of average R&D productivity. This downward evolution provides evidence of the R&D challenges Pfizer was facing prior to the merger, as described in the "Company-specific concerns" section above. Unfortunately, the number of NMEs in development in 2009 is not available, but we can see that post-merger, the downward trend in R&D productivity has continued, and Pfizer has underperformed its peers on average in both 2010 and 2011. The decline in R&D productivity between 2010 and 2011 occurred despite a decrease in R&D expenses. That is, it was driven by a decrease in the total number of NMEs in development. Indeed, over the entire period, Pfizer's number of NMEs in development has decreased significantly, from 177 in 2006 to 72 in 2011.[36] Such a decrease should not immediately be interpreted as a bad sign, however. As part of its cost-cutting initiatives, both pre-merger and in the context of achieving post-merger synergies, Pfizer has taken measures to optimize its R&D division. Beyond site closures and personnel reductions, Pfizer has also redesigned its R&D strategy: "on February 1, 2011, [Pfizer] announced a new research and productivity initiative to

[36] It should be noted that at least one NME will no longer be in development as of 2012: bapinezumab, Wyeth's monoclonal antibody for Alzheimer's disease. Indeed, Pfizer suffered an R&D setback in July 2012, when bapinezumab failed in Phase III clinical trials.

accelerate [its] strategies to improve innovation and overall productivity in R&D by prioritizing areas with the greatest scientific and commercial promise, utilizing appropriate risk/return profiles and focusing on areas with the highest potential to deliver value in the near term and over time" (Pfizer 10-K 2011, 31). It seems therefore, that the decrease in number of NMEs in development might be due to a strategic reshuffling and prioritization, rather than "failure" to deliver on the R&D front. If this is the case, it may take years before the outcome of this strategy becomes apparent. It is thus difficult to conclude that the downward trend in R&D productivity figures implies that the merger has destroyed value. Indeed, it may have acted more as a catalyst for facilitating changes in the R&D structure, the effects of which are yet to become apparent.

Table 26 below considers a second calculation of R&D productivity, based on the number of NME approvals in a given year. In this case, R&D productivity is calculated as the number of NME approvals divided by R&D expenses. I have multiplied the results by 100,000, so as to facilitate their reading. This measure seems closer to the notion of innovation – the very motor behind value creation in the pharmaceutical industry – as it relates to the approval of never-before-seen molecules.

Table 26

R&D PRODUCTIVITY

Company	R&D productivity by NMEs approved					
	2006	2007	2008	2009	2010	2011
Pfizer Inc.	26.62	13.26	13.35	-	-	11.85
Abbott Laboratories	-	-	-	-	-	-
Bristol-Myers Squibb Co.	33.89	30.99	-	27.42	-	52.10
Eli Lilly & Co.	-	-	-	23.11	-	-
Johnson & Johnson	28.07	13.02	26.40	28.63	-	39.75
Merck & Co Inc	41.82	20.48	-	-	-	11.81
AstraZeneca PLC	-	-	-	-	-	18.11
GlaxoSmithKline PLC	-	60.11	27.17	48.71	-	49.89
Novartis AG	18.79	31.10	-	40.17	11.03	10.44
Roche Holding AG	-	11.93	-	-	9.97	12.01
Sanofi S.A.	-	-	-	21.62	21.99	-
Average	**13.56**	**16.44**	**6.08**	**17.24**	**3.91**	**18.72**
Median	**-**	**13.02**	**-**	**21.62**	**-**	**11.85**
High	**41.82**	**60.11**	**27.17**	**48.71**	**21.99**	**52.10**
Low	**-**	**-**	**-**	**-**	**-**	**-**

Source: own calculations
Note: all figures divided by 100,000

In the pre-merger period, Pfizer's R&D productivity as measured by the number of NMEs approved declined sharply between 2006 and 2007, and then was relatively stable

between 2007 and 2008. Pfizer outperformed its peers on average in 2006 and 2008, but underperformed the benchmark in 2007.

In 2009 and 2010, Pfizer had no NME approvals. Again, while this could viewed as a negative sign, it needn't necessarily be a result of poor innovation. An alternate explanation for this lack of immediate post-merger NME approvals is simply timing. 2009 was the merger year, while 2010 was a year of intense post-merger integration. According to John LaMattina, President of Pfizer global research and development until his retirement in 2007, "'mergers cause disruptions and delays'" (Jack, Saigol and MacIntosh, Financial Times, 26 January 2009). Indeed, as resources are devoted to integrating two companies, mergers can distract from R&D productivity.

In 2011, Pfizer received NME approval for one drug, leading to R&D productivity of 11.85. This is both below its pre-merger performance and below the average performance of its peers in the same period. As of November 20, 2012, however, Pfizer has already received approval for four NMEs in 2012 – more than any other company. If anything, this suggests that it is perhaps too early to draw conclusions about the mega-merger's impact on Pfizer's R&D productivity and innovation capabilities. Thus, while at first glance Pfizer's post-merger R&D productivity seems on the decline, it is also possible that the merger is only starting to bear its fruits.[37]

[37] Despite the aforementioned R&D setback due to the failure of Wyeth's bapinezumab in Phase III trials in July 2012.

CONCLUSION

This study considered the topic of value creation through M&A, both from an academic perspective and through a practical application.

Part I defined value creation as a function of the difference between the market value of capital employed and its book value, and presented various tools for its measurement. Such tools included M&A-specific value creation indicators – synergies and event studies – and non-specific indicators of value creation – NPV, ROCE – WACC, EVA, accounting indicators (EPS, ROE, and ROCE), market indicators such as TSR and MVA, and KPIs. Finally, Part I considered the academic literature on value creation, both in general and in the pharmaceutical industry in particular. The general literature seems to converge around the conclusion that M&A creates value for target shareholders, while its impact on acquiring shareholders is less clear. The literature on value creation in the pharmaceutical industry does not allow us to draw generalized conclusions, although we did see evidence that pharmaceutical mega-mergers have suffered – rightly or not – a reputation for destroying value.

Part II was concerned with presenting a detailed case study – a clinical study – on the 2009 mega-merger of Pfizer and Wyeth, the results of which are summarized below.

A qualitative analysis of analyst and industry reactions showed that overall the merger restored Pfizer to analysts' good graces, albeit with cautious optimism. An analysis of analyst recommendations confirmed that, in the eyes of analysts, Pfizer was more attractive as an investment after its merger with Wyeth than before.

A quantitative assessment of Pfizer's post-merger value creation based on stock market performance indicators seemed to show overall that Pfizer has created value in the post-merger period. The positive abnormal return on the merger rumor date, January 23, 2009, suggested that investors were optimistic about the merger's ability to create value for Pfizer's shareholders. A long-run analysis of share price performance supported the conclusion that there has been value creation for Pfizer's shareholders in the post-merger period to date, with Pfizer's stock price up +45.7%. An analysis of EV/Sales suggested that the mega-merger has at least restored value, if

not created it. An analysis of EV/EBITDA, EV/EBIT, and P/E showed that although Pfizer has created value as compared with 2008, this positive revaluation post-merger has not fully restored Pfizer to its pre-merger valuation level in 2006. Finally, an analysis of TSR suggested that Pfizer's merger with Wyeth created value for Pfizer's shareholders, as TSR increased following the merger and has remained positive in all years post-merger.

A quantitative assessment of Pfizer's post-merger operating performance, based on an accounting analysis, yielded negative results overall. Although Pfizer successfully achieved the cost synergies expected of the merger, its revenues and EPS in 2012e have fallen short of merger announcement financial targets for 2012. In addition, both indicators of profitability – ROE and ROCE – seemed to indicate that Pfizer has been worse off since the merger. It should be remembered, however, that these accounting measures were considered as performance indicators, rather than value creation indicators, as they do not factor in risk. As such, their contribution to the determination of value creation is limited.

A quantitative assessment of ROCE – WACC suggested that Pfizer's mega-merger with Wyeth has created value, as Pfizer has kept making investments that yield more than they cost.

Finally, a quantitative assessment of R&D productivity showed declining R&D productivity, both as measured by NMEs in development and by NME approvals. This could be considered as a sign that the merger has not created value. However, given strategic reshufflings of R&D post-merger and an encouraging slate of NME approvals in the first eleven months of 2012, it seems more likely that the effects of the merger on R&D productivity have not yet been fully realized. This suggests that it might be premature to assess value creation through the R&D productivity criterion.

In light of this overall contradictory evidence, it is difficult to answer the question "Has Pfizer's mega-merger with Wyeth created value for Pfizer's shareholders?" According to a *Wall Street Journal* publication: "In the courts, people are innocent until proven guilty. On Wall Street, deals are vulnerable until they are proved viable" (Moore, WSJ Deal Journal, 26 January 2009). The clinical study presented in this thesis suggests that Pfizer's deal with Wyeth is still vulnerable, as it has not proved, beyond reasonable doubt, that it has created value for Pfizer's shareholders.

Despite this lack of a clear answer, we can draw one conclusion at the very least: the evidence on pre-merger value creation was more clear-cut. Indeed, most indicators of value creation pointed to the deterioration in Pfizer's ability to create and deliver value to its shareholders in the three years leading up to the merger. Rightly sensing this, capital markets put pressure on Pfizer to take action.

Pfizer chose the mega-merger route. Was this the appropriate solution for Pfizer to create value for its shareholders? As we have seen, the evidence is still mixed as of today. Perhaps three years of post-merger data is not sufficient to evaluate its full impact, especially in an industry driven by such long cycles and product development times and in which time is a crucial factor. Thus, only time will tell if Pfizer's mega-merger with Wyeth was simply a short-term palliative, or whether it has been therapeutic for Pfizer's shareholders by creating long-term sustainable value.

APPENDICES

Appendix A – Enterprise value calculations

Note: blue denotes inputs, black denotes calculations, and green denotes data input from other sheets.

MARKET CAPITALIZATION CALCULATION

Company	Curr.	Price at year end						
		2006	2007	2008	2009	2010	2011	2012e
Pfizer Inc.	USD	25.90	22.73	17.71	18.19	17.51	21.64	25.08
Abbott Laboratories	USD	23.31	26.87	25.54	25.83	22.92	26.90	31.34
Bristol-Myers Squibb Co.	USD	26.32	26.52	23.25	25.25	26.48	35.24	32.59
Eli Lilly & Co.	USD	52.10	53.39	40.27	35.71	35.04	41.56	49.32
Johnson & Johnson	USD	66.02	66.70	59.83	64.41	61.85	65.58	70.10
Merck & Co Inc	USD	43.60	58.11	30.40	36.54	36.04	37.70	40.94
AstraZeneca PLC	GBP	27.44	21.64	28.07	29.11	29.22	29.75	29.10
GlaxoSmithKline PLC	GBP	13.44	12.79	12.85	13.20	12.40	14.72	13.35
Novartis AG	CHF	70.25	62.10	52.70	56.50	54.95	53.70	57.45
Roche Holding AG	CHF	218.50	195.60	162.50	175.80	137.00	159.20	184.00
Sanofi S.A.	EUR	69.95	62.98	45.40	55.06	47.85	56.75	71.39

Source: Datastream (adjusted prices)

Company	Weighted average shares outstanding - Diluted						
	2006	2007	2008	2009	2010	2011	2012e
Pfizer Inc.	7,274	6,939	6,750	7,045	8,074	7,870	7,550
Abbott Laboratories	1,537	1,560	1,561	1,555	1,556	1,567	1,591
Bristol-Myers Squibb Co.	1,963	1,980	1,999	1,978	1,727	1,717	1,697
Eli Lilly & Co.	1,087	1,091	1,094	1,098	1,106	1,114	1,160
Johnson & Johnson	2,961	2,911	2,836	2,789	2,789	2,775	2,805
Merck & Co Inc	2,188	2,193	2,145	2,273	3,120	3,094	3,077
AstraZeneca PLC	1,570	1,498	1,453	1,450	1,446	1,367	1,269
GlaxoSmithKline PLC	5,700	5,567	5,226	5,108	5,128	5,099	4,972
Novartis AG	2,360	2,329	2,284	2,277	2,301	2,413	2,445
Roche Holding AG	862	862	861	859	857	851	853
Sanofi S.A.	1,359	1,354	1,311	1,307	1,308	1,327	1,328

Source: company filings, Bloomberg

Company	Curr.	Market cap (diluted)						
		2006	2007	2008	2009	2010	2011	2012e
Pfizer Inc.	USD	188,397	157,723	119,543	128,149	141,376	170,307	189,349
Abbott Laboratories	USD	35,816	41,913	39,856	40,173	35,670	42,170	49,861
Bristol-Myers Squibb Co.	USD	51,666	52,510	46,477	49,945	45,731	60,507	55,305
Eli Lilly & Co.	USD	56,658	58,235	44,075	39,223	38,748	46,296	57,234
Johnson & Johnson	USD	195,485	194,144	169,654	179,646	172,487	182,004	196,631
Merck & Co Inc	USD	95,384	127,429	65,217	83,063	112,445	116,644	125,972
AstraZeneca PLC	GBP	43,081	32,417	40,786	42,202	42,252	40,668	36,922
GlaxoSmithKline PLC	GBP	76,608	71,202	67,128	67,400	63,587	75,032	66,376
Novartis AG	CHF	165,822	144,624	120,380	128,625	126,440	129,578	140,437
Roche Holding AG	CHF	188,347	168,607	139,913	151,012	117,409	135,479	156,952
Sanofi S.A.	EUR	95,048	85,269	59,515	71,985	62,597	75,290	94,799

NET DEBT CALCULATION

Company	Curr.	Total debt						
		2006	2007	2008	2009	2010	2011	2012e
Pfizer Inc.	USD	7,980	13,139	17,283	48,662	44,013	38,949	38,857
Abbott Laboratories	USD	12,411	12,214	11,445	16,456	18,918	15,415	16,730
Bristol-Myers Squibb Co.	USD	7,435	6,272	6,739	6,361	5,445	5,491	7,359
Eli Lilly & Co.	USD	3,714	5,007	10,462	6,662	6,927	6,987	5,520
Johnson & Johnson	USD	6,593	9,537	11,852	14,541	16,773	19,627	16,851
Merck & Co Inc	USD	6,836	5,739	6,240	17,661	17,882	17,515	19,600
AstraZeneca PLC	USD	1,223	15,160	12,011	9,273	9,222	9,328	10,913
GlaxoSmithKline PLC	GBP	5,490	10,571	16,187	16,257	15,100	14,901	17,485
Novartis AG	USD	7,299	5,794	7,364	13,988	22,987	20,229	20,840
Roche Holding AG	CHF	8,243	6,866	4,089	42,416	30,058	26,853	26,553
Sanofi S.A.	EUR	6,944	5,941	6,006	8,827	8,260	15,439	16,182

Source: company filings, Bloomberg

Company	Curr.	Cash and cash equivalents						
		2006	2007	2008	2009	2010	2011	2012e
Pfizer Inc.	USD	27,713	25,475	23,731	25,969	28,012	26,758	22,968
Abbott Laboratories	USD	1,373	2,821	5,080	9,932	5,451	8,097	11,505
Bristol-Myers Squibb Co.	USD	4,013	2,225	8,265	8,514	7,301	8,733	2,930
Eli Lilly & Co.	USD	3,891	4,831	5,926	4,498	6,727	6,897	6,900
Johnson & Johnson	USD	4,084	9,315	12,809	19,425	27,658	32,261	19,771
Merck & Co Inc	USD	8,713	8,231	5,486	9,605	12,201	14,972	18,117
AstraZeneca PLC	USD	7,760	6,044	4,674	11,402	12,550	11,819	6,816
GlaxoSmithKline PLC	GBP	3,040	4,532	6,014	6,813	6,241	5,898	3,617
Novartis AG	USD	7,955	13,201	6,117	17,449	8,134	5,075	5,801
Roche Holding AG	CHF	24,331	24,202	20,771	18,549	10,901	11,287	9,220
Sanofi S.A.	EUR	1,153	1,711	4,226	4,692	6,465	4,124	4,307

Source: company filings, Bloomberg
Note: Bristol-Myers Squibb cash and cash equivalents excludes non-current marketable securities

Company	Curr.	Net debt						
		2006	2007	2008	2009	2010	2011	2012e
Pfizer Inc.	USD	(19,733)	(12,336)	(6,448)	22,693	16,001	12,191	15,889
Abbott Laboratories	USD	11,037	9,393	6,366	6,524	13,467	7,317	5,225
Bristol-Myers Squibb Co.	USD	3,422	4,047	(1,526)	(2,153)	(1,856)	(3,242)	4,429
Eli Lilly & Co.	USD	(177)	176	4,536	2,165	200	90	(1,380)
Johnson & Johnson	USD	2,509	222	(957)	(4,884)	(10,885)	(12,634)	(2,920)
Merck & Co Inc	USD	(1,877)	(2,491)	754	8,056	5,681	2,543	1,483
AstraZeneca PLC	USD	(6,537)	9,116	7,337	(2,129)	(3,328)	(2,491)	4,097
GlaxoSmithKline PLC	GBP	2,450	6,039	10,173	9,444	8,859	9,003	13,868
Novartis AG	USD	(656)	(7,407)	1,247	(3,461)	14,853	15,154	15,039
Roche Holding AG	CHF	(16,088)	(17,336)	(16,682)	23,867	19,157	15,566	17,333
Sanofi S.A.	EUR	5,791	4,230	1,780	4,135	1,795	11,315	11,875

OTHER ENTERPRISE VALUE ITEMS

Company	Curr.	Minority Interests						
		2006	2007	2008	2009	2010	2011	2012e
Pfizer Inc.	USD	74	114	184	432	452	431	412
Abbott Laboratories	USD	-	45	39	43	88	86	90
Bristol-Myers Squibb Co.	USD	-	-	(33)	(58)	(75)	(89)	-
Eli Lilly & Co.	USD	-	-	2	2	(8)	(6)	(8)
Johnson & Johnson	USD	-	-	-	-	-	-	-
Merck & Co Inc	USD	2,406	2,407	2,409	2,435	2,429	2,426	2,465
AstraZeneca PLC	USD	112	137	148	161	197	226	223
GlaxoSmithKline PLC	GBP	262	307	387	737	858	795	805
Novartis AG	USD	183	173	149	75	6,573	96	123
Roche Holding AG	CHF	7,370	7,960	9,343	2,048	2,193	2,387	2,460
Sanofi S.A.	EUR	220	177	205	258	191	170	146

Source: company filings, Bloomberg

Company	Curr.	Preferred equity						
		2006	2007	2008	2009	2010	2011	2012e
Pfizer Inc.	USD	141	93	73	61	52	45	41
Abbott Laboratories	USD	-	-	-	-	-	-	-
Bristol-Myers Squibb Co.	USD	-	-	-	-	-	-	-
Eli Lilly & Co.	USD	-	-	-	-	-	-	-
Johnson & Johnson	USD	-	-	-	-	-	-	-
Merck & Co Inc	USD	-	-	-	-	-	-	-
AstraZeneca PLC	USD	-	-	-	-	-	-	-
GlaxoSmithKline PLC	GBP	-	-	-	-	-	-	-
Novartis AG	USD	-	-	-	-	-	-	-
Roche Holding AG	CHF	-	-	-	-	-	-	-
Sanofi S.A.	EUR	-	-	-	-	-	-	-

Source: company filings, Bloomberg

MilSCELLANEOUS

FX used for companies with a different listing and accounting currency	Exchange rate at year-end						
	2006	2007	2008	2009	2010	2011	2012
GBP / USD (AstraZeneca)	1.9582	1.9963	1.4473	1.5926	1.5468	1.5453	1.6153
CHF / USD (Novartis)	0.8198	0.8876	0.9468	0.9634	1.0629	1.0640	1.0942

Source : Oanda

Appendix B – Key aggregates

Note: blue denotes inputs, black denotes calculations, and green denotes data input from other sheets.

KEY AGGREGATES (in millions, local currency)

Company	Curr.	Sales						
		2006	2007	2008	2009	2010	2011	2012e
Pfizer Inc.	USD	48,371	48,209	48,341	49,934	67,791	67,425	58,412
Abbott Laboratories	USD	22,476	25,914	29,528	30,765	35,167	38,851	32,687
Bristol-Myers Squibb Co.	USD	17,256	15,617	17,715	18,808	19,484	21,244	17,584
Eli Lilly & Co.	USD	15,691	18,634	20,378	21,836	23,076	24,287	22,397
Johnson & Johnson	USD	53,324	61,095	63,747	61,897	61,587	65,030	67,297
Merck & Co Inc	USD	22,636	24,198	23,860	27,428	45,987	48,047	47,013
AstraZeneca PLC	USD	26,475	29,559	31,601	32,804	33,269	33,591	28,157
GlaxoSmithKline PLC	GBP	23,225	22,716	24,352	28,368	28,392	27,387	26,720
Novartis AG	USD	34,393	38,072	41,459	44,267	50,624	58,566	56,744
Roche Holding AG	CHF	42,041	46,133	45,617	49,051	47,473	42,531	45,380
Sanofi S.A.	EUR	28,373	28,052	27,568	29,306	30,384	33,389	34,889

Source: company filings, Bloomberg
Note: 2012e estimates based on mean broker consensus estimates

Company	Curr.	EBITDA						
		2006	2007	2008	2009	2010	2011	2012e
Pfizer Inc.	USD	23,473	22,837	24,716	24,466	34,736	35,468	30,317
Abbott Laboratories	USD	5,615	6,433	8,316	9,212	9,025	9,468	10,045
Bristol-Myers Squibb Co.	USD	2,991	3,392	4,382	5,646	6,722	7,448	5,187
Eli Lilly & Co.	USD	4,927	5,851	6,651	7,668	8,100	7,692	6,218
Johnson & Johnson	USD	15,886	17,990	19,001	19,437	19,466	19,311	21,342
Merck & Co Inc	USD	7,510	7,959	8,070	7,315	11,166	17,015	20,252
AstraZeneca PLC	USD	9,561	10,916	11,657	13,235	14,170	13,829	10,888
GlaxoSmithKline PLC	GBP	8,607	8,717	9,115	11,117	6,932	9,845	9,668
Novartis AG	USD	9,691	10,121	11,978	12,318	15,866	17,818	17,142
Roche Holding AG	CHF	14,168	17,004	16,541	17,705	16,038	15,822	17,910
Sanofi S.A.	EUR	10,630	10,650	9,940	12,805	13,156	12,593	12,985

Source: company filings, Bloomberg (Bloomberg in particular for Sanofi)
Note: 2012e estimates based on mean broker consensus estimates

Company	Curr.	EBIT						
		2006	2007	2008	2009	2010	2011	2012e
Pfizer Inc.	USD	18,180	17,637	19,626	19,709	26,249	26,442	23,906
Abbott Laboratories	USD	4,056	4,579	6,477	7,123	6,401	6,424	7,454
Bristol-Myers Squibb Co.	USD	2,064	2,500	3,566	4,939	5,978	6,647	4,527
Eli Lilly & Co.	USD	4,125	4,803	5,528	6,370	6,772	6,318	4,802
Johnson & Johnson	USD	13,709	15,213	16,169	16,663	16,527	16,153	17,664
Merck & Co Inc	USD	5,242	5,971	6,439	4,739	3,785	9,588	15,572
AstraZeneca PLC	USD	8,216	9,060	9,037	11,148	11,429	11,279	9,283
GlaxoSmithKline PLC	GBP	7,649	7,695	7,884	9,555	5,253	8,422	8,153
Novartis AG	USD	7,768	7,263	9,308	10,017	12,447	12,030	12,920
Roche Holding AG	CHF	11,730	14,468	13,896	15,012	13,486	13,454	15,369
Sanofi S.A.	EUR	5,729	6,106	6,457	7,818	7,904	7,499	11,225

Source: company filings, Bloomberg (Bloomberg in particular for AstraZeneca, GlaxoSmithKline, and Novartis)
Note: 2012e estimates based on mean broker consensus estimates

Company	Curr.	Net income attributable to shareholders						
		2006	2007	2008	2009	2010	2011	2012e
Pfizer Inc.	USD	14,982	15,113	16,366	14,202	17,983	18,217	12,697
Abbott Laboratories	USD	1,717	3,606	4,881	5,746	4,626	4,728	5,929
Bristol-Myers Squibb Co.	USD	1,585	2,165	5,247	10,612	3,102	3,709	3,005
Eli Lilly & Co.	USD	2,663	2,953	(2,072)	4,329	5,070	4,348	3,857
Johnson & Johnson	USD	11,053	10,576	12,949	12,266	13,334	9,672	12,857
Merck & Co Inc	USD	4,434	3,275	7,808	12,899	861	6,272	9,329
AstraZeneca PLC	USD	6,043	5,595	6,101	7,521	8,053	9,983	6,276
GlaxoSmithKline PLC	GBP	5,389	5,214	4,602	5,531	1,634	5,261	5,287
Novartis AG	USD	7,175	11,946	8,195	8,400	9,794	9,113	9,724
Roche Holding AG	CHF	7,880	9,761	8,969	7,784	8,666	9,343	10,372
Sanofi S.A.	EUR	4,006	5,263	3,851	5,265	5,467	5,693	5,684

Source: company filings, Bloomberg (Bloomberg in particular for AstraZeneca, GlaxoSmithKline, and Novartis)
Note: 2012e estimates based on mean broker consensus estimates

Company	Curr.	Shareholders' equity (Group share)						
		2006	2007	2008	2009	2010	2011	2012e
Pfizer Inc.		71,358	65,010	57,556	90,014	87,813	82,190	81,662
Abbott Laboratories		14,054	17,779	17,479	22,856	22,388	24,440	27,014
Bristol-Myers Squibb Co.		9,991	10,562	12,241	14,843	15,713	15,956	13,900
Eli Lilly & Co.		10,981	13,664	6,735	9,524	12,420	13,542	16,065
Johnson & Johnson		39,318	43,319	42,511	50,588	56,579	57,080	63,761
Merck & Co Inc		17,560	18,185	18,758	59,057	54,376	54,517	55,747
AstraZeneca PLC		15,304	14,778	15,912	20,660	23,213	23,246	22,038
GlaxoSmithKline PLC		9,386	9,603	7,931	10,005	8,887	8,032	6,223
Novartis AG		41,111	49,223	50,288	57,387	63,196	65,844	67,082
Roche Holding AG		39,444	45,347	44,479	7,366	9,469	12,095	9,616
Sanofi S.A.		45,600	44,542	44,866	48,188	53,097	56,219	56,208

Source: company filings, Bloomberg
Note: 2012e shareholders' equity as of 3Q 2012 (H1 2012 for Roche and Sanofi)

Appendix C – Individual TSRs

ABBOTT LABORATORIES

Year	Currency	Share price		Dividends	TSR
		Beg. of period	End of period		
2012	USD	26.90	31.34	2.01	24.0%
2011	USD	22.88	26.90	1.88	25.8%
2010	USD	25.83	22.92	1.72	(4.6%)
2009	USD	25.54	25.83	1.56	7.3%
2008	USD	26.87	25.54	1.41	0.3%
2007	USD	23.31	26.87	1.27	20.7%
2006	USD	18.87	23.31	1.16	29.7%
2005	USD	22.33	18.87	1.09	(10.7%)
2004	USD	20.85	22.32	1.03	12.0%
2003	USD	17.90	20.85	0.97	21.9%
TSR over 10 years (2003-2012)					**153.8%**
TSR 2006-2008					**55.7%**
TSR 2010 - 2012					**43.0%**

Sources : own calculations, based on Datastream, Yahoo Finance, Abbott

BRISTOL-MYERS SQUIBB

Year	Currency	Share price		Dividends	TSR
		Beg. of period	End of period		
2012	USD	35.24	32.59	1.36	(3.7%)
2011	USD	26.58	35.24	1.32	37.5%
2010	USD	25.25	26.48	1.28	9.9%
2009	USD	23.25	25.25	1.24	13.9%
2008	USD	26.52	23.25	1.24	(7.7%)
2007	USD	26.32	26.52	1.12	5.0%
2006	USD	22.98	26.32	1.12	19.4%
2005	USD	25.43	22.98	1.12	(5.2%)
2004	USD	28.60	25.62	1.12	(6.5%)
2003	USD	23.15	28.60	1.12	28.4%
TSR over 10 years (2003-2012)					**92.8%**
TSR 2006-2008					**16.3%**
TSR 2010 - 2012					**44.8%**

Sources : own calculations, based on Datastream, Yahoo Finance, Bristol-Myers Squibb

ELI LILLY

Year	Currency	Share price		Dividends	TSR
		Beg. of period	End of period		
2012	USD	41.56	49.32	1.96	23.4%
2011	USD	35.00	41.56	1.96	24.3%
2010	USD	35.71	35.04	1.96	3.6%
2009	USD	40.27	35.71	1.96	(6.5%)
2008	USD	53.39	40.27	1.88	(21.1%)
2007	USD	52.10	53.39	1.70	5.7%
2006	USD	56.59	52.10	1.60	(5.1%)
2005	USD	56.25	56.59	1.52	3.3%
2004	USD	70.33	56.75	1.42	(17.3%)
2003	USD	63.50	70.33	1.34	12.9%
TSR over 10 years (2003-2012)					**4.9%**
TSR 2006-2008					**(19.7%)**
TSR 2010 - 2012					**54.6%**

Sources : own calculations, based on Datastream, Yahoo Finance, Eli Lilly

JOHNSON & JOHNSON

Year	Currency	Share price		Dividends	TSR
		Beg. of period	End of period		
2012	USD	65.58	70.10	2.40	10.6%
2011	USD	62.82	65.58	2.25	8.0%
2010	USD	64.41	61.85	2.11	(0.7%)
2009	USD	59.83	64.41	1.93	10.9%
2008	USD	66.70	59.83	1.80	(7.6%)
2007	USD	66.02	66.70	1.62	3.5%
2006	USD	60.10	66.02	1.46	12.3%
2005	USD	62.90	60.10	1.28	(2.4%)
2004	USD	51.66	63.42	1.10	24.9%
2003	USD	53.71	51.66	0.93	(2.1%)
TSR over 10 years (2003-2012)					**61.9%**
TSR 2006-2008					**7.7%**
TSR 2010 - 2012					**19.3%**

Sources : own calculations, based on Datastream, Yahoo Finance, Johnson & Johnson

MERCK & CO.

Year	Currency	Share price		Dividends	TSR
		Beg. of period	End of period		
2012	USD	37.70	40.94	1.69	13.1%
2011	USD	36.04	37.70	1.56	8.9%
2010	USD	36.54	36.04	1.52	2.8%
2009	USD	30.40	36.54	1.52	25.2%
2008	USD	58.11	30.40	1.52	(45.1%)
2007	USD	43.60	58.11	1.52	36.8%
2006	USD	31.81	43.60	1.52	41.8%
2005	USD	31.26	31.81	1.52	6.6%
2004	USD	46.20	32.14	1.50	(27.2%)
2003	USD	53.58	46.20	1.46	(11.0%)
TSR over 10 years (2003-2012)					**5.0%**
TSR 2006-2008					**9.9%**
TSR 2010 - 2012					**25.1%**

Sources : own calculations, based on Datastream, Yahoo Finance, Merck& Co.

ASTRAZENECA

Year	Currency	Share price		Dividends	TSR
		Beg. of period	End of period		
2012	GBp	2,975	2,910	181.70	3.9%
2011	GBp	2,922	2,975	168.60	7.6%
2010	GBp	2,911	2,922	150.30	5.6%
2009	GBp	2,807	2,911	140.80	8.7%
2008	GBp	2,164	2,807	95.50	34.1%
2007	GBp	2,744	2,164	88.30	(17.9%)
2006	GBp	2,829	2,744	78.40	(0.2%)
2005	GBp	1,889	2,829	56.20	52.7%
2004	GBp	2,680	1,889	45.40	(27.8%)
2003	GBp	2,220	2,680	43.95	22.7%
TSR over 10 years (2003-2012)					**78.3%**
TSR 2006-2008					**8.5%**
TSR 2010 - 2012					**17.2%**

Sources : own calculations, based on Datastream, Yahoo Finance, AstraZeneca

GLAXOSMITHKLINE

Year	Currency	Share price		Dividends	TSR
		Beg. of period	End of period		
2012	GBp	1,472	1,335	78.00	(4.0%)
2011	GBp	1,240	1,472	68.00	24.2%
2010	GBp	1,320	1,240	64.00	(1.2%)
2009	GBp	1,285	1,320	60.00	7.4%
2008	GBp	1,279	1,285	56.00	4.8%
2007	GBp	1,344	1,279	51.00	(1.0%)
2006	GBp	1,469	1,344	48.00	(5.2%)
2005	GBp	1,222	1,469	42.00	23.6%
2004	GBp	1,280	1,222	44.00	(1.1%)
2003	GBp	1,192	1,280	40.00	10.7%
TSR over 10 years (2003-2012)					**58.2%**
TSR 2006-2008					**(2.0%)**
TSR 2010 - 2012					**17.1%**

Sources : own calculations, based on Datastream, Yahoo Finance, GlaxoSmithKline

NOVARTIS

Year	Currency	Share price		Dividends	TSR
		Beg. of period	End of period		
2012	CHF	53.70	57.45	2.25	11.2%
2011	CHF	55.45	53.70	2.25	0.9%
2010	CHF	56.50	54.95	2.20	1.2%
2009	CHF	52.70	56.50	2.10	11.2%
2008	CHF	62.10	52.70	2.00	(11.9%)
2007	CHF	70.25	62.10	1.60	(9.3%)
2006	CHF	69.05	70.25	1.35	3.7%
2005	CHF	58.00	69.05	1.15	21.0%
2004	CHF	56.15	57.30	1.05	3.9%
2003	CHF	50.45	56.15	1.00	13.3%
TSR over 10 years (2003-2012)					**47.5%**
TSR 2006-2008					**(16.5%)**
TSR 2010 - 2012					**13.5%**

Sources : own calculations, based on Datastream, Yahoo Finance, Novartis
Note: 2012 not published yet. Based on the company's payout history of annual dividend increases, I have made the conservative assumption that the 2012 dividend will at least be equal to the 2011 dividend.

ROCHE

Year	Currency	Share price		Dividends	TSR
		Beg. of period	End of period		
2012	CHF	159.20	184.00	6.80	19.8%
2011	CHF	136.80	159.20	6.80	21.3%
2010	CHF	175.80	137.00	6.60	(18.3%)
2009	CHF	162.50	175.80	6.00	11.9%
2008	CHF	195.60	162.50	5.00	(14.4%)
2007	CHF	218.50	195.60	4.60	(8.4%)
2006	CHF	197.30	218.50	3.40	12.5%
2005	CHF	131.50	197.30	2.50	51.9%
2004	CHF	124.75	130.90	2.00	6.5%
2003	CHF	96.35	124.75	1.65	31.2%
TSR over 10 years (2003-2012)					**138.0%**
TSR 2006-2008					**(11.0%)**
TSR 2010 - 2012					**16.2%**

Sources : own calculations, based on Datastream, Yahoo Finance
Note: 2012 not published yet. Based on the company's payout history of annual dividend increases, I have made the conservative assumption that the 2012 dividend will at least be equal to the 2011 dividend.

SANOFI

Year	Currency	Share price		Dividends	TSR
		Beg. of period	End of period		
2012	EUR	57.42	71.39	2.65	28.9%
2011	EUR	49.39	56.75	2.65	20.3%
2010	EUR	55.06	47.85	2.50	(8.6%)
2009	EUR	45.40	55.06	2.40	26.6%
2008	EUR	62.98	45.40	2.20	(24.4%)
2007	EUR	69.95	62.98	2.07	(7.0%)
2006	EUR	75.30	69.95	1.75	(4.8%)
2005	EUR	59.30	74.00	1.52	27.4%
2004	EUR	59.70	58.80	1.20	0.5%
2003	EUR	58.25	59.70	n.a.	2.5%
TSR over 10 years (2003-2012)					**55.1%**
TSR 2006-2008					**(31.7%)**
TSR 2010 - 2012					**43.8%**

Sources : own calculations, based on Datastream, Google Finance, Sanofi
Note: 2012 not published yet. Based on the company's payout history of annual dividend increases, I have made the conservative assumption that the 2012 dividend will at least be equal to the 2011 dividend.

Appendix D – Pfizer summary financial statements

P&L SUMMARY (AS REPORTED)

in $ millions, at 12/31	2006	2007	2008	2009	2010	2011	2012e
Revenues	**48,371**	**48,418**	**48,296**	**50,009**	**67,057**	**67,425**	**58,412**
% growth	+2.0%	+0.1%	(0.3%)	+3.5%	+34.1%	+0.5%	(13.4%)
Gross profit	**40,731**	**37,179**	**40,184**	**41,121**	**51,219**	**52,340**	**-**
% margin	84.2%	76.8%	83.2%	82.2%	76.4%	77.6%	-
EBITDA	**17,417**	**12,719**	**16,816**	**15,876**	**22,105**	**24,267**	**30,317**
% margin	36.0%	26.3%	34.8%	31.7%	33.0%	36.0%	51.9%
EBIT	**12,124**	**7,519**	**11,726**	**11,119**	**13,618**	**15,241**	**23,906**
% margin	25.1%	15.5%	24.3%	22.2%	20.3%	22.6%	40.9%
Profit before tax	**13,028**	**9,278**	**9,694**	**10,827**	**9,282**	**12,762**	**22,917**
% margin	26.9%	19.2%	20.1%	21.7%	13.8%	18.9%	39.2%
Income from continuing operations	**11,024**	**8,213**	**8,026**	**8,621**	**8,180**	**8,697**	**-**
% margin	22.8%	17.0%	16.6%	17.2%	12.2%	12.9%	-
Net income	**19,337**	**8,144**	**8,104**	**8,635**	**8,257**	**10,009**	**12,697**
% margin	40.0%	16.8%	16.8%	17.3%	12.3%	14.8%	21.7%

Sources : Pfizer annual reports

P&L SUMMARY (NON-GAAP)

in $ millions, at 12/31	2006	2007	2008	2009	2010	2011	2012e
Revenues	**48,371**	**48,209**	**48,341**	**49,934**	**67,791**	**67,425**	**58,412**
% growth	+2.0%	(0.3%)	+0.3%	+3.3%	+35.8%	(0.5%)	(13.4%)
Gross profit	**41,162**	**40,516**	**41,301**	**42,261**	**55,171**	**54,389**	**-**
% margin	85.1%	83.7%	85.5%	84.5%	82.3%	80.7%	-
EBITDA	**23,473**	**22,837**	**24,716**	**24,466**	**34,736**	**35,468**	**30,317**
% margin	48.5%	47.2%	51.2%	48.9%	51.8%	52.6%	51.9%
EBIT	**18,180**	**17,637**	**19,626**	**19,709**	**26,249**	**26,442**	**23,906**
% margin	37.6%	36.4%	40.6%	39.4%	39.1%	39.2%	40.9%
Profit before tax	**19,223**	**19,183**	**21,012**	**20,157**	**25,644**	**25,900**	**22,917**
% margin	39.7%	39.6%	43.5%	40.3%	38.2%	38.4%	39.2%
Income from continuing operations	**14,982**	**15,113**	**16,366**	**14,202**	**17,983**	**18,217**	**-**
% margin	31.0%	31.2%	33.9%	28.4%	26.8%	27.0%	-
Net income	**14,982**	**15,113**	**16,366**	**14,202**	**17,983**	**18,217**	**12,697**
% margin	31.0%	31.2%	33.9%	28.4%	26.8%	27.0%	21.7%

Sources : Pfizer annual reports and 8-K filings (non-GAAP financials)

BALANCE SHEET SUMMARY

in $ millions, at 12/31	2006	2007	2008	2009	2010	2011	2012e
Fixed assets	63,996	63,563	56,594	138,157	124,798	120,817	-
Tangible fixed assets	16,632	15,734	13,287	22,780	19,123	16,938	-
Intangible fixed assets	24,350	20,498	17,721	68,015	57,558	53,833	-
Goodwill	20,876	21,382	21,464	42,376	43,947	45,067	-
Other	2,138	5,949	4,122	4,986	4,170	4,979	-
Working capital	(296)	4,633	684	2,254	8,395	6,767	-
Inventories	6,111	5,302	4,381	12,403	8,405	7,769	-
Accounts receivable	9,392	9,843	8,958	14,645	14,612	13,608	-
Accounts payable	2,019	2,270	1,751	4,370	3,994	3,836	-
Other working capital items (net)	(13,780)	(8,242)	(10,904)	(20,424)	(10,628)	(10,774)	-
TOTAL CAPITAL EMPLOYED	63,700	68,196	57,278	140,411	133,193	127,584	-
Equity	71,432	65,124	57,740	90,446	88,265	82,621	-
Shareholders' equity (excl. minority interests)	71,358	65,010	57,556	90,014	87,813	82,190	-
Minority interests	74	114	184	432	452	431	-
Net financial debt	(13,272)	(1,121)	(6,153)	40,826	36,260	35,365	-
Long-term debt	5,546	7,314	7,963	43,193	38,410	34,931	-
Short-term debt	2,434	5,825	9,320	5,469	5,603	4,018	-
Cash and cash equivalents	27,713	25,475	23,731	25,969	28,012	26,758	-
Short-term loans	514	617	824	1,195	467	51	-
Long-term investments and loans	3,892	4,856	11,478	13,122	9,748	9,457	-
Other	10,867	16,688	12,597	32,450	30,474	32,682	-
Assets held for sale	(62)	(114)	(148)	(496)	(561)	(101)	-
Provisions	5,602	4,307	5,839	9,635	9,229	9,699	-
TOTAL INVESTED CAPITAL	63,700	68,196	57,278	140,411	133,193	127,584	-

Sources : Pfizer annual reports

CASH FLOW STATEMENT SUMMARY

in $, at 12/31	2006	2007	2008	2009	2010	2011	2012e
Cash from:							
Operating activities	17,594	13,353	18,238	16,587	11,454	20,240	-
Investing activities	5,101	795	(12,835)	(31,272)	(492)	2,200	-
Financing activities	(23,100)	(12,610)	(6,560)	14,481	(11,174)	(20,607)	-
Effect of exchange rate changes on cash and cash equivalents	(15)	41	(127)	60	(31)	(29)	-
Net increase (decrease) in cash and cash equivalents	(420)	1,579	(1,284)	(144)	(243)	1,804	-

Source : Pfizer annual reports

Appendix E – R&D productivity

Note: blue denotes inputs, black denotes calculations, and green denotes data input from other sheets.

R&D EXPENDITURE

Company	Curr.	Sales					
		2006	2007	2008	2009	2010	2011
Pfizer Inc.	USD	48,371	48,209	48,341	49,934	67,791	67,425
Abbott Laboratories	USD	22,476	25,914	29,528	30,765	35,167	38,851
Bristol-Myers Squibb Co.	USD	17,256	15,617	17,715	18,808	19,484	21,244
Eli Lilly & Co.	USD	15,691	18,634	20,378	21,836	23,076	24,287
Johnson & Johnson	USD	53,324	61,095	63,747	61,897	61,587	65,030
Merck & Co Inc	USD	22,636	24,198	23,860	27,428	45,987	48,047
AstraZeneca PLC	USD	26,475	29,559	31,601	32,804	33,269	33,591
GlaxoSmithKline PLC	GBP	23,225	22,716	24,352	28,368	28,392	27,387
Novartis AG	USD	34,393	38,072	41,459	44,267	50,624	58,566
Roche Holding AG	CHF	42,041	46,133	45,617	49,051	47,473	42,531
Sanofi S.A.	EUR	28,373	28,052	27,568	29,306	30,384	33,389

Source: company filings, Bloomberg

Company	Curr.	R&D expenses					
		2006	2007	2008	2009	2010	2011
Pfizer Inc.	USD	7,513	7,544	7,488	7,739	9,338	8,437
Abbott Laboratories	USD	2,255	2,506	2,689	2,744	3,724	4,129
Bristol-Myers Squibb Co.	USD	2,951	3,227	3,585	3,647	3,566	3,839
Eli Lilly & Co.	USD	3,129	3,487	3,841	4,327	4,884	5,021
Johnson & Johnson	USD	7,125	7,680	7,577	6,986	6,844	7,548
Merck & Co Inc	USD	4,783	4,883	4,805	5,845	11,111	8,467
AstraZeneca PLC	USD	3,902	5,162	5,179	4,409	5,318	5,523
GlaxoSmithKline PLC	GBP	3,457	3,327	3,681	4,106	4,457	4,009
Novartis AG	USD	5,321	6,430	7,217	7,469	9,070	9,583
Roche Holding AG	CHF	7,365	8,385	8,845	9,874	10,026	8,326
Sanofi S.A.	EUR	4,430	4,537	4,575	4,626	4,547	4,811

Source: company filings

Company	R&D expenditure					
	2006	2007	2008	2009	2010	2011
Pfizer Inc.	15.5%	15.6%	15.5%	15.5%	13.8%	12.5%
Abbott Laboratories	10.0%	9.7%	9.1%	8.9%	10.6%	10.6%
Bristol-Myers Squibb Co.	17.1%	20.7%	20.2%	19.4%	18.3%	18.1%
Eli Lilly & Co.	19.9%	18.7%	18.8%	19.8%	21.2%	20.7%
Johnson & Johnson	13.4%	12.6%	11.9%	11.3%	11.1%	11.6%
Merck & Co Inc	21.1%	20.2%	20.1%	21.3%	24.2%	17.6%
AstraZeneca PLC	14.7%	17.5%	16.4%	13.4%	16.0%	16.4%
GlaxoSmithKline PLC	14.9%	14.6%	15.1%	14.5%	15.7%	14.6%
Novartis AG	15.5%	16.9%	17.4%	16.9%	17.9%	16.4%
Roche Holding AG	17.5%	18.2%	19.4%	20.1%	21.1%	19.6%
Sanofi S.A.	15.6%	16.2%	16.6%	15.8%	15.0%	14.4%

Source: own calculations

NEW MOLECULAR ENTITIES

Company	NMEs in development					
	2006	2007	2008	2009	2010	2011
Pfizer Inc.	177	151	84	n.a.	92	72
Abbott Laboratories	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Bristol-Myers Squibb Co.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Eli Lilly & Co.	n.a.	44	60	64	68	67
Johnson & Johnson	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Merck & Co Inc	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
AstraZeneca PLC	46	71	75	89	75	63
GlaxoSmithKline PLC	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Novartis AG	n.a.	n.a.	n.a.	n.a.	n.a.	66
Roche Holding AG	48	57	62	59	62	79
Sanofi S.A.	n.a.	n.a.	n.a.	n.a.	n.a.	60

Source: company filings, Bloomberg (Bloomberg in particular for Sanofi)
Note: Eli Lilly includes New Chemical Entities and New Biotech Entities

Company	NME approvals					
	2006	2007	2008	2009	2010	2011
Pfizer Inc.	2	1	1	-	-	1
Abbott Laboratories	-	-	-	-	-	-
Bristol-Myers Squibb Co.	1	1	-	1	-	2
Eli Lilly & Co.	-	-	-	1	-	-
Johnson & Johnson	2	1	2	2	-	3
Merck & Co Inc	2	1	-	-	-	1
AstraZeneca PLC	-	-	-	-	-	1
GlaxoSmithKline PLC	-	2	1	2	-	2
Novartis AG	1	2	-	3	1	1
Roche Holding AG	-	1	-	-	1	1
Sanofi S.A.	-	-	-	1	1	-

Source: fda.gov, Merger Market (to identify subsidiaries)

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