

**Differential Advantages in the Global Pharmaceutical Industry: The Role of
Intangible Assets**

By

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Abstract: This paper seeks to examine the role of intangible assets within the business enterprise, and how such assets influence the enterprises evolution. This is done within the context of the global pharmaceutical industry by examining the core of the industry and the activities of the Pfizer Corporation. This industry has managed to obtain higher-than-normal profit rates for the nearly 50 years, and the heavy reliance upon intangible assets in the form of patents is likely the key to understanding why. The findings here suggest that not only are intangible assets indeed the reason why this industry has been dominant for so long, but that the accumulation of such assets is the driving force behind changes in industry structure through mergers and acquisitions. (122 words)

JEL Codes: D21, L22, L65, Z13

Institutional economics has long been concerned with the role intangible assets play in the system of social provisioning and the business enterprises. Tangible assets provide clear benefits to the community by allowing it to produce the goods and services it needs to survive. Intangible assets, meanwhile, do not seem to make tangible assets more productive, but at the same allow the business enterprise to increase its profitability (Endres 1985). In this manner, intangible assets influence the earning capacity of the business enterprise. As the business enterprise grows, however, how does the role of intangible assets change? In what ways are they able to continue to increase earning capacity, even as the nature of business changes?

This paper seeks to answer these questions by examining the global pharmaceutical industry. This industry is characterized by the use of patents and brands to not only develop new drugs, but also to organize markets. Research spending in the industry has increased from \$2.0 billion in 1980 to an estimated \$51.1 billion in 2013 (PhRMA 2014), with the goal of that spending being the development and maintenance of new intellectual property rights that will confer a greater profit to the patent holders. Understanding the pharmaceutical industry and the ways in which it uses intangible assets as a key part of their profit-making activities will go a long way towards increasing our understanding of how and why intangible assets function to increase profits for the general business enterprise.

This paper is broken into two main sections. In the first section, I examine the concept of the business enterprise from the standpoint of the degrees of separation, with a specific focus on the role that intangible assets play in each stage. Specifically, I address how intangible assets are used to obtain a differential advantage for the enterprise. In the

second section, I build on the theoretical underpinnings of the business enterprise to examine the pharmaceutical industry and the Pfizer Corporation and the role of intangible assets in their activities. Overall, it will be shown that the evolution of the business enterprise brings with it an evolution of the role of intangible assets in the generation of earning capacity.

Intangible Assets and the Degrees of Separation

This section examines the concept of intangible assets from the perspective of the degrees of separation, as explained by Veblen (1904) and Dean (2013). Furthermore, these degrees of separation will be examined from Commons's theory of transactions¹ (1924/1974), and the role such transactions have in creating these assets.

The First Degree of Separation

Veblen begins his analysis of tangible and intangible assets with a discussion of the community and technological development. For Veblen, the base of all material assets is the joint stock of knowledge, defined as the 'information and proficiency in the ways and means of life.' (Veblen 1908a, p. 518) This knowledge is created by the community as a whole, and utilized in the system of social provisioning to reproduce the community as the going concern – it is out of the social knowledge that the means of life are produced.

Furthermore, this joint stock of knowledge dictates what is possible for the society to

¹ Commons breaks activity into three forms of transactions, each of which includes a change of ownership rights (Commons 1934). The first are bargaining, which are transactions between two legal equals, such as buyers and sellers. The second are managerial, in which there exists a legal superior who dictates the actions of a legal subordinate, such as an employer and employee. The third are rationing, in which an action space within which bargaining and managerial transactions occur may take place, such as the passing of a new law. In general, bargaining and rationing transactions affect the sphere of distribution, while managerial transactions affect the sphere of production (Atkinson 1987).

produce – a community cannot produce that which it does not know how to produce. In this manner, the level of technology depends upon the joint stock of knowledge.

Technology, for the purpose of this paper, is defined as tool-skill combinations (Ayres 1952, 1953). A pen – the tool – is only useful to one who knows how to write – the skill. Likewise, the ability to write is meaningless without a tool to utilize that skill. Based on this, two things become clear. First, technology depends upon the joint stock of knowledge – the greater the level of knowledge, the better the level of technology. Second, the tools – be they simple, like pens and pencils, or more advanced like machinery, computers, or airplanes – are the physical manifestation of the joint stock of knowledge.

The joint stock of knowledge dictates what actions are possible for a community – what can it do, what can it build, how many people can it feed, and so on (Foster 1981a). In this sense, the joint stock of knowledge embodies the relationship of members of the community to the physical world. At the same time, however, it encompasses the relationship of members of the community to one another (Dean 2013). Because technology requires both the tool and the ability to use the tool, it is not a thing, but a learned behavior (Ayres 1952); it is the knowledge of some type of skill, which allows one to act. These skills are taught to members of the community by the community, and the skills taught depend upon the value structure of the community. Therefore, technology is not simply a physical concept – it is also a cultural concept that serves to connect individual members of society to one another (Lower 1987).

The joint stock of knowledge is historical, developed over the entire lifespan of the community. Both the depth and breadth of this knowledge require that the community as a whole be charged with owning, maintaining, and expanding the stock:

Even in a relatively small and primitive community, the mass of detail comprised in its knowledge and practice of ways and means is large, - too large for any one individual or household to become competently expert in it all... (Veblen 1908, p. 520).

In this manner, the joint stock of knowledge is created by the community and owned by the community. All tangible assets developed which rely upon this joint stock of knowledge, therefore, are themselves, too, communal creations. They are the physical embodiment of the community's knowledge, and therefore would not exist absent the community. This implies two key points. First, tangible assets will always exist, regardless of the social system. For a community to survive, it must have some way of providing the means of life, which requires social knowledge. Second, and more importantly, there are no ownership rights inherently embedded within tangible assets. Such ownership rights only arise as a result of the social system in place. It is these ownership rights that are called "intangible assets."

Intangible assets include many items such, as "brand names, copyrights, corporate culture, covenants not to compete, franchises, future interests, licenses, operating rights, patents, record masters, secret processes, supplier relationships, trademarks, and trade names." (Dean 2014, p. 82; Hendrickson & van Breda 1992; King 2006) Such items convey ownership over parts of the joint stock of knowledge; they represent control over the relationship between the community and the physical world, as is the case with operating rights, patents, and copyrights or members of the community with one another, as is the case with items such as goodwill. The creation of these assets is what I mean when discussing the first degree of separation. In this degree, the community becomes separated from the joint stock of knowledge by way of intangible assets. Those with the ownership rights are able to extract payments from the community for access to its own knowledge

base; in this manner, the joint stock of knowledge becomes the vehicle for the Veblenian form of exploitation. Those who do not own must gain access to the knowledge base to provision themselves. This is done through selling the one asset the non-owners do own – labor² (Marx 1867/1967; Lee 2011; Lee & Jo 2011). This sale of labor, however, only occurs because the community has been locked out of its own knowledge.

This degree of separation gives rise to two types of employments: those activities that run the system and those activities that direct the evolution of the system (Dean 2013). Combining these two types of employments gives rise to the concept of the going plant, which is the locus of production for the business enterprise. Within this going plant are the tangible assets that embody the joint stock of knowledge, and the intangible assets that grant the owner of the plant the right to exclude others from accessing this knowledge. Meanwhile, the community's interaction with the knowledge stock is limited to bargaining transactions in the form of sale and purchase. In this sense, the first degree of separation reflects the creation of intangible assets that enable the appropriation of tangible assets for private interests; it is the separation of the community from the joint stock of knowledge.

The Second Degree of Separation

For the going plant to survive, it must engage in ongoing monetary transactions. In charge of ensuring the continuation of such transactions is the Captain of Industry. Initially, the chief concern of this individual is to ensure that the going plant produces output (Veblen 1904). However, this concern changes over time as the survival of the business requires a pecuniary mindset – money making. With this transition, a new unit becomes attached to the going plant. This unit is called the “going business”, and its role is to ensure

² It should be noted that the community and the joint stock of knowledge condition this labor in the same manner as they do tangible assets

that the enterprise is able to reproduce itself (Commons 1924/1974, 1934). In this manner, the going enterprise is now composed of two units. First, there is the going plant whose role is still the production of output. It is still composed of tangible assets and labor that act as the material representation of the joint stock of knowledge. Second, there is the going business.

The going business is in a position of legal superiority to the going plant – it is composed of the intangible assets that reflect ownership rights and therefore holds the right of use or disuse over that assets of the going plant. It dictates the actions of the going plant in a way that ensures the reproduction of the business enterprise as a going concern. In this manner, the going business engages in managerial transactions with the going plant, dictating what will be produced and how much (Commons 1924/1974). Furthermore, whereas the motives behind the going plant are the production of output and general serviceability to the community through the use of tangible assets, this is not so with the going business. The motives behind the going business are those of pecuniary gain, and their actions must ensure the viability of the going concern (Veblen 1921). In this sense, the going business, through its control of intangible assets, dictates the activities of the going plant to ensure that the output produced will be sold.

In the first degree of separation, intangible assets lock the community from its joint stock of knowledge by conferring ownership rights over tangible assets; this is the separation of production from consumption. In the second degree of separation, intangible assets serve to grant control of the tangible assets to the Captains of Industry, who use such assets to ensure the survival of the going concern; this is the separation of the going plant and the going business. In each case, the ability to earn profit depends upon the ability for

the holder of intangible assets to control access to the joint stock of knowledge. In the first degree of separation, it is through the sale of output that arises because intangible assets are primarily composed of operating rights. In the second degree of separation, it becomes a little more muddled – rather than simply focusing on the sale of output, the holder of intangible assets is also able to control access to markets. This is done through items such as goodwill, patents, copyrights, brand names, and production secrets. Each represents the ability for the going concern to prevent others from engaging in bargaining transactions with consumers, either by establishing customary relationships or through legal means. In this sense, intangible assets are what Hamilton (1943) termed “market equities” in that they dictate who has access to what markets in which to sell their products.

In the first and second degree of separation, the goal for the going concern is to increase its earnings by increasing sales – the ability for the going concern to remain viable depends upon its ability to sell output. Intangible assets have value in these degrees because they allow the concern to boost the volume of sales. However, in the third degree, this way of increasing pecuniary earnings changes.

The Third Degree of Separation

In the first degree of separation, the community is once separated from its joint stock of knowledge through the separation of production and sale. In the second degree of separation, the community is twice separated from its joint stock of knowledge by the separation of the going plant and going business, with the going business controlling the joint stock of knowledge through managerial transactions. As industrial production grows larger, there becomes a third separation – the separation of ownership and control.

With the separation of ownership and control, those who own the company have become removed from those in charge of running the going concern. There arises now a class of absentee owners, whose goal is pecuniary return, regardless of how that return is earned (Veblen 1923). The running of the business enterprise is left in the hands of managers, whose goal is to increase their salaries through their control over the going plant by way of managerial transactions (Herman 1981). This creates three different goals motivating business activity. First, the going plant, due to its being the location of tangible assets, is focused on the production of usable output. The key transactions here are bargaining transactions with the consumers, managerial transactions with the joint stock of knowledge³, and rationing transactions with the joint stock of knowledge⁴ (Dean 2013). Second, the going business, being controlled by the managers who desire for higher salaries, is focused on increasing the amount of value extracted from the going plant, as this is how managers are able to show their worth to the absentee owners qua board of directors (Marglin 1974; Moss 1981). This is done primarily through managerial transactions, as the going business dictates the actions of the going plant. Finally, the wills of the shareholder and absentee owners revolve around increasing the return on their investments. In this sense, the focus is not on the serviceability of output, or even the profitability of the going concern, but on the pecuniary value of the enterprise (Veblen 1904, 1923). In this sense, the absentee owners interact with the going concern through rationing transactions: the activities of the business enterprise must fit within the scope of increasing the pecuniary value.

³ Those in charge of running the plant dictate the way in which the knowledge will be used.

⁴ The size of the joint stock of knowledge dictates what is possible, which limits the possible activities of the going plant.

The third degree of separation is so called because the ownership of the joint stock of knowledge is now separated three times from the community. The absentee owners are separated from the going concern, the concern itself has an internal separation between the going enterprise and the going plant, and the going plant itself is separated from the community. The important feature of the enterprise in the third degree is that it acts in a way to increase its pecuniary earning capacity, thereby increasing shareholder value. Veblen (1904) describes two ways this may occur: increasing the volume of sales or increasing the rate of capital turnover. Intangible assets play an important role in both. As discussed above, they allow for the swelling of the volume of sales by restricting competition. At the same time, however, they increase the rate of turnover, as they may be capitalized upon to allow the going concern to obtain external financing. Goodwill, for example, increases the earning capacity of the going concern as it grants the enterprise control over social relationships. In this manner, goodwill may boost the pecuniary value of the enterprise by giving it a differential advantage over another in the form of customary relations that allow it to maintain a stable consumer base. Furthermore, this differential advantage is capitalized upon, as it goodwill as an asset is used as collateral for loans. In this manner, enterprises with large amounts of goodwill have assets that they can collateralize to increase the rate of turnover (Veblen 1904; Dean 2013). Enterprises without sufficient goodwill are unable to do so, and lose out.

Intellectual property rights, such patents and brand names, offer similar advantages. In the same vein as goodwill, they act as market equities, giving the patent- or brand-holding enterprise access to markets that non-holders do not have, and they may also act as collateral for external financing. At the same time, however, intellectual property rights

offer signaling benefits. Levitas and McFayden (2009) found that enterprises “mitigate the costs associated with raising cash through external capital markets by reducing knowledge asymmetries through highly valued patenting activity.” (p. 675) Patents signal to potential lenders that the enterprise is a successful innovator and therefore worthy of financing at a lower cost. In this manner, they reduce the cost of turnover for a business, allowing it to occur more rapidly. Intellectual property rights, therefore, offer three forms of differential advantage to their holders. First, as market equities, they grant access to markets that non-holders are not able to access to boost the volume of sales. Second, as assets they are able to act as collateral for loans to increase the rate of capital turnover. Third, they allow for financing to occur at a lower rate, thereby actually increasing the goodwill of the enterprise⁵.

What the above has shown is that the evolution of the business enterprise through the first, second, and third degrees of separation involves the separation of the joint stock of knowledge from the community. This separation takes the form of intangible assets, which at first lock out the community from its stock, then grant the going concern market equities, and finally allow for the increase in the rate of capital turnover. In all stages, then, intangible assets function to increase the pecuniary earning capacity of the industry. The next section takes a closer look at the role intangible assets play in industry profits by examining the global pharmaceutical industry.

The Global Pharmaceutical Industry

⁵ Goodwill, as explained by Commons (1924/1974), refers to the fact that buyers are willing to pay a higher price for the product due to some external benefit, such as certainty in the good or not having to go elsewhere. Lowering the rate paid on a loan because the lender has some certainty as to the borrower’s ability to repay is, in this manner, a form of goodwill.

This section examines the role of intangible assets within the global pharmaceutical industry. Specifically, I look at the influence of such assets both at the industry level and at the level of the enterprise – specifically the Pfizer Corporation. At the industry level, I am investigating the performance in terms of revenue of the pharmaceutical core to other industries; at the level of the enterprises, I am investigating the role intangible assets have played in profit rates for Pfizer over time. In doing so, I show the role the accumulation of intangible assets in the third degree of separation plays in granting differential profit advantages.

The Pharmaceutical Industry as a Whole

The first question that must be addressed is who makes up the pharmaceutical industry, and more importantly, which enterprises compose the core of the industry. The industry includes many actors from many different sectors – university researchers and small, individual research centers and biotechnology companies; brand name producers; generic producers; and even insurance companies, HMOs, and doctors – can influence the production and distribution of drugs (Levy 1999; Gagnon 2013). However, to truly understand the way in which the industry operates, we must examine which entities compose the core of the industry, as these are the ones that can truly influence industrial output.

To develop the core, I determine which enterprises are the largest ones as a starting point. Each year, the 500 largest enterprises are listed in terms of revenue in the Fortune 500 and capitalization in the Financial Times Global 500⁶. Table 1 shows the enterprises

⁶ Both are used, as the Fortune 500 data only looks at American companies.

Table 1: Pharmaceutical companies listed in the FT Global 500 and in the Fortune 500 in 2013

Enterprise	Country	FT Global 500 Rank	Capitalization (Billion \$)	Fortune 500 Rank	Revenues (Billion \$)
Johnson & Johnson	US	7	258.4154	41	67.20
Roche	Switzerland	9	241.368	-----	-----
Novartis	Switzerland	17	216.615	-----	-----
Pfizer	US	24	198.515	48	61.20
Merck	US	38	133.60	58	47.30
Sanofi	France	38	140.6941	-----	-----
GlaxoSmithKline	UK	44	129.5903	-----	-----
Gilead Sciences	US	57	115.1544	280	9.70
Bristol Myers Squibb	US	89	87.5137	158	17.60
Amgen	US	92	86.0306	162	17.30
AbbVie	US	94	84.0133	-----	-----
Novo Nordisk	Denmark	99	81243.0	-----	-----
AstraZeneca	UK	117	74.3241	-----	-----
Celgene	US	129	69.6256	456	5.50
Biogen Idec	US	135	66.0384	454	5.50
Abbott Laboratories	US	155	59.2652	70	39.90
Eli Lilly	US	160	57.4591	130	22.60
Valeant Pharmaceuticals International	Canada	251	39.0531	-----	-----
Teva Pharmaceuticals	Israel	263	37.8638	-----	-----
Takeda Pharmaceuticals	Japan	284	36.2515	-----	-----
Allergan	US	319	33.0088	440	5.80
CSL	Australia	359	29.9018	-----	-----
Actavis	US	364	29.24	432	5.90
Astellas Pharmaceuticals	Japan	394	27.0862	-----	-----
Mylan	US	-----	-----	374	6.80

Sources: (Fortune, 2013; Financial Times, 2013)

within the 2013 FT Global 500 and the Fortune 500. There are several issues with simply stopping here. First, this list includes both pharmaceutical and biotechnology enterprises. Biotechnology companies primarily focus on research and development of medications by manipulating microorganisms, enzymes, and other biological substances; this type of research is typically much more costly than chemical research. Upon discovery of a new compound, the biotech will either begin marketing and selling the drug itself or partner with another company – usually a larger pharmaceutical company – to sell the drug (Ferrarra 2011). Pharmaceutical companies, meanwhile, will conduct research in more areas than biotechnology, and due to their size, have the option of conducting R&D in house or licensing research from other enterprises, including biotech (Ferrarra 2011; Gagnon 2014). Therefore, a distinction must be made between those biotech companies that actively produce their own products and those that act as inputs to the production process – they require assistance from the core to bring products to market.

The second issue with the list is that there are certain enterprises included that focus not on the production of new drugs, but generic versions of already produced drugs. While an important part of the industry as a whole, these firms – such as Teva – do not truly engage in new or innovative R&D; they follow the direction of the industry, rather than lead it. Therefore, to include generic producers in the pharmaceutical core would be incorrect. Finally, there is a special case of Bayer. While Bayer is a chemical company, it does play a key role in pharmaceutical markets and must be considered a core member (Gagnon 2009)⁷.

⁷ Bayer, along with Hoechst, were chemical companies that produced pharmaceuticals such as aspirin, vaccines, and pain killers. While Hoechst eventually became Aventis – a core pharmaceutical company – Bayer maintained itself primarily as a chemical company

It becomes necessary, then, to differentiate between those pharmaceutical enterprises which are simply large and those enterprises which are important. Alfred Chandler provides a lens through which enterprises may be evaluated to determine whether they are core members or simply members of the periphery and supporting nexus. This lens is efficiency theory, though what we mean by “efficiency” must be explicitly defined, as Chandler has changed what he means by it since its introduction (Chandler 1977). Initially, efficient enterprises were those that were better at conducting large scale production due to economies of scale; efficiency referred to productive efficiency (Chandler 1977; 1990). However, in the third degree of separation, the purpose of the enterprise is to increase earning capacity, rather than increase output. Therefore, efficiency should be judged from a business perspective in terms of the enterprises ability to generate a return for its absentee owners, rather than in terms of industrial output.

In his later works, Chandler takes a wider view, more consistent with the going concern in the third degree of separation (Chandler 2001, 2005; Gagnon 2009). Rather than judging efficiency based on output, the enterprise is judged based on its “learned organizational capabilities”:

In market economies, the competitive strengths of industrial firms rest on learned organizational capabilities... The capabilities are product related in terms of technologies used and markets served. These product-related capabilities, moreover, are learned and embodied in an organizational setting: individuals come and go, but the organization remains. Thus, in modern industrial economies, the large enterprise performs its critical role in the evolution of industries not merely as a unit carrying out transactions on the basis of flows of information, but, more important, as a creator and

(Chandler 2005). Still, its role in the pharmaceutical industry is too important to not include it as a core company.

repository of product-related embedded organizational knowledge (Chandler 2005, p. 6).

In this sense, efficiency depends upon learned organizational capabilities, which reflect the ability for the enterprise to be a going concern. An efficient going concern is one that is able to evolve and create new knowledge bases upon which output may be produced. Chandler discusses three different types of learned organizational capabilities: 1) research and production, which deals with the research part of R&D and the knowledge required for it; 2) marketing and distribution, which deals with the development part of R&D and the manufacture and marketing of the product; and 3) managerial (Gagnon 2009). For an enterprise to be a member of the core of an industry, it must have these three types of learning bases.

Core companies use these organizational capabilities in such a way to control markets; this is done primarily by controlling networks of production and distribution, which gives these enterprises the ability to direct the course of action for the entire industry. There are typically two types of enterprises that form the core: the first-movers, which are the first to develop the knowledge base and therefore are able to set the pace for the industry; and those enterprises which are able to catch up, usually by entering the industry from a related one after having developed the necessary learning bases – such as Bayer entering pharmaceuticals from chemicals – or by taking advantages of knowledge spillovers (Carlsson & Eliasson 2003). Any enterprise that does not have these three capabilities, no matter how large, is not a member of the core; rather, it is a member of the periphery or supporting nexus (Galbraith 1967). In this sense, they support the core in ways such as research and development, as is the case of most biotechnology enterprises, or the production of generic output.

Gagnon (2014) uses Chandler's learned organizational capabilities to identify which enterprises belong in the core of the global pharmaceutical industry. This information may be found in Table 2. These 15 enterprises constitute approximately 60 per cent of global market shares⁸. In terms of enterprises included in the FT Global 500 and Fortune 500 but not in the core are generic producers, such as Teva and Mylan. These companies, while they manufacture and market their own products, do not engage in new research. Other companies focus on niche markets, so they do not have the same breadth of technical knowledge capabilities required to influence the industry in any meaningful way. Furthermore, some companies, like Takeda, Astellas, and CSL, do have the technological and managerial capabilities to be core members, but not the functional capabilities – they require assistance from core enterprises to produce and market their drugs.

This table gives a clear picture of what the pharmaceutical core looks like. Using this, we may examine how intangible assets impact the ability for pharmaceutical companies to obtain differential advantages. There are two ways in which a company may obtain a differential advantage: differential breadth and differential depth (Nitzan & Bichler 2009). In both cases, there is an expansion of the business activities of the company relative to others in the industry; the difference is in how this is done. Differential breadth refers to increasing the *scale* of business faster than average in the industry. This can be done either externally through greenfield investment that adds productive capacity, or it

⁸ Two of them, Gilead Sciences and Amgen, are biotechnology companies that are included due to their ability to develop integrated learning bases – both research, develop, produce, and sell their own products independently.

Table 2: The Global Pharmaceutical Core, as of December 2013

Enterprise	Country	Global Rank in Terms of Capitalized Value	Capitalized Value (Billions \$)
Johnson & Johnson	US	7	258.4154
Roche	Switzerland	9	241.368
Novartis	Switzerland	17	216.615
Pfizer	US	24	198.515
Merck	US	36	146.2424
Sanofi	France	38	140.6941
GlaxoSmithKline	UK	44	129.5903
Bayer	Germany	54	116.3463
Gilead Sciences	US	57	115.1544
Bristol Myers Squibb	US	89	87.5137
Amgen	US	92	86.0306
AbbVie	US	94	84.0133
AstraZeneca	UK	117	74.3241
Abbott Laboratories	US	155	59.2652
Eli Lilly	US	160	57.4591

Source: (Financial Times, 2013; Gagnon, 2014)

can be done internally through mergers and acquisitions⁹. Differential depth, on the other hand, refers to increasing earnings faster than average without increasing capacity. This, too, can be done internally or externally. Internal depth is achieved through cost cutting, which makes production for one enterprise cheaper than average either by efficiency gains or reductions in input prices. It can also be done externally through stagflation, which increases prices without increasing capacity. Differential depth internally is typically done through the use of intangible assets. Goodwill allows enterprises to sell output at higher prices than average, and allows inputs to be obtained cheaper than average. Patents, by the same token, protect the technology used to produce output cheaper or, more commonly, outright eliminate competition. For the purpose of this paper, I focus mainly on differential depth.

To measure differential depth, I focus on differential profit rates between sectors. This is done by comparing the rate of profit for the pharmaceutical industry to the rate of profit for all other industries. The first step to doing this is to determine what should be used for the rate of profit. Gagnon (2009) identifies five different potential rates: return on investment (ROI), return on assets (ROA), return on equity (ROE), profit-per-employee, and return on revenue (ROR). ROI measures return based on investment in productive assets or productive capacity. This is problematic for two reasons. First, it views the rate of profit as being the result of productivity; intangible assets in the third degree of separation, however, do add to the productive capacity of the enterprise but at the same time increase its earning capacity. Second, R&D expenses are not considered to be part of investment;

⁹ Nitzan and Bichler argue that mergers and acquisitions are more common for three reasons: “it directly increases differential breadth; it indirectly helps to protect and possibly boost differential depth...; and it reduces differential risk.” (2009, p. 330)

they are considered expenditures. Therefore, it is a poor idea to use ROI to measure the rate of profit for the pharmaceutical industry, as it simultaneously diminishes both the role of intangible assets and the expenditures for R&D. Indeed, several studies show that were R&D expenditures to be included, ROI would be between 18 per cent and 36 per cent higher than it is (Clarkson 1977; Megna & Mueller 1991; Jensen 1993). Therefore, comparing ROI for pharmaceuticals to other industries would not give an accurate measurement of the differential rates of return.

The second traditional measurement is ROA. Differential depth according to this measurement would show the difference between profits per unit of assets for the different industries. However, ROA ignores the fact that R&D expenditures and advertising expenditures may become assets in the form of patents and trademarks (Gagnon 2009). Without a way to connect those expenditures to the assets included in ROA, such a measurement is poor for examining rates of profit for the pharmaceutical industry.

Return on equity measures the return on ownership. The problem with using ROE as a rate of profit, however, is that it assumes a direct relationship between profitability and equity, which is not always true. For example, industries with a large equity base may have low ROE but high profits. ROE also depends upon things such as corporate governance and how an enterprise decides to manage its external financing. Furthermore, a company that engages in stock buy-backs reduces its equity and increases ROE, but does not necessarily increase its differential depth. ROE, therefore, is a fickle measure of the rate of profit.

Bichler and Nitzan (2002) use the measurement of profit-per-employee, which should measure the amount of profit generated by each employee of the enterprise. The

problem with such a measurement, however, is that it must assume a homogenous labor force. Different employees are paid differently and have different responsibilities between sectors. In essence, such a measurement attempts to compare the profit-per-employee between a Wal-Mart cashier and a Pfizer researcher, and assumes that something meaningful can be said about the difference (Gagnon 2009).

The measure used here is what Gagnon (2009) calls return on revenue, which measures the ratio of profits to sales. ROR is not concerned with assets or investment, and the fact that R&D and advertising expenditures are excluded from asset and investment calculations is unimportant to revenue, meaning the problems of ROA and ROI disappear with ROR. When dealing with pharmaceuticals, ROR is especially important due to the sales-driven nature of the industry. Because revenue is primarily composed of sales, and because the ability to sell depends upon access to the market and ownership of intangible assets, ROR helps measure the ability of the enterprises to control these social relationships. Gagnon sees ROR as measuring the profit mark-up for pharmaceuticals, as “an increase in ROR means an increase in the mark-up between cost and selling price per unit of a drug.” (2009, p. 250) Ability to control market relations, therefore, is shown with a higher markup and increase in ROR.

The differential profit rates are measured using ROR; these rates were calculated by relating net income to revenue. While historical data for the pharmaceutical core as described is unavailable, Gagnon calculates ROR for the American dominant enterprises using the Fortune 500 database. In Figure 1 and Figure 2, I reproduce and update his

Figure 1: Return on Revenue for Big Pharma and Other Enterprises, 1954-1994

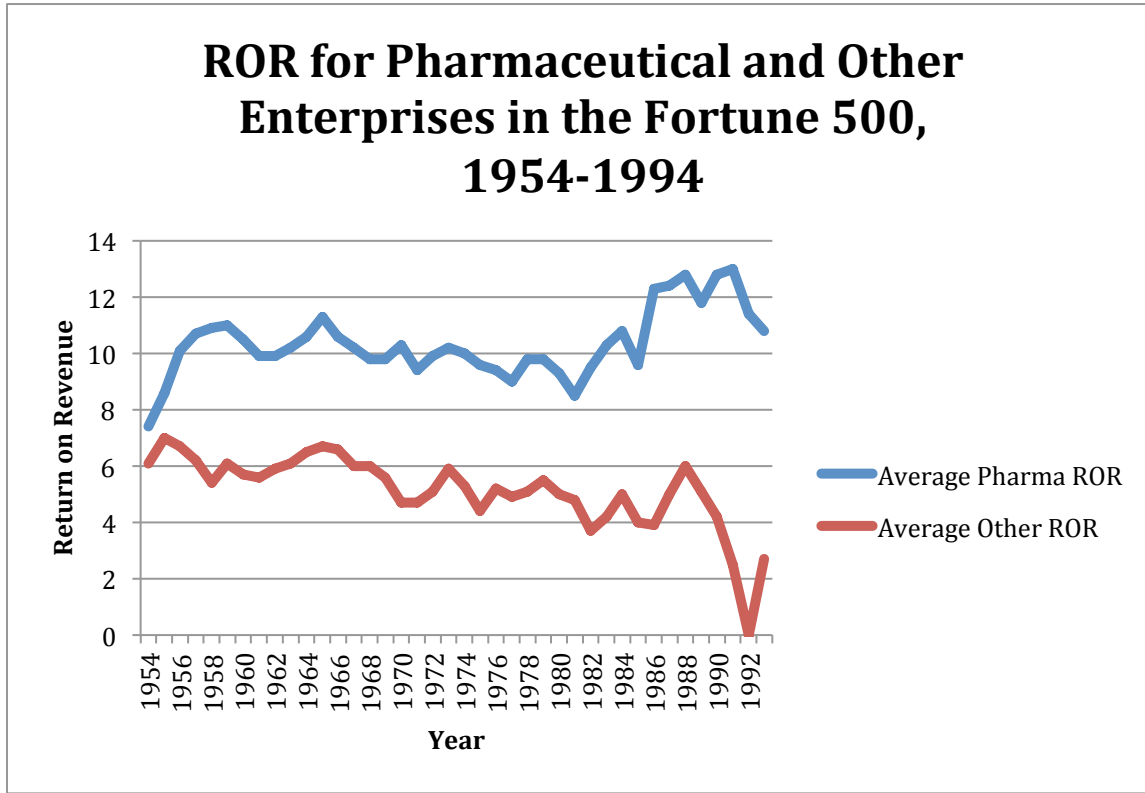
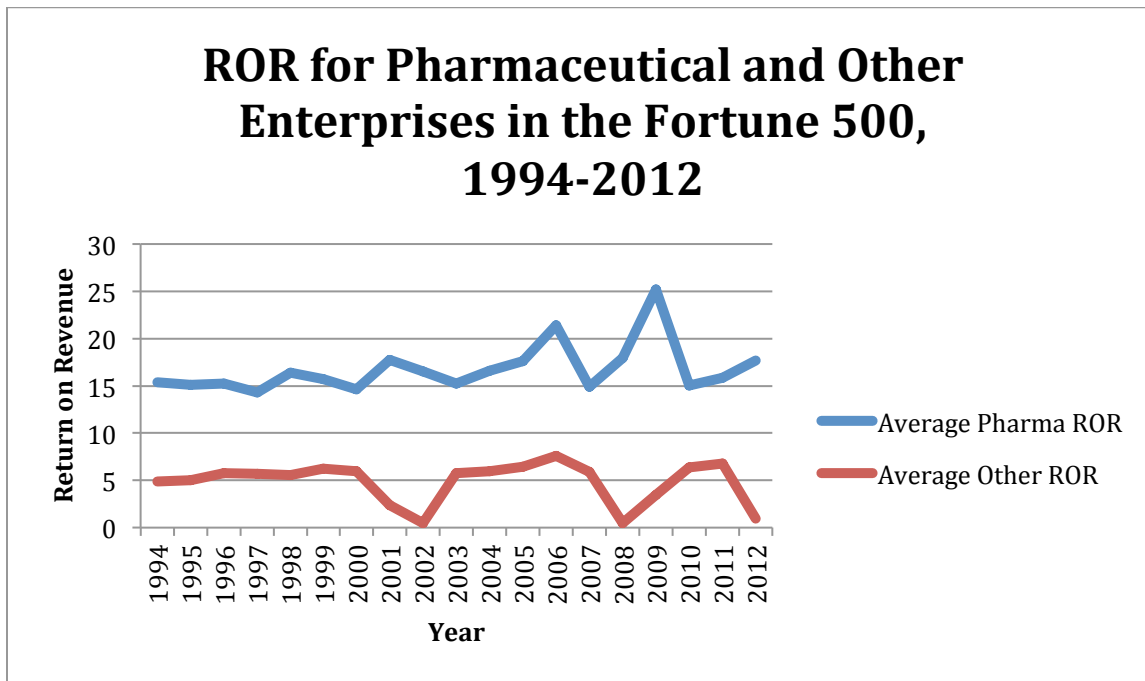


Figure 2: Return on Revenue for Big Pharma and Other Enterprises, 1954-1994



Sources: (Fortune 500, Gagnon 2009)

results¹⁰. The datasets are split into two to account for differences in the types of enterprises included in their rankings. Prior to 1994, the only enterprises included were manufacturing and mining. Since 1994, all industries were included, meaning enterprises in the retail, service, and financial sectors were added.

After an initial surge between 1954 and 1958, which saw the ROR for dominant pharmaceutical enterprise increase from 7.4 per cent to 10.9 per cent, ROR remained fairly stable in the 10-11 per cent range until 1981. Starting in 1981, ROR began to increase, going from 8.5 per cent to 13 per cent. This is quite different from the other Fortune 500 enterprises during the same time. Between 1954 and 1981, ROR for these enterprises gradually decreased from 6.1 per cent to 4.8 per cent, never rising above 7 per cent. It stays in the range of 3 to 5 per cent until 1990, with only 1988 being greater at 6 per cent. Due to the recession in the early 90s, ROR for all non-pharmaceutical Fortune 500 enterprises dropped to nearly 0 per cent in 1992 before beginning to rise. Dominant pharmaceutical enterprises performed much better during this time, with ROR dropping from 13 per cent to 10.8 per cent. Overall, during this period from 1954 to 1993, the average rate of return for dominant pharmaceutical enterprises was 10.36 per cent while the average rate of return for all other Fortune 500 enterprises was 5.13 per cent. In other words, a dominant pharmaceutical enterprise, on average, could expect to have a ROR of approximately 2.02 times that of the average non-pharmaceutical Fortune 500 enterprise.

Not much changes post-1994 when enterprises beyond manufacturing and mining are included in the Fortune 500. Dominant pharmaceutical enterprises still maintain an

¹⁰ Much thanks to Marc-Andre Gagnon for sharing the datasets he used to calculate differential ROR from 1954 to 2006. My changes include a reproduction of 1994-2006 and the years 2007-2012 using his methodology.

advantage over the non-pharmaceutical enterprises, and in fact, increase their advantage throughout the years included. Between 1994 and 2000, both the ROR for dominant pharmaceuticals and for the non-pharmaceutical enterprises stayed relatively stable, between 14 and 16 per cent for dominant pharma and between 4 and 6 per cent for the others. During the early 2000s recession, however, ROR for non-pharmaceutical enterprises drops to 0.5 per cent in 2002 before rebounding in 2003, while ROR for dominant pharma never falls below 14.5 per cent during the same time period. After 2003, dominant pharma begins to widen their advantage, with rates of return jumping to over 21 per cent in 2006 and over 25 per cent in 2009; meanwhile, the peak for non-pharmaceutical enterprises was 7.6 per cent in 2006, and twice during the time period, ROR dropped to below 1 per cent (2008 and 2012). Overall, the average ROR for dominant pharmaceuticals was 16.76 per cent between 1994 and 2012 while the average ROR for non-pharmaceutical enterprises in the Fortune 500 was 4.82 per cent, a difference in magnitude of 3.47.

Overall, then, it seems that dominant pharmaceutical enterprises have a differential advantage over other enterprises, based on return on revenue. Those dominant pharmaceutical enterprises should expect to earn a higher rate of profit than those non-pharmaceutical enterprises. Furthermore, it seems as if this differential advantage is increasing – post-1994, the difference between the average ROR has increased since pre-1994. It also seems as if years in which the rest of the Fortune 500 does poorly – 1992, 2002, 2008, and 2012 – pharmaceutical enterprises have record or near-record RORs. These results are consistent with those found by Spitz and Wickham (2012) and Scherer and Ross (1990). Scherer and Ross found that pharmaceutical enterprises earned 2-3 per

cent more profits per year than other enterprises between 1976 and 1987. Furthermore, Spitz and Wickham compared profits for pharmaceutical enterprises to non-pharmaceutical enterprises, and included a subsample for high-R&D enterprises. Their results showed that pharmaceutical enterprises enjoyed a 3.2 times higher net profit margins than non-pharmaceuticals. Just as striking was that this result was not simply due to higher R&D expenses that pay dividends; pharmaceutical enterprises were found to have profits that ranged between 2.5 to 37 times that of the average high R&D enterprise over time.

Why has the pharmaceutical industry managed to obtain such differential assets? As mentioned earlier, with the second and third degree of separation, control of intangible assets becomes necessary for the success of an enterprise (Veblen 1904). Patents and other intellectual property rights are effectively rationing transactions that limit the number of suppliers of a given drug. In cases where these patents are cross-licensed, the agreements typically include rules regarding prices, with those who refuse not being granted the license (Schifrin 1967; Clarke & Evenett 2003). The effects of intangible assets and the role they play in increasing differential depth can be clearly seen by examining a specific case.

Pfizer, Profits, and Intangible Assets

The Pfizer corporation is a dominant pharmaceutical enterprise and member of the industry's core. Founded in 1849, it was a first mover in the industry, has been a member of the Fortune 500 since the list's inception, and has maintained its standing as a dominant enterprise partially through in-house development of blockbuster drugs such as Zoloft, Viagra, and Lipitor, and partially through mergers and acquisitions of biotechnology and

other large pharmaceutical enterprises. The key for this section will be to examine the role intangible assets have played in maintaining Pfizer's dominance¹¹.

Starting in 2002, these intangible assets are split into three main categories: goodwill; indefinite lived intangible assets, which include things such as brands; and definite lived intangible assets, which include patents. For the sake of simplicity, the latter two are here combined into one category as intangible assets less goodwill¹². Figure 3 shows total intangible assets¹³ as a percentage of total assets, goodwill as a percentage of total assets, and all other intangible assets less goodwill as a percentage of total assets from 1995 to 2013. The rate of profit, measured as return on revenue is also included to give a clearer picture of the relationship between profit and intangible assets. There are several things to note. First, Pfizer made three major acquisitions during this period. In 2000, it acquired Warner-Lambert, which at the time was ranked 139 on the Fortune 500. This accounts for the uptick in goodwill and total intangible assets, as Pfizer acquired Warner-Lambert's intangible assets. It also accounts for the downtick in ROR, as merger expenses reduced Pfizer's net income for that year. In 2003, Pfizer made the acquisition of the Swedish biotechnology and pharmaceutical company Pharmacia¹⁴, which at the time was 106 on the Fortune 500. This led to a massive spike in intangible assets from 5.14 per cent of total assets in 2002 to 52.52 per cent in 2003 (Pfizer, 2014). This also explains the decline in ROR from 28.19 in 2002 to 8.65 in 2003¹⁵. Finally, in 2009, Pfizer acquired

¹¹ Data on intangible assets is found in Pfizer's annual reports starting in 1995.

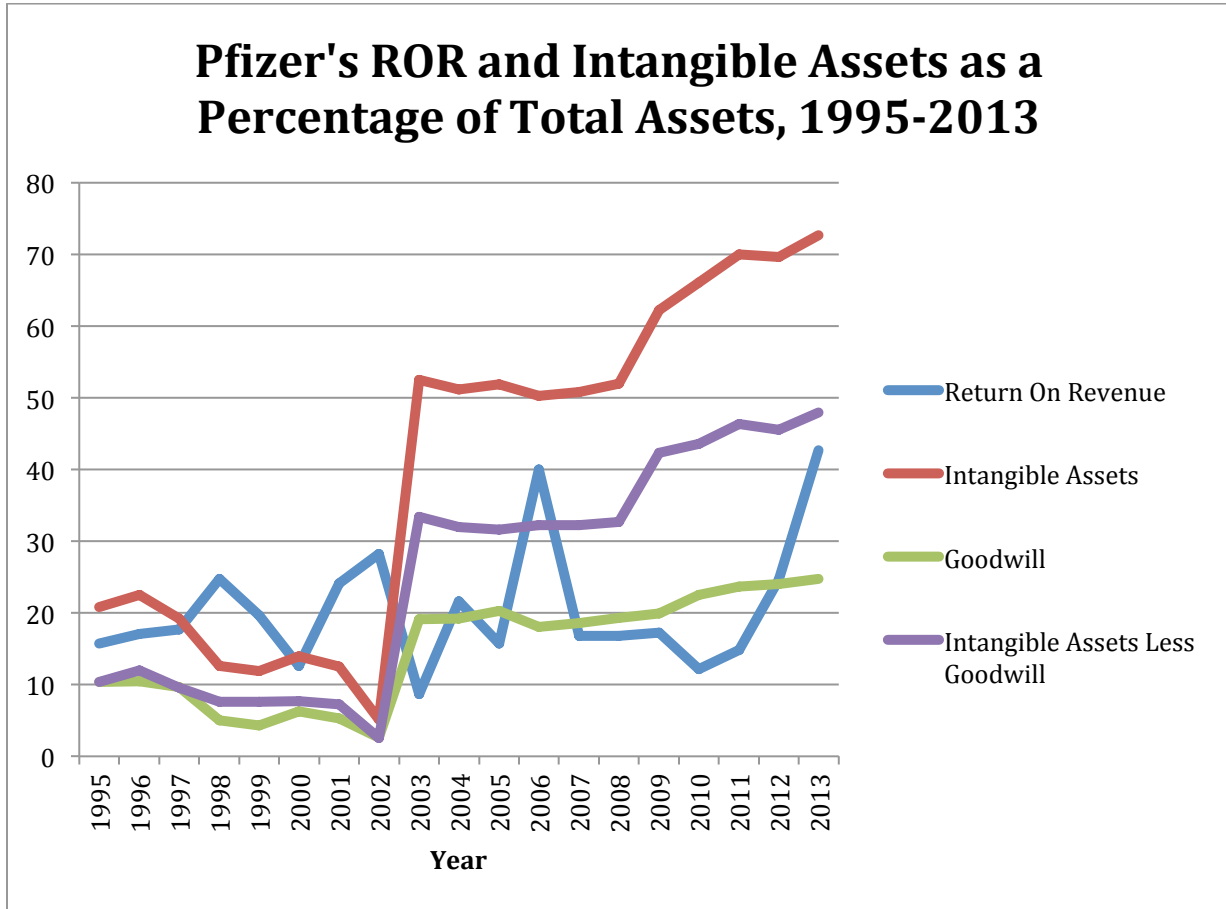
¹² This also makes the transition from pre-2002 to post-2002 data smoother.

¹³ This is gross intangible assets, so amortization costs are excluded.

¹⁴ Much of this was a move to obtain Pharmacia's rights to the arthritis medication Celebrex.

¹⁵ This is Pfizer's lowest ROR in the 18 years observed.

Figure 3: Pfizer's ROR and Intangible Assets, 1995-2013



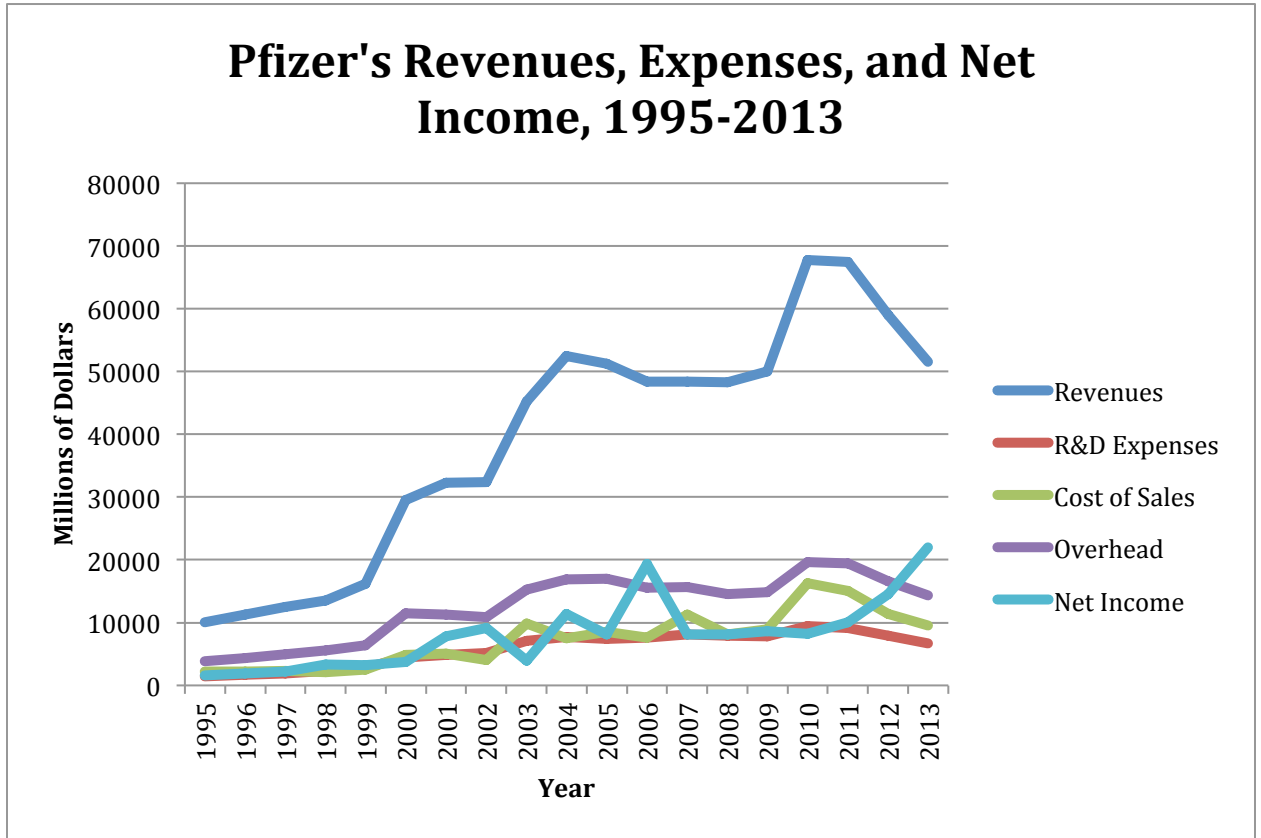
Source: (Pfizer, 2014; US Securities and Exchange Commission, 2014)

another member of the global pharmaceutical core when it purchased Wyeth for \$68 Billion. This led to an increase in intangible assets from 52 per cent in 2008 to 62.25 per cent in 2009. ROR also actually increased from 16.78 in 2008 to 17.27 in 2009, before dropping to 12.18 in 2010. Since the Wyeth acquisition, intangible assets have grown, from 66.09 per cent of total assets in 2010 to 72.65 per cent in 2013. Likewise, ROR has risen from 12.18 in 2010 to 42.65 per cent in 2013, a record setting year.

We can expand upon this by looking at Pfizer's revenues and expenses to determine the key behind the pattern behind the ROR. Figure 4 shows Pfizer's revenues, R&D expenses, cost of sales, overhead costs, and net income between 1995 and 2013. This gives us a more clear look at the relation between revenue, net income and several important expenses, allowing us to examine whether the observed ROR is simply due to reductions in costs, rather than something more. As the graph shows, the only clear instance of decreases in costs likely playing an important role in increases in ROR are the most recent periods; all major expense categories declined between 2011 and 2013. It is also worth noting that revenue declined during this period as well, while net income increased. In this manner, sales and expenses were reduced, while ROR increased, as did intangible assets as a percentage of total assets. Furthermore, the increases in ROR that occurred after the acquisitions of Warner-Lambert and Pharmacia were not due to reductions in costs; in fact, all three categories of expenses increased, as did revenues and net income.

The increase in ROR over the time period, then, is likely due to the effect of intangible assets and the control they give Pfizer over the social relationships involved in the production and sale of pharmaceuticals. This not only includes control over knowledge

Figure 4: Revenues, Expense, and Net Income



Source: (Pfizer, 2014)

in the form of exclusivity rights through patents, but also control over the market relationships. As figure 4 shows, overhead costs, including advertising, are a greater expense to the corporation than either the production of output or research and development, an action that helps increase goodwill.

Conclusion

The purpose of this paper was to examine the role that intangible assets played in influencing profits in the pharmaceutical industry. I began with a discussion of the theoretical issues of intangible assets and how the evolution of the business enterprise through the first, second, and third degree of separation can be traced based on the roles that intangible assets play in each stage. During the first degree, intangible assets serve to close off the community from its joint stock of knowledge through the creation of both tangible property rights and intangible property rights. In this way, the joint stock of knowledge becomes a tool used for exploitation; those who have such property rights are able to extract a payment from the community for use of its own knowledge. In the second degree – the separation of the going plant from the going business – intangible assets control access to markets through what Hamilton (1943) calls market equities. Finally, in the third degree – the separation of ownership and control – intangible assets are used as a means of increasing pecuniary earning capacity. However, in all three stages, the main role of intangible assets is to grant the owner differential profits through the control of social relations. This analysis is supported by the experience of Pfizer and the pharmaceutical industry in general – revenue increases more or less coincide with increases in intangible assets. In fact, the spikes in Pfizer's net income coincide with the time of its mergers with Warner-Lambert, Pharmacia, and Wyeth – each of which also boosted its intangible assets.

Future research should develop further the role of intangible assets in creating differential advantages. For example, this paper only looked at issues of differential depth with regards to profit differentials; future research should also take into account market structure and its influence on differential depth. Furthermore, I did not investigate how such intangibles influence differential breadth – while I do address the importance mergers play in Pfizer’s ability to obtain a differential advantage by acquiring other enterprises’ intangible assets, future research should investigate this further.

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