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X-INEFFICIENCY IN MONOPOLIES

An analysis of the causes of x-inefficiency in the cases of IBM and Xerox.

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1. Introduction

Despite its history of “trust busting” and efforts to reduce monopoly power, the United States is home to many companies with strong monopoly power, if not true monopolies. However, many economists argue that the anti-monopoly laws and regulations have not been effectively enforced in America since the 1980s (Lynn, ix). The increase in monopoly power should result in increased economic profits, because monopolies should be able to generate above-average economic profits in the long run. However, in practice, many monopolistic firms wind up becoming “fat, slow, and stupid” over time. The lack of competitive pressure produces what economists call x-inefficiency, which results in firms falling behind on technological advances, and having bloated overhead costs to their production. Thus, there is a trend of firms with great monopoly power causing issues within industries, and throughout our society (Lynn, 27). What exactly causes the x-inefficiency, however, is not readily apparent.

The x-inefficiency observed between the theoretical success of a monopolistic firm, and the practical failure that is so often observed, can be explained in one of two ways (Needham, 45). First, the firms may be behaving in such a way as to cause failure, in which case government regulations on monopolies might be warranted. This explanation, coupled with the fall of economic empires during the 1930s, is why monopolistic regulations exist in the first place (Geisst, 126). It is also possible that the monopolies also lack new growth opportunities, or the skill sets to move into new industries. So, they expend resources, which raise costs, in hopes of finding a new market. Secondly, it is also possible that government regulations are causing the x-inefficiency observed in firms with strong monopoly power. Either these monopoly

regulations are hindering the firms' ability to perform, or the threat of anti-trust legal action is enough prevent monopolists from being aggressive competitors. In this case, the negative consequences of the regulations may outweigh the benefits. Therefore, such regulations might appropriately be relaxed, in order to allow for firms to experience the success that is suggested by economic theory.

This paper will take a case study approach to studying the efficiency and causes of decline for monopoly firms. The focus of the analysis will be on two firms: IBM, and Xerox. The main causes of failure studied will be financial issues, mismanagement, and regulatory cases. One theory is that, as monopolies operate, one begins to see a differential between growth of profits and expenditures. Thus, the firms become "fat and slow." The company may also become bogged down with overhead, attempting to maintain unsustainable and unnecessary levels of employment. Compounding this issue, many managers fail to accurately predict the movement of the industry, causing firms to fall behind their competitors and become obsolete. Additionally, anti-trust laws often curtail what actions can be taken by the firm, regarding mergers and patents, as well as making companies wary of making strategic moves that may attract the attention of regulators. It is possible that any of these factors may be the root source of the x-inefficiency observed in monopolies.

2. X-Inefficiency: Why Monopolies Fall

Monopoly decline, this research has found, comes down to four main factors: not predicting market trends, mismanagement, behavior when faced with regulatory barriers, and wasting resources looking for new markets. Not accurately predicting the behavior of the market can cause a company to fall behind competitors. Said

competitors, if they more accurately predicted the movements of the market, can gain a significant lead on a firm that has not been so accurate in its predictions. Firms with strong monopoly power fall into this trap most frequently, because they become entrenched in what they do best, and fail to adapt. This is most notable in IBM, which was so focused on its mainframe computers that it didn't direct enough attention to the development of a personal computer. The firm did make its own personal computer, but IBM put it together with pieces developed by other companies, and did not want to own either the software or operating system (Carroll, 24). Because of its unwillingness to follow the market into personal computing, IBM stuck to its specialty, which became largely obsolete.

Mismanagement also contributes to the failure of firms with monopoly power. Xerox, in particular, had a large and successful research department, but rarely managed to take any innovations to market. Xerox's management and decision-making teams provided such a barrier to innovation, that the company missed out on being first to market with many lucrative inventions. Because of the way in which firms with monopoly power are structured, often having more personnel than necessary, such firms can sometimes encounter such situations where there are too many cooks in the kitchen. Xerox's management was not on the same page, and so getting anything other than its standard copiers to market proved a challenge for the company.

Regulatory barriers contribute to the failure of monopolies as well. Firms with monopoly power can be directly affected by anti-trust legislation, or indirectly affected. Xerox was detrimentally affected by an anti-trust suit brought against it by the Federal Trade Commission. The FTC alleged that Xerox's patent structure made the industry

exclusive, and difficult to enter. Following this suit, Xerox lost most, if not all, of the advantage that it had built up through its patent structure. Much of its monopoly power was concentrated in its patents, so this was a harsh blow for the company. More indirectly, IBM faced similar repercussions as a result of an anti-trust lawsuit. Although the case brought against IBM by CalComp was decided in IBM's favor, the court did conclude that the firm had significant monopoly power. This finding likely made IBM wary of any business ventures that may lead to further monopoly power, or other lawsuits. The risk of regulatory action may make firms with monopoly power gun shy, thus preventing such firms from operating or expanding to their true potential.

Finally, when firms become very large in one market, they may seek to expand into other markets. This attempted diversification could be due to wariness of anti-trust violation in the current market, or a lack of opportunities for further growth within the current market. However, many firms become entrenched in doing what they know best, and flounder in their attempts to enter new markets. When firms seek to enter new markets, it is important to draw from the resources that the company already has, rather than try to enter an unrelated market. Though the products need not be related, the resources necessary to produce and market said products must be (Collis & Montgomery, 75). Both IBM and Xerox stumbled in this regard, attempting to enter markets for which they did not have the resources to compete. Ironically, IBM made attempts to enter the copying industry, while Xerox spent significant research and development funds putting together a computer. Unsuccessful attempts to compete in industries that the companies were not equipped for would have siphoned off resources and focus from the primary enterprise, and could contribute to decline.

3. Background

3.1 Monopoly Power

3.1.1 Industry Concentration:

Industry concentration is a measure of monopoly power within an industry. The measures of industry concentration take into consideration how many firms are in the industry, as well as how much of the industry is dominated by the largest firms, usually delineated by the largest four or eight firms. The higher the concentration ratio for an industry, the closer that industry will be to a monopoly (Melicher, Rush, & Winn, 49). Few firms in practice are pure monopolies, but many firms with high degrees of monopoly power are regarded as “monopolies.”

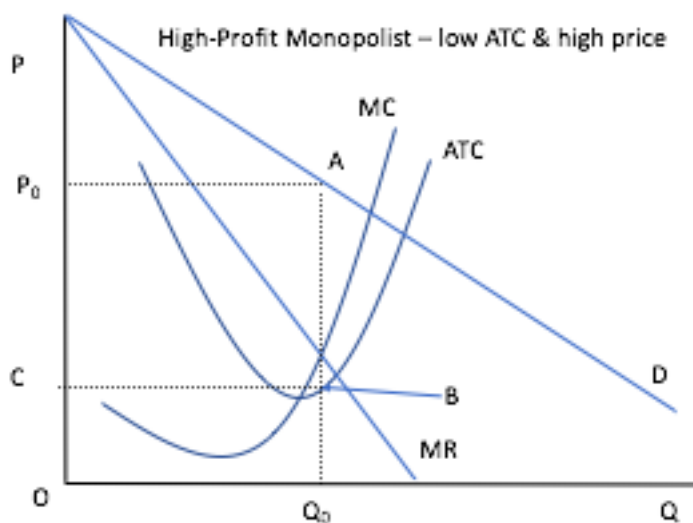
Measures of industry concentration can be taken in several ways. The Lerner index measures an industry’s departure from perfectly competitive conditions. Thus, in this scale, zero indicates perfect competition, and higher numbers indicate greater levels of industry concentration. The Gini index, similarly, measures an industry’s departure from conditions wherein each firm has equal market share. Thus, the Gini coefficient is mainly an indicator of inequality between firms in an industry. The four firm concentration ratio is simply a measure of the percentage of total industry sales controlled by the largest four firms in an industry; the eight firm concentration ratio is the same measure, but for the largest eight firms. The Herfindahl-Hirschman Index values an industry with only one firm at one. The value decreases as more firms enter the industry. This index is particularly helpful, as it weights firms dependent on their size (Scherer 57-58).

3.1.2 Monopoly Characteristics

In a pure monopoly there is only one firm. Therefore, the firm is the industry. This model, in its most pure form, is rarely found outside of theory, though it becomes easier to find pure monopolies if you define the market as small enough. Many firms have some degree of monopoly power, wherein it can control some elements of the industry through its behavior, but few industries fit the mold of the perfect monopoly (Shubik & Levitan, 6). As seen in graph 1, the monopolist has absolute control over setting the price of its product, although there are often government regulations dictating certain aspects of the monopolist's behavior. Firms with strong monopoly power, which control a majority of their industry, may exhibit similar characteristics. Although not pure monopolies, such large, dominant firms tend to have significant control over the industries in which they operate. Most countries regulate monopoly behavior in some way; many countries, the United States included, have strong legislation on the books to control firms that operate as monopolies. The monopolistic industry will have high barriers to entry, which protect the status of the monopolist within their industry. These firms will also likely operate under economies of scale.

Economies of scale, which the monopolist will likely enjoy, dictate that as production increases, the average cost of production will decrease. The increased volume of production works to decrease average costs in some way, largely because of bulk purchasing of raw materials and distribution of fixed costs. If an industry has high fixed costs, then the relative cost of producing will decrease as more is produced; the high costs will be distributed across a large volume of production, and each unit will cost relatively less to produce.

Absent regulations, the monopolist will also enjoy above-average economic profits. This is because of the inelastic nature of their demand. Whereas the competitive firms cannot change their price, because of a variety of substitute products existing in the market, consumers have no alternative to the product created by the monopolist. If the monopolist raises its price, the quantity demanded for their product will not decrease as much as in an industry where there are significant alternatives. Therefore, by altering prices the monopolist can increase its profits fairly easily; the barriers to entry prevent other firms from taking advantage of the high economic profits, and pulling customers away from the monopolist.



(Nowlan)

Graph 1

3.1.3 Monopolist Price Setting and Profits

The price elasticity of demand in an industry is affected by the concentration of said industry, and impacts the profits of the firms. The more firms there are in an industry, the more close substitutes there will be for consumers to choose between; firms within industries such as these will experience demand that is highly price elastic, though

elasticity for the whole industry may be low. Therefore, these firms will have less control of price, and will amass lower profit margins. The less price elastic the demand for a single firm, the more control a firm will have over its prices and the larger its profit margins will be.

The ability to set their own price is an integral factor in firms' ability to earn profits. In a highly competitive industry, regardless of what production costs are, a firm won't be able to change its price unless the entire industry is doing so. Therefore, the only recourse to increase profits is to sell more product, or to decrease production costs. However, a firm with monopoly power is able to alter its price. Depending on the price elasticity of demand for the firm, this strategy can significantly increase profit, without altering their production or their costs. In addition, monopolists are also more likely to practice price discrimination, thus further increasing their economic profits.

Profit is the amount of money that a firm earns from their production, after all costs are accounted for. Economic profit, specifically, further accounts for the opportunity cost of production. As previously discussed, economic theory indicates that industries of various concentrations should earn varying degrees of economic profit. The conditions that dictate the classification of an industry further contribute to the amount of profit that a firm should be expected to earn. Monopolists, in theory, should always earn above average economic profits. The prediction of success is based on several characteristics of the monopoly industry.

3.1.4 Barriers to Entry

Barriers to entry can also influence the amount of profit that a firm is able to generate. It is not clear in economic literature whether barriers to entry work

independently of industry concentration, or whether their effect is captured within the effects of industry concentration. Regardless of the exact influence of barriers to entry, there are several barriers to entry which can contribute to both higher industry concentration, and increased profits for firms within that industry (Needham, 159).

One fairly simple barrier to entry is the barrier of economies of scale. When an enterprise has high fixed costs, entry at an appropriate scale requires large capital outlays. The larger the firm, the better it can distribute the high fixed costs associated with production. Therefore, only large firms will be likely to survive in an industry where economies of scale are required or prevalent (Hay & Morris, 50). Because few firms begin as large firms, it is difficult for any new firms to break into an industry where the established players are all operating with economies of scale.

The regulatory environment surrounding the industry can also prevent new entrants from joining an industry. Some industries, such as utilities, are referred to as natural monopolies, due to economies of scale. Natural monopolies typically attract government regulation of behaviors. Less obvious regulations can also contribute to increased profits and concentration. Environmental regulations, for one, can make participation in an industry more difficult and costly, thus discouraging entry. These regulations, however, can often have more of an effect on the location of a firm, rather than the decision of whether or not to enter an industry.

Another fairly simplistic barrier to entry is start-up capital. If an enterprise requires significant capital at the outset, which may not be fully recouped for many years, then there are many firms that will not be able to enter into the industry. A smaller firm in

particular may not be able to justify the capital outlay to enter into the venture, if it knows it will be a particularly expensive undertaking.

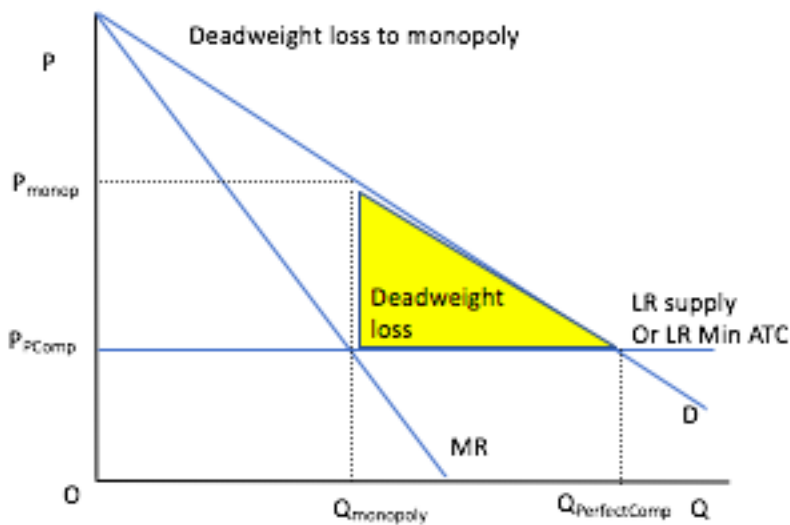
Advertising intensity of previously established firms can also act as a barrier to entry. The amount of capital that a firm puts into advertising can be instrumental in building brand loyalty and creating exposure. Thus, if a new firm wishes to break into an industry, it will have to contend with consumers who may be inundated with advertising for a competitor firm. In order to be an effective competitor, the new firm will have to expend significant capital towards advertising, just to keep up with existing firms in the industry. Furthermore, this spending does not go towards tangible assets, such as land or equipment, which could be resold if necessary. This advertising is a gamble for the firm, and the money expended becomes a sunk cost, which can effectively never be recouped, should the firm fail.

3.2 Efficiency and Inefficiency

3.2.1 Allocative Efficiency

The general concept of efficiency centers around the idea that resources and goods have a value. This value is ascribed to them by the society that utilizes the resources; thus, any use of the resource must be in alignment with the value that the society places on the good. Each resource should be put to its highest valued use. If one use of a resource is valued at \$10, and valued in a second use at \$11, then the resource should be allocated to the second use. This is, generally, the concept of allocative efficiency. If a market is operating under allocative efficiency, then it can be said that resources are being properly allocated, given the values of the society.

If resources in a society are being misallocated, however, a welfare loss to the society can occur. Monopolistic industries are one potential source of resource misallocation. Monopolists, if unregulated, will set their price above marginal cost, in order to generate high economic profits. These high prices restrict output, and therefore resources wind up being allocated to causes that may be less highly valued by the society. Because the resource allocation in this circumstance is being determined by artificially skewed product demand, the true value that society places on the good is not being reflected. In this instance the producer of the good is receiving a net welfare gain, because of the higher economic profits, but the consumers are taking a net welfare loss, because of the misallocated resources. The loss of consumer surplus tends to outweigh the gain to producer surplus under these circumstances, leading to a net welfare loss to society, as seen in graph 2 (Scherer, 400).



(Nowlan)

Graph 2

3.2.2 Productive Efficiency

Productive efficiency, following from allocative efficiency, deals with the way in which resources are utilized. After resources are allocated to a given purpose, those resources have to be utilized in some way. If those resources are being used efficiently, then productive efficiency has been met. If, however, a producer is misusing or wasting resources, or not using them to their full productive capacity, then there will be a productive inefficiency.

Productive efficiency can result from a number of factors, including technological limitations and improper employment of labor. However, often mismanagement can contribute significantly to productive inefficiency. Particularly in monopoly firms, management can have the decision-making leeway with which to create inefficiency. If the monopoly management “[tolerates] inefficiency and sheer waste,” then their production can move to the inside of the production function curve, and productive inefficiency will occur. This situation would not occur in a profit maximizing enterprise, such as in a perfectly competitive industry, where a firm would be forced to produce along the production function (Scherer, 405).

3.2.3 X- Inefficiency

X-inefficiency, a term first coined by Harvey Leibenstein, is the name for the inefficiency which occurs in firms when cost minimization is not a given. Often, people and organizations do not work as effectively as they could in theory. These inefficiency losses, which exceed losses that are purely attributable to misallocation, are often correlated to monopoly power. The originating study of this concept postulated that much of the root cause of this correlation is due to a lack of competitive pressure.

Where there is light competitive pressure, individuals and firms are unlikely to take extreme efforts, or risk interpersonal and interfirm relations, to achieve greater efficiency (Leibenstein, 413).

Economic theory does, in some ways, indicate that monopolies will inherently produce less inefficiently than firms with competition. Productive efficiency occurs where the firm is producing at its lowest possible average total cost. Allocative efficiency occurs when the firm has priced its good at the marginal cost of production. Because competitive firms charge a price equal to marginal revenue, when they produce at a profit maximizing point their marginal cost will equal price, and average total cost will be minimized. Therefore, competitive industries can force firms to produce where both productive efficiency and allocative efficiency are present. In a monopoly industry, however, the monopolist sets its own price. In order for the monopolist to produce at allocative efficiency, they would need to produce at a loss, thus causing it to be essentially impossible for an unregulated monopoly to have productive and allocative efficiency occur simultaneously. The monopolist can produce at a socially optimal level if regulated or subsidized, but the subsidies can cause welfare losses to society too. Economic literature, though it sufficiently covers the effects, says little about the causes of x-inefficiency.

3.3 Regulation

3.3.1 Reasons

Broadly, it can be said that there are five categories of reasons by which a government may become involved in the regulation of a monopolistic industry. One such reason is if the industry is a natural monopoly. Under these conditions, the most

productive industry organization is a monopoly, and government may become involved to ensure the industry remains monopolized, while preventing the firm from charging monopoly prices. A second reason is to prevent monopoly and limit growth in monopoly power. Third, governments may become involved in industry to mitigate externalities. Externalities are effects, positive or negative, on individuals not involved in the industry, which a firm may not properly pay for in its costs. For example, air pollution is a negative externality, which regulations can force a company to account for in their costs. Fourth, governments may become involved in an industry in order to force income redistribution, which can be done through laws such as minimum wage restrictions and price ceilings. Finally, governments can create laws which maintain standards of production. Such laws can keep monopolies, or other firms, from producing a sub-standard good (Papps, 10). For the current paper, preventing monopoly and limiting the growth in monopoly power is the critical regulatory issue, broadly known as anti-trust policy.

3.3.2 US History of Anti-Trust Law

The Sherman Antitrust Act was passed in America in 1890, and was the manifestation of public concerns regarding monopoly. The act prohibited monopolization, conspiracy to monopolize, and restraint of trade. Though this act reflected an American preference for a competitive, free enterprise, system, actually legislating such a system has proven difficult. Such a disparity may be explained by the difficulty of forcing competition to exist where it does not naturally. Although competition is desirable, it is not easy to keep the economy competitive through force (Massel, 2).

The Sherman Act, which outlawed restraint of trade and monopolization, was followed by the Clayton Antitrust Act, which worked to make the broad provisions of the Sherman Act more specific and pointed. For example, the Clayton Act contains provisions as specific as to outlaw many types of price discrimination. While the Sherman Act merely outlawed monopolization as a whole, the Clayton Act went further to outlaw specific actions that could cause monopolization (Massel, 45).

The same year as the Clayton Act was passed, 1914, the Federal Trade Commission Act was enacted. This Act established the Federal Trade Commission and outlined its functions. For example, Section 5 outlaws “unfair methods of competition,” and “unfair or deceptive acts,” and makes it the Federal Trade Commission’s job to monitor and regulate any such activities (Massel, 46). Together, the Department of Justice and the Federal Trade Commission evaluate anti-trust cases.

The long history of court case precedents are part of the public record, so firms with substantial monopoly power are likely to add legal staff to help guide the firm away from illegal activities. Anti-trust lawsuits are expensive and can take management’s focus away from running the firm. So, even without a case being brought, firms may see the legal barriers and change their behaviors to avoid having a case filed against them. Thus, the legal framework can cause firms to raise costs by hiring lawyers and become less aggressive in competition.

3.3.3 US Regulatory Laws

In the United States, regulatory laws typically allow for private ownership of industries, with government regulation. Public production, though present, is not a large portion of American output. One such form of government regulation comes in the form

of commissions, which exist for some industries within the United States, and regulate operation and production within their respective industries. Such commissions attempt to regulate three facets of industry operation. The commissions attempt to control rates charged by companies, rates of return earned, and the service provided (Papps, 45). As these scenarios only apply to natural monopolies, such controls apply exclusively to utilities industries.

These commissions and regulations exist largely because of the attitude towards industry and government operation in the United States. People are generally favorable towards privately owned enterprise, and would prefer government regulation to outright government operation. Thus, when an industry has some measure of monopoly power, rather than trying to take over the industry, the government will use regulation in an attempt to artificially apply pressure on the firm. This pressure can be applied largely through restriction on the profits a firm can earn (Papps, 49).

There are, as can be expected, costs to government regulation of industry. One such cost is an externality resulting from the creation of a monopoly, and a failure to properly regulate it. If the government allows for monopolies to exist, but does not regulate effectively, then there can be negative effects on the economy from the negative externalities associated with monopoly production. Externalities that are regulated, such as monopolies inflating market prices, are regulated in many cases. Real externalities, such as pollution, however, are generally not regulated by the public utilities commission, which regulates price. Other costs derive from the real costs of regulation, namely administrative costs, delay costs, and contingency costs. The running of commissions comes with inherent costs, and there are costs to regulated

firms which are unable to quickly react to market changes when regulated, and have to plan for the uncertainty of future commission actions (Papps, 51).

Although all industry is regulated through general laws, industries with strong monopoly power tend to face more regulation. Specifically utility companies tend to be heavily regulated, if not publicly owned. Commissions exist for some industries, that regulate production, price, and operation. Such regulations are utilized in order to apply competitive pressure to the firm artificially, in an attempt to keep the monopoly from becoming complacent. Regulations inducing competitive pressure would alleviate some of the x-inefficiency observed in monopolies, assuming that the x-inefficiency is caused by the firm itself, and the way in which it operates.

4. IBM

4.1 Background

IBM was born from a merger of three independent companies in 1911. The International Time Recording Company, the Computing Scale Company, and the Tabulating Machine Company were consolidated by financier Charles R. Flint into the Computing-Tabulating-Recording Company, or CTR. When Thomas J. Watson, Sr. was made general manager of the newly formed CTR he began pushing the company in a research and engineering direction, coining the motto "THINK" (IBM, 1910s).

Less than a year after joining CTR, Watson had been made the president of the company. Under his leadership, revenues more than doubled within four years. Because of the company's rapid growth, the old name of CTR became limited, and restricting for the activities that the company wished to pursue. In February of 1924 CTR formally became known as International Business Machines Corporation, or IBM.

Even during the Great Depression IBM managed to continue growing, which was in sharp contrast to the state of the rest of the American economy. During World War Two, the company made its facilities open for use by the United States government, and began manufacturing items such as bombsights, rifles, and engine parts. IBM took only a one percent profit on the items, and set up a fund for widows and orphans of war casualties (IBM, 1940s). The fact that IBM was in a strong enough position to take such measures immediately following the Great Depression speaks to its financial strength and stability during this time period. During the war, IBM also made its first steps into the computing market. The firm introduced the Automatic Sequence Controlled Calculator, also known as the Mark I, in 1944. This machine, which was the first to execute long computations automatically, took six years of development, was over 50 feet long, eight feet high, and weighed five tons (IBM, 1940s).

Following the Mark I, IBM continued to make technological advancements in computing machines. The IBM 701 used vacuum tubes, rather than electromechanical switches. These large machines were used primarily by the government and for research work, but they were moving into private use for payroll and inventory control as well (IBM, 1950s). When Watson Sr.'s son took over the company, he lived up to his father's mantle of moving the company in a new direction. Watson Jr. saw potential in the private business market, and began moving IBM towards being a leader in the computer industry. He also moved the company towards "unbundling" their offerings, which led to the birth of software and services industries (IBM, 1960s). However, the company's primary focus remained on mainframe computers, the market which they had dominated.

IBM, at its peak, was a goliath of a company. It was the largest technology company of its time, comparable to Apple today. In 1967, IBM was valued at \$258.6 billion, adjusted for inflation to 2017 dollars. IBM was the top company in the United States at this time (Shaw & Kollmeyer). As a member of the United States technology sector, IBM remained fairly dominant throughout the early to mid 1980s. In August of 1987, IBM was still the dominant maker of computers, and set a record high with their stock price of just over \$175. At this time, IBM was the only company in the United States with a market value of over \$100 billion. (Norris).

However, the 1980s began a shift in the computing market, and a shift in IBM's fortune. A new CEO, John R. Opel, had taken control of the company in 1981, and personal computers were a growing segment of the computing market. Though IBM had been at the forefront of technological advancement in the computing market since its inception, this shift was a stumbling point for the company. Even the IBM account of this period acknowledges that the IBM personal computer was "not a spectacular machine" (IBM, 1980s). After nearly a century of technological leadership and market domination, IBM was laid low by their failures in one market segment, which would grow to become a multi-billion dollar industry in its own right (Carroll, 25).

4.2 Decline

The decline of IBM as a corporation, by most accounts, begins with their missteps in the personal computer industry. IBM's attempted foray into personal computers, a huge industry today, began with an informal meeting between a mid-level executive and Bill Gates, who had dropped out of Harvard to begin his own company. Gates' company, Microsoft, was formed with the "hacker culture" of the time, which

proved to be at odds with IBM's staunch sense of bureaucracy. While IBM maintained the expected company model of middle aged company executives, Microsoft was run by men in their early twenties, who "maintained the intense focus [of] teenage boys" (Carroll, 12).

Gates' expertise was in programming language, which would simplify use of a personal computer enough so that an average person could easily use the device. Prior to the introduction of basic programming language, all computers ran on a binary code, which a user would need to learn and become proficient in before they were able to really use the computer. Microsoft's basic programming language would make computers accessible to an average layperson, which was essential in the production of computers for the general public. Because of the importance of this programming language, IBM was very interested in obtaining this advancement from Gates and Microsoft (Carroll, 11).

However, working with Microsoft did not always go smoothly for both parties. One of the largest issues in their working relationship was miscommunication. Keith Sams, a representative from IBM, wanted to purchase an operating system. This software acts as a translator between the user and the computer. Although the technology was difficult and expensive, it would allow users to forego the necessity of learning computer language. Sams, however, assumed that Gates had an operating system to sell; Gates, on the other hand, had worked out an agreement with an operating system company, Digital Research Intergalactic (DRI). Gates would write programming language, and DRI would produce operating systems. DRI and IBM, in their initial meetings, did not create a smooth working relationship, and as such IBM

was unwilling to purchase an operating system from the company. Gates was told to “find or write an operating system somehow or the deal for Microsoft’s languages was off” (Carroll, 18).

Though Microsoft was initially reluctant to create its own operating system, they eventually decided that creating one would be beneficial. However, it would take them longer than IBM was willing to wait to create the system from scratch. Microsoft then, however, found out about an operating system, termed QDOS, that someone had already developed, and would likely license to Microsoft. IBM, however, was reluctant to venture into software. IBM wanted to take pieces from other people, and make its money through compiling the pieces into a personal computer. Because of IBM’s reluctance to move on picking up the operating system, Microsoft seized the opportunity instead. For \$75,000 Microsoft bought the system and led the personal computer industry, becoming a multi-billion dollar company. Microsoft, though a tiny enterprise with personnel in the double digits, managed to gain a strong foothold in the personal computer industry from the start, occupying a very advantageous position. IBM, though a huge corporation, missed getting on the front end of the industry, and is still playing catch-up today (Carroll, 25).

Though it seems that IBM made a miscalculation in choosing not to fully embrace the personal computer or enter the software market, it may be that a cultural problem within their firm caused their decline. A slightly different take on the firm characterizes IBM as a company with cyclical rises and falls, due largely to falling behind in technology and desperately scrambling to catch up to the rest of the industry. Angering customers through changing their strategy of “singleness” also played a part in their

decline. This second take on IBM's decline frames their performance issues as an ongoing and systematic issue, rather than merely a one-time strategy miscalculation (Mills & Friesen, vii).

IBM, in its descent, began straying from the promises made to consumers. Mainframe computers were falling by the wayside, in favor of newer machines that were faster, cheaper, and more versatile. In addition to being outdated, IBM's quality began to slip. Deliveries were made late, and devices didn't meet IBM's prior standards. The company fell into decline as promises and reputation failed to induce and sustain consumer loyalty. The beginnings of decline sent management into a panic, which only served to further expedite the difficulties the company was facing (Mills & Friesen, 4).

Though IBM suffered from falling profits, technological lag, and poor decisions regarding corporate partnerships, it can be argued that these are effects, not causes, of their decline. IBM had lost sight of where the industry was going. Although IBM president Watson thought "there is a world market for about five computers," the market did not agree (Strohmeyer). Personal computers became a commodity during the time that IBM was focusing on mainframe computers. Not predicting the change in the market, and perhaps actively refusing to see that change, certainly contributed to IBM's decline. Some analysis also traces IBM's fall from grace to the root cause of broken promises. Customers were promised high quality technology and service, and a close relationship with IBM, while employees were promised job security (Mills & Friesen, 8). The promise to customers was broken in order to finance expansion, which failed to materialize. After the failed expansion, the promise to employees was broken to bail out shareholders (Mills & Friesen, 9). With both employee and customer relationships

tarnished, IBM was unable to continue to realize high profits and growth, thus thrusting them into the difficult period they faced during their foray into personal computers.

5. Xerox

5.1 Background

Xerox began its history as the Haloid Company, in 1906. On the fringe of the photography industry, Haloid set about designing a new kind of paper. This innovation came out in 1933, and successfully shielded the company from the worst effects of the Great Depression. In 1935, Haloid purchased the Rectigraph Company, which manufactured photocopiers that used Haloid paper. During World War II, Haloid flourished as the company providing high-quality photo paper to the war effort, for aerial reconnaissance. However, after the war, Haloid needed to develop more products to stay competitive against new paper manufacturers. Thus, in 1947, Haloid contracted with a company from Columbus, Ohio, to create a machine that would conduct the process of xerography (Lewis et al., 476).

Xerography was invented by a patent lawyer in 1938. The process involves copying documents with light and a resinous powder, known as toner. The introduction of the XeroX Copier was, at first, lackluster. It required a lot of manual processing, and made frequent errors. However, sales derived from the copiers ability to make masters for offset printing funded the development of a second-generation model. Haloid was made the sole licensing agency for xerography related patents, which was the start of their monopoly in the photocopying industry.

In 1958, Haloid became Haloid Xerox Inc., which reflected the new direction of the company. Although their paper products were still more profitable at this time, the

introduction of the Xerox 914 copier in 1960 tipped the scale. The first automatic Xerox copier was large, weighed 650 pounds, and could be leased monthly from Haloid Xerox, to make the device affordable for smaller businesses. The success of this enterprise prompted Haloid Xerox to change its name to Xerox Corporation when it was listed on the New York Stock Exchange in 1961. At this point, the formerly dominant photo operations were shuffled away under the newly formed Haloid Photo Division (Lewis et al., 477).

In 1963, Xerox developed a desktop version of their copier. It sold well, but was not particularly profitable. Still relying upon sales of their larger copiers, Xerox opened the Palo Alto Research Center (PARC), and began a foray into computing. Despite developing what may be the first personal computer, the PARC innovations were largely overlooked by Xerox in the grand scheme of things.

In 1970, IBM released a copying machine. This was Xerox's first real competition in the industry; though the IBM machine wasn't up to Xerox's technological level, it was backed by the IBM reputation. Xerox responded to the burgeoning competition, not with a new innovation, but with a lawsuit. The patent infringement suit resulted in IBM paying Xerox \$25 million, in 1978. At their height, in 1974, Xerox controlled 85% of the worldwide, plain-paper copying market, which gave them substantial market power (Lewis et al., 478).

5.2 Decline

Xerox's decline can likely be said to have started with the loss of their monopoly, when IBM introduced its copier in the early 1970s. Much of its success had been due to Xerox's complete control of the market (Hiltzik, xiv). In order to compensate for the loss

of their monopoly, rather than adjusting to the competitive pressure, Xerox turned to the legal route. Though their lawsuit was ostensibly won, when IBM paid Xerox \$25 million, Xerox no longer held the strong monopoly that it had prior, and it became clear that other companies could be players in this industry if given the chance.

Although Xerox was successful in their case against IBM, not all of the lawsuits they were involved in worked out favorably for them. Xerox's decline can be, in part, linked to the anti-trust cases levied against them. While Xerox was successfully defending its patent against IBM, they were also being attacked for violating anti-trust laws. One such case was brought by the Federal Trade Commission (Lewis et al., 478). In this case Xerox was charged with using patents to possess monopoly power in the sale and lease of office copiers. The language of the complaint accuses Xerox, in essence, of using their patents to create a barrier to entry for the copier market. Through this method, Xerox was accused of monopolizing the industry (McKeown, 3). Ultimately, Xerox entered into an agreement with the FTC, wherein they would take certain penal action, but the suit would be dropped with no admission of guilt on Xerox's part. But, it is likely that Xerox now clearly saw regulatory limits, and may have become less aggressive as a result.

Xerox, with its focus on defending its monopoly against anti-trust lawsuits, fell behind the burgeoning competition in other ways. Kodak and IBM came out with new copiers, which were more sophisticated than the Xerox model. When these companies chose to lease their devices in the same manner that Xerox had done, they stole important clients from Xerox, thus crippling Xerox's business. Although Xerox spent hundreds of millions of dollars on research and development, it released few new

products. Consequently, Xerox fell behind its competitors and lost more than half of its market share. By 1985, Xerox's market share in worldwide, plain-paper copiers had dropped to 40%. Xerox's revenues, however, grew during this same time. This revenue growth came down to a near liquidation, wherein Xerox sold the machines it had previously leased (Lewis et al., 479).

Furthermore, Xerox stumbled in its forays into other industries. Though Xerox is known for, and sometimes eponymous with, copiers, they also branched out into other avenues. Their typewriter, released in the early 1980s, captured 20% of the electric typewriter market (Lewis et al., 479). However, their foray into computers, at their PARC facility, proved to be an overwhelming failure from a business perspective. Xerox was, by all accounts, the first to develop much of the technology that contributes to personal computers today. Yet Xerox controls none of the market for any of these products. Its inability to properly bring these innovations to market proved to be their downfall, with IBM, Apple, and Microsoft taking the profits and market share that could have belonged to Xerox (Hiltzik, 389).

Much of Xerox's decline in the technological field can be attributed to bureaucracy and poor decision making. Xerox developed a laser printer, but hesitated for five years in bringing it to market. Because of this lengthy hesitation, IBM beat them as first to market with a laser printer. In order to even make it to market, innovations by Xerox had to make it through layers of bureaucracy, and competing ideas for how Xerox should be run, and which direction the company should go in (Hiltzik, 390).

6. Analysis

6.1 Anti-Trust Case Specifics

6.1.1 The Federal Trade Commission v. Xerox

This litigation against Xerox was a serious impediment to their hegemony over the copying industry. The complaint, brought forth by the Federal Trade Commission, contained ten allegations relating to patent misuse. Xerox was charged with the following:

1. Monopolizing and attempting to monopolize patents applicable to office copiers
2. Maintaining a patent barrier to competition by attempting to recreate a patent structure which would be equivalent in scope to expired patents
3. Developing and maintaining a patent structure of great size, complexity, and with obscure boundaries
4. Using its patent position to obtain access to technology owned by actual or potential competitors
5. Entering into cross-license arrangements with actual or potential competitors
6. Including in licenses under United States Patent Number 3,121,006 provisions having the effect of limiting licensees to the manufacture and sale of only coated paper copiers
7. Offering patent licenses applicable to plain paper copiers with provisions which, in effect, limit the licensee to the manufacture or sale of low speed copiers
8. Including in patent licenses provisions having the effect of precluding the licensee from utilizing Xerox patents in the office copier market
9. Entering into and maintaining arrangements with Battelle Memorial Institute Inc. and Battelle Development Corporation...pursuant to which Battelle is required to convey to Xerox all patents, patent applications, and know-how coming into its possession relative to xerography
10. Preventing actual and potential competitors from developing plain paper copiers while permitting them to develop coated paper copiers (McKeown, 3).

These charge elements, at their source, accuse Xerox of attempting to monopolize the plain paper copying industry, through misuse of patents. The various elements claim

that Xerox was attempting to circumvent patent laws, create barriers to entry, and collude with other companies in order to maintain control over the industry.

In 1974, during pre-hearing negotiations, an agreement was reached between Xerox and the FTC. In accordance with this agreement, Xerox accepted several remedial actions, in exchange for the case being withdrawn. Under this agreement, Xerox did not have to admit to any wrongdoing. However, Xerox did need to grant a nonexclusive license under any of its office copier patents upon written request, provide licensees with know-how for a reasonable charge, and was barred from acquiring patents or exclusive licenses on office copier patents for a period of ten years (McKeown, 2).

Xerox, in negotiating this case, likely spent significant time and monetary resources. Instead of devoting their resources to developing new products or getting their products to market, Xerox had to devote itself to holding the regulators at bay, and defending its monopoly power. While fighting and negotiating the case, Xerox fell behind their competitors, and lost ground in the market to IBM and Kodak (Lewis et al., 478). The case likely also brought some degree of bad publicity to Xerox, thus hurting their public image. The most obvious negative effect brought upon Xerox by this case is in the settlement itself. Xerox was essentially stripped of much of its monopoly power. Much of their power in the industry was concentrated in their patents. When they were forced to offer royalty free licensing, and required to provide know-how to their licensees, the company lost a lot of what had made it a force in the industry. This case took away the strategic advantage gained through patents and secrecy, and forced

Xerox to rely on products and research and development alone to maintain their position of supremacy.

6.1.2 California Computer Products Inc. v. IBM

California Computer Products, or CalComp, manufactured computer products, namely disk drives and controllers that were compatible with IBM computers. CalComp would purchase and reverse engineer IBM technology, improving upon the technology where they could. By skipping IBM's costly research and development phases, CalComp was subsequently able to undersell IBM (Stelzer, 58).

CalComp began their suit in 1973. The complaint "alleged that IBM's introduction of new CPUs and disk products, its price cuts on existing disk products, its leasing policies, and other marketing practices prevented CalComp from effectively competing" (Stelzer, 58). These actions, according to CalComp, took place over a ten year span, resulting in damages totaling \$306 million. The suit claimed that IBM was creating an anticompetitive environment for three types of company: general purpose computer systems manufacturers, leasing companies, and IBM-compatible peripheral equipment manufacturers. CalComp, however, was found unable to sue on the first two grounds. The Clayton Act, in Section 4, "confers standing to sue only upon those persons causally injured by anti-trust violations (Stelzer, 58). Because CalComp was a peripheral equipment manufacturer, it could not sue IBM for any anti-trust violations relating to an industry of which it was not a member. On the grounds of the peripheral equipment manufacturing, however, the lawsuit was allowed to continue.

In order to prove their monopolization suit, CalComp was required to show that IBM possessed monopoly power in the relevant market, had willfully acquired and

maintained that power, and that causal anti-trust losses had occurred (Stelzer, 60). In order to prove an attempt to monopolize it had to be shown that IBM had intent to control prices or destroy competition, predatory or anticompetitive conduct intended to cause monopoly, dangerous probability of success, and had caused casual anti-trust injury (Stelzer, 61).

Ultimately, it was found, and affirmed by an appellate court, that IBM had not caused anticompetitive injury to CalComp. Rather, the judge found the opposite. CalComp mainly based their claims on lost revenues due to IBM price reductions. However, IBM's stimulus to make their price cuts was competition from CalComp and other peripheral equipment manufacturers. Therefore, the action was not taken to exclude or restrict competition, but rather IBM had lowered prices because of a highly competitive industry environment. As the Sherman Act was meant to protect competition, and not competitors, the appellate court found that it could not find in favor of CalComp, whose position was that IBM could not compete if such competition would harm its competitors (Stelzer, 67).

However, the appellate court did agree that IBM possessed monopoly power in the relevant market. After reviewing all of the testimony, the court assumed that IBM did possess the relevant monopoly power, and focused their review on whether or not IBM had acts or practices that intentionally violated the laws on monopolizing, or attempting to monopolize (Stelzer, 64). Although IBM was not found liable for damages to CalComp in this case, the finding that they did hold monopoly power could have been damaging to the company in other cases. Since it was taken as a given that they held monopoly power, any other company that wanted to sue IBM for anti-trust violations

would need only prove intentional actions. Further, such a finding could have opened IBM up to action from regulatory bodies, such as the Federal Trade Commission. As a result, IBM may have become less aggressive in its business strategies, for fear of legal action.

6.2 High Overhead Costs

For both Xerox and IBM, there was a point reached where employment levels were unsustainable. Although some of the data was not obtainable, it is clearly shown that during their periods of decline there was a drastic decrease in employment. Leading up to these declines in employment, the companies had grown in size due to a growth in revenue. However, growth in employment reached unsustainable levels, and thus employees had to be purged when the companies began to decline.

When companies are experiencing rapid growth there is a risk of the firm becoming bloated. Employment increases, but as growth begins to slow employment does not follow suit. Thus, the company winds up with more employees than it needs or can afford to keep on. Notably, after the companies entered periods of rebuilding, both IBM and Xerox near immediately began adding employees once more. Xerox, in particular, went through several periods of adding and then removing employees within the span of a few years. The cycle of attempting to grow beyond its means, and then reverting back to its former size, is indicative of an unsustainable attitude towards employment, which contributed to both companies' downfalls.

6.3 Mismanagement

Xerox, though it invested significantly in research and development, never managed to become a particularly innovative company. Much of the cause for their lack

of innovation lies in mismanagement. Xerox established PARC, its Palo Alto Research Center, and let it run wild. The researchers were largely free from oversight, and allowed to follow their research wherever it took them. However, Xerox rarely took the inventions of PARC to market. Xerox was too mired in the copying industry, and did not have the resources or skills necessary to move into new markets, while also maintaining its position in the copying industry. PARC, in the annals of business history, is known for being “ignored by its parent company while earning billions for others” (Hiltzik, xxvi). Although PARC did make money for Xerox, the most profitable invention to come from the enterprise was the laser printer—still in the field of copying. Xerox had the opportunity to branch out into other technological fields, but through corporate bureaucracy managed to lose nearly every lead it had in technological development. Xerox’s management, with its levels of bureaucracy and poor decision making, prevented the company from becoming what it could have been, and contributed significantly to its eventual decline.

IBM had its own experience with mismanagement, though seemingly not as endemic as Xerox’s. IBM’s most notable issue with management comes from its squandered opportunity to partner with Microsoft in the development of a personal computer. Through several meetings, IBM and Microsoft were poised to make a deal in creating a personal computer. Microsoft had found an operating system, and all that remained was to purchase it. Ultimately, IBM executives did not want to work with the operating system, as they felt that software was not something that the company should be “bogged down in” (Carroll, 24). Because of this choice, Microsoft purchased the operating system, and made their fortune off of software. IBM’s management, in

negotiations and dealings with Microsoft, set the smaller company up to make a fortune, while putting themselves at a disadvantage in the industry.

6.4 Bad Predictions of Market Trends

Although both IBM and Xerox fell into the trap of poorly predicting market trends to some degree, this characteristic is most notable in IBM, with their attitude towards the personal computer. IBM's difficulty in predicting market trends can be traced all the way back to its CEO, who once notably said "there is a world market for about five computers" (Strohmeyer). The company also never gave the product its full attention. Rather than developing its own personal computer, IBM wanted to "pull pieces together from the outside" (Carroll, 24). IBM's attitude towards the personal computer project was not that it would be particularly important; the executives wanted to compile parts developed by other people, and devote as little of their own resources to it as possible.

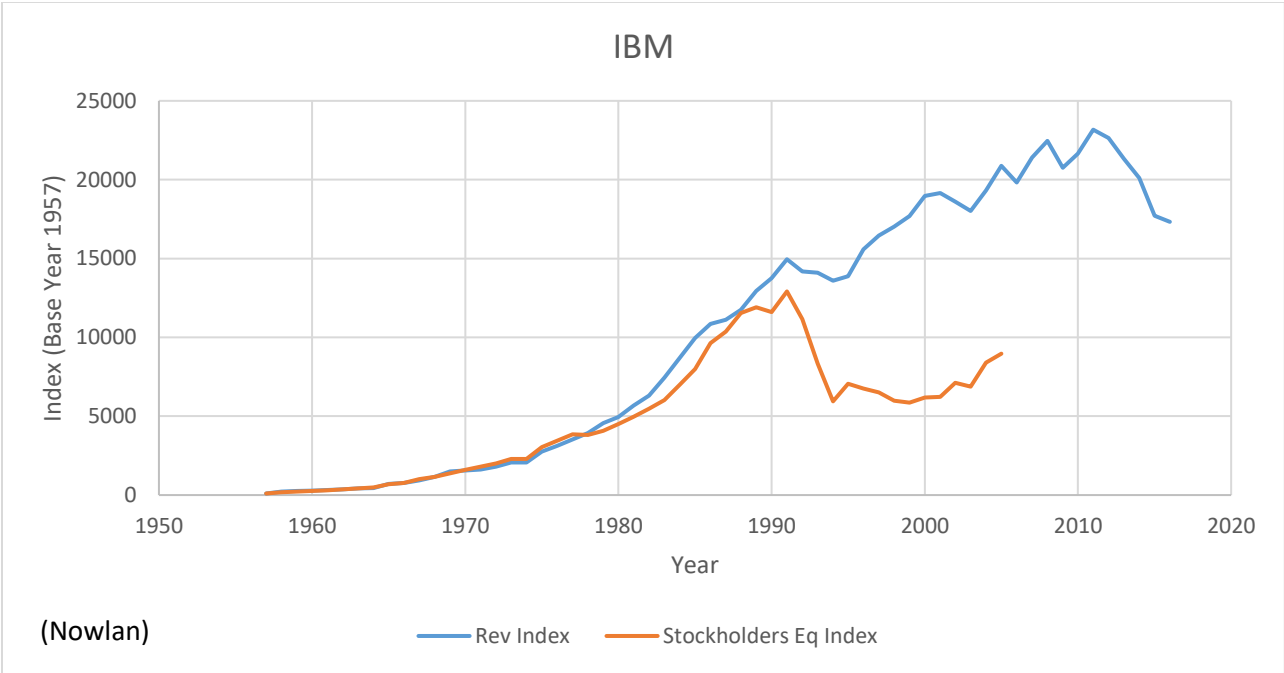
Their attitude towards the project, and the importance that they placed on it, was a large factor in IBM's decline within the computing industry. When the whole industry shifted towards personal computers, IBM was behind the curve because of its unwillingness to move in that direction, even when the industry was signaling that personal computers were the future. When IBM didn't get into the personal computer industry on the ground floor, it set the company up to enter the industry at a disadvantage, which was very difficult for IBM to recover from.

6.5 Financials

6.5.1 IBM

An analysis of company performance can be accomplished through comparison of several related metrics. Stockholders' equity indicates the general performance of the

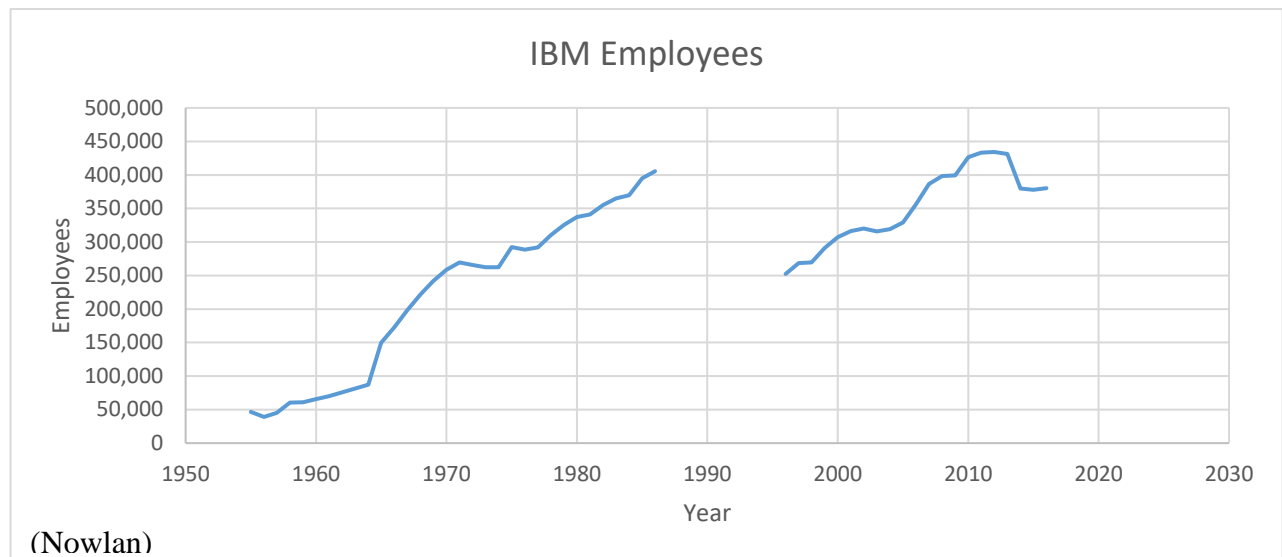
company, as well as the public perception and valuation of their performance. Revenue indicates their sales, and is indicative of their performance amongst consumers of their product. Number of employees is used to show how the company is doing in terms of their management and overhead. If the company is under-performing, or on a decline, for revenue and market value, then their employee numbers should be either constant or similarly declining. During growth periods, firms often hire more employees, sometimes becoming “bloated,” and overstaffed. If the company’s overhead becomes too heavy, then that can become a drag on profits during periods in which the company is declining or stagnating. Comparing all three, through the use of indices, can paint a picture of how firm management is handling decisions during a time of decline.



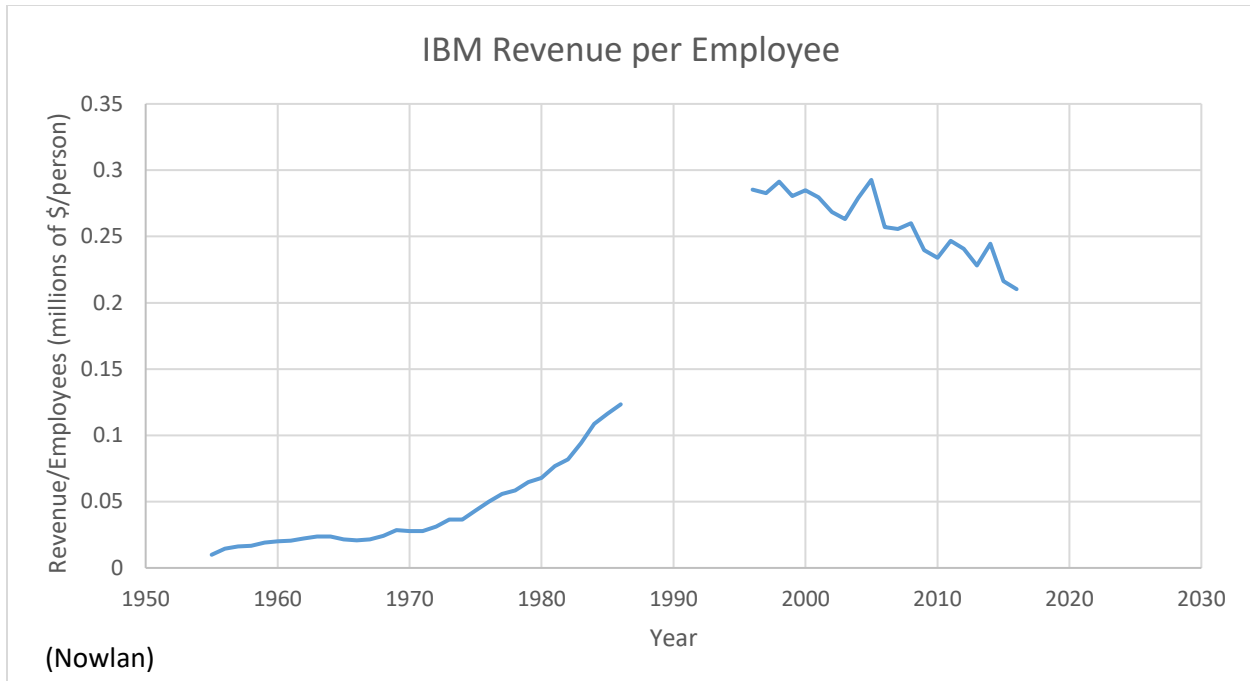
Stockholders’ equity data for IBM was taken from the Fortune 500 archives, while data for revenue and number of employees was derived from both Fortune 500 archives and SEC annual 10k filings. This data goes back to 1957, with a few gaps in coverage. As decline for IBM began in the mid-1980s, this data shows their decline, as well as

their revival and growth. The data for revenue and stockholders' equity were indexed to base year 1957.

Stockholders' equity and revenue experienced many of the same patterns over this time period. The metrics both grew consistently through the 1980s, before experiencing a decline, and then grew and declined in a generalized upwards trend. However, stockholders' equity declined more sharply than revenue, and did not recover as well. Revenue continued to grow rapidly, while stockholders' equity grew at a much more modest pace for the years immediately following IBM's decline. Because stockholders' equity and employees moved at a more steady pace, while revenue continued to grow rapidly, there were likely still issues present within management of the firm. They were still generating sale revenue increases, but not managing their assets and liabilities, and not keeping a sustainable level of employment. These trends indicate that IBM may have been bringing in revenue, but not converting that into profits. Because of this disparity, it is possible that the recovery is partially artificial in nature, and may not be as sustainable as investors and IBM would hope. Further, the poor performance of stockholders' equity, when compared to revenue, could be a signal that shareholders and the public have doubts about the company's performance.



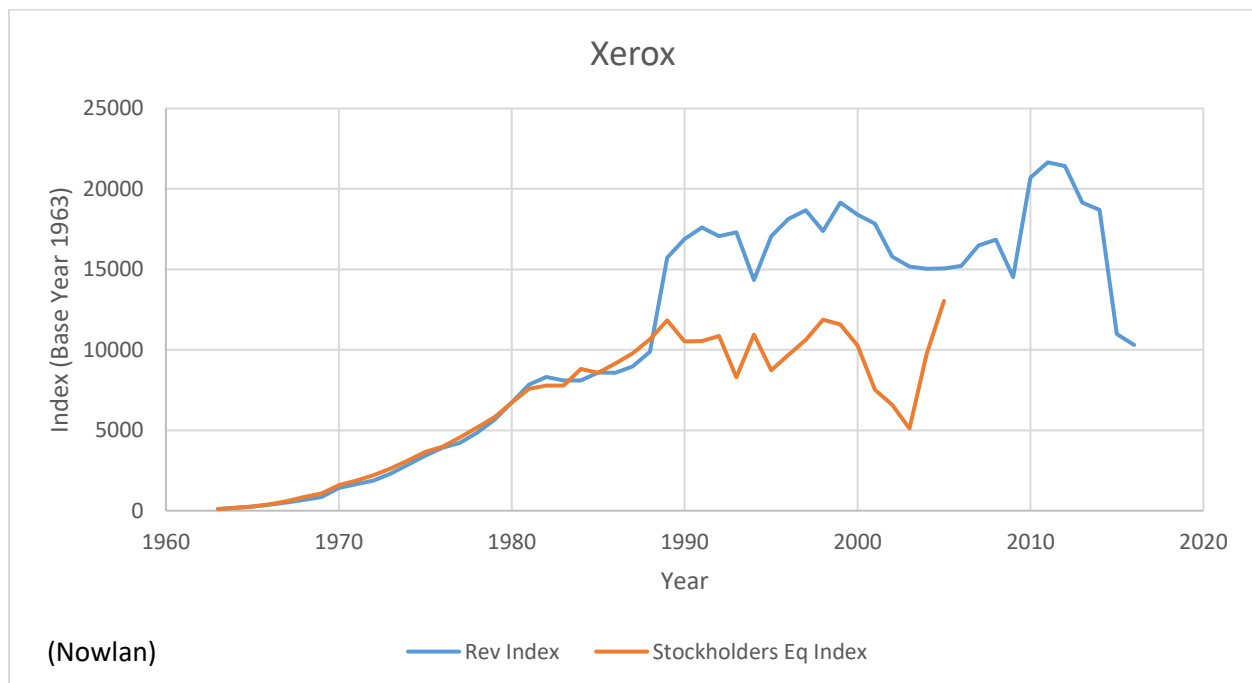
Going into the gap in data, IBM had 405,000 employees, while coming out the company had 252,215. This gap in data coincides both with IBM's decline, as well as with the market shift from mainframe computers to personal computers and networks. This decline in employment, occurring over the company's worst performance years, shows the difficulties they were having, and may indicate that they had become overstaffed. The employment numbers proceeded to grow back to what they were in 1986, before slowly declining again. This pattern seems to show that IBM continues to move past a sustainable level of employment for their company.



Initially, the revenue per employee measurement shows growth, even as employee numbers are increasing. This growth indicates a clear increase in revenues, offsetting the growth in employment. Coming out of the gap in data, however, the gradual increase in revenue per employee has instead spiked to a peak value. This rapid growth is likely due to the corresponding decrease in employment that occurs during the gap in data. Because there are so many fewer employees, the revenue per employee is much higher. However, as the data continues, and IBM begins to hire more employees, the revenue per employee begins to decrease. This change indicates that the increase in revenue per employee was in part an artificial increase; it only occurred because of a decline in employees, not because of improved revenues. Because revenue per employee is decreasing as IBM hires more employees, it can be inferred that the company is becoming overstaffed, and thus operating less efficiently.

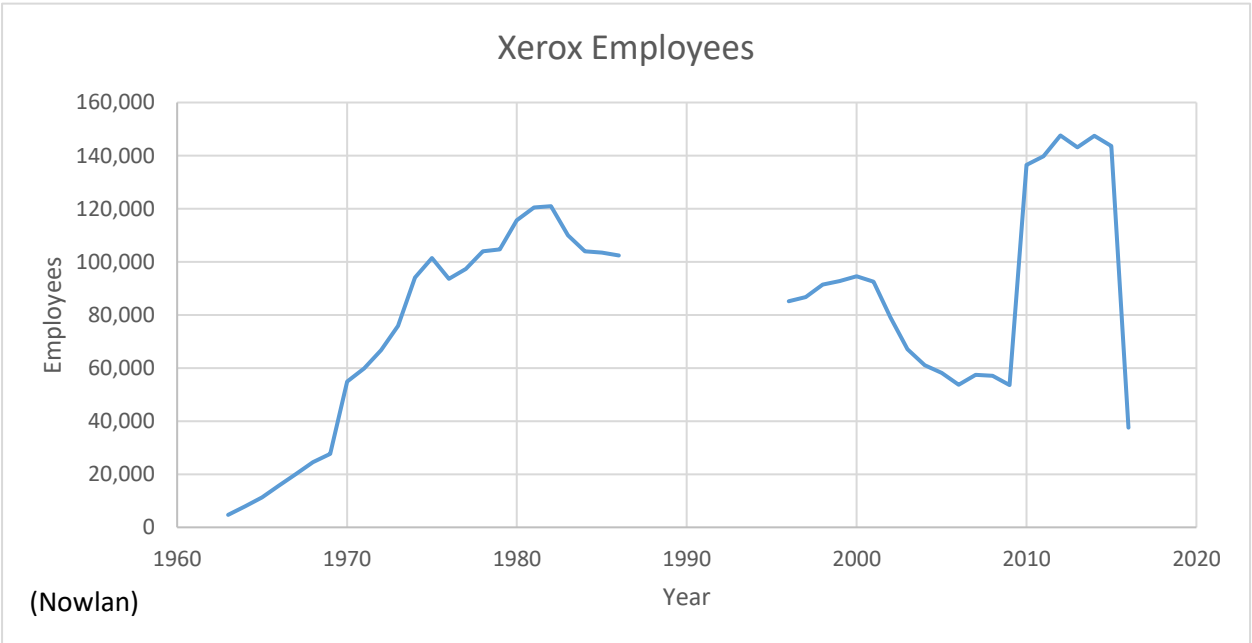
6.5.2 Xerox

The same metrics and sources were used to analyze Xerox's performance as were used for IBM. Revenue, stockholders' equity, and employees were indexed to a base year of 1963. Between the years of 1987 and 1995 there is a gap in data for employees, as Fortune 500 did not report employee data for those years. Stockholders' equity only goes until 2005, as that is where the Fortune 500 archives stop reporting.



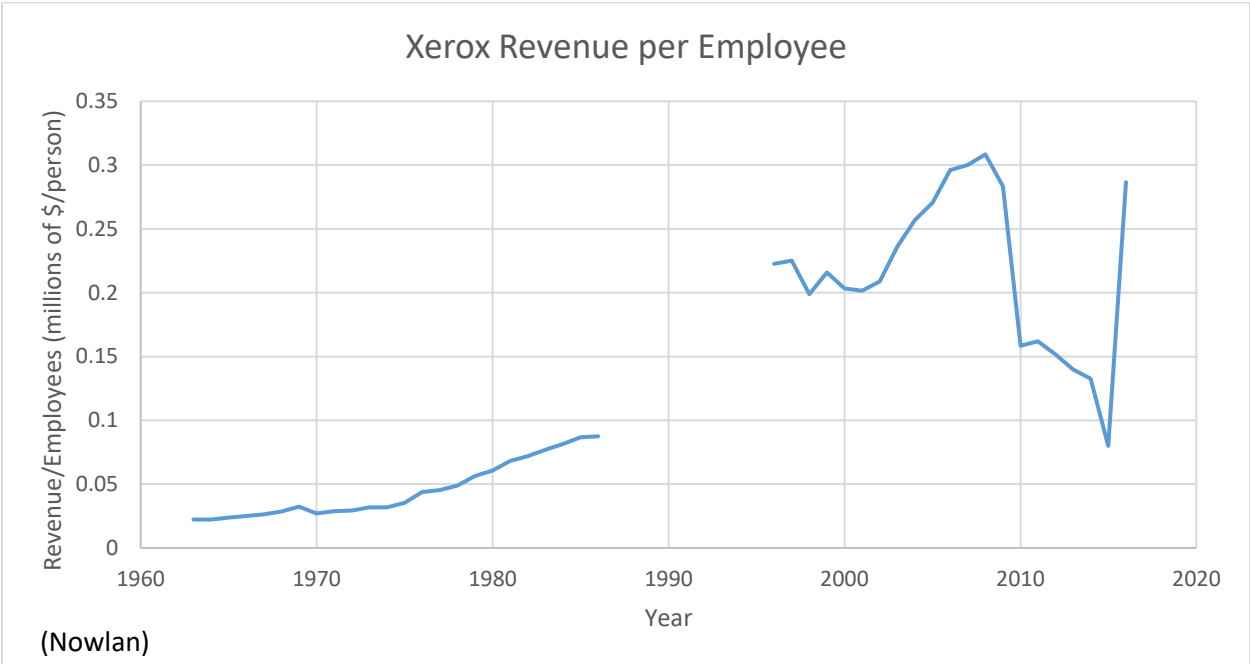
As with IBM, stockholders' equity and revenue tend to move in similar patterns. For Xerox, however, changes in stockholders' equity tend to precede changes in revenue. Stockholders' equity dipped in the early 1990s, and within a few years revenue had experienced a similar small decline. After a declining period, stockholders' equity experienced rapid growth in the early 2000s, going into the end of the data. A year later, revenue came out of a multi-year valley and began to increase again. This correlation could occur because of the company behaviors that are causing the revenue growth. Stockholders' equity shows assets less liabilities, so an increase would indicate lower

liabilities, or an increase in assets. Research and development could breed new assets, which would shortly after cause an increase in revenues, which would explain the correlation of the metrics. Rapid revenue growth going into 2010, however, is likely correlated to employment, rather than stockholders' equity. The growth of both metrics are likely related to Xerox's acquisition of new companies. Both metrics spiked, stayed relatively constant, and then sharply declined at the same point. Notably, during the period in which Xerox owned the new subsidiary, revenue slightly declined from the point of purchase to the point of sale. The slight decline in revenue over the period of ownership could explain why the acquisition was subsequently sold.



Xerox's employee data, as with IBM, grew much more slowly than its other metrics. The growth, though slow, was fairly consistent in the earlier years. However, there were many times when Xerox increased its employee numbers by over 10,000 in one year, and then subsequently reversed that increase a few years later. This pattern indicates that Xerox was consistently attempting to grow their employee numbers larger

than what was realistic for them as a company. The most anomalous period occurs between 2010 and 2015, when Xerox increased their employees by roughly 80,000 in a year, and then decreased employees by 100,000 in a year, five years later. This occurred because Xerox bought, and then sold, its information technology outsourcing division. The division was purchased as part of a larger set of acquisitions, and then sold in order to provide cash to make more acquisitions (Patnaik & Baker). This acquisition, and general trend, illustrates Xerox’s struggle to enter new divisions. The company entered and then left an industry within five years, showing attempts to branch out, but little success or commitment to the new industries.



The beginning period of the revenue per employee data shows a gradual increase in the metric, while employees were increasing fairly sharply. As employees were increasing, and revenue per employee was also increasing, it is clear that revenues were increasing substantially during this period. After the break in data, however, employees had declined, and revenue per employee had spiked. This spike

likely occurred because of the decline in employees, rather than a surge in revenue. From that point on, the data for revenue per employee and employees move as inverses to one another. Because the employee and revenue per employee data are inverses to one another, again it can be inferred that changes are due to shifts in employees, rather than changes in revenue. The rapid movements in these data sets from 2000 onward show Xerox floundering to find an ideal employment level for its current company performance.

7. Conclusion

Although monopolies, by their very characteristics, should be highly profitable, many large companies with monopoly power wind up in decline from former positions of power. The disparity between what economic theory predicts and what occurs in real industry is referred to as x-inefficiency. The economic literature regarding this theory, though it covers the effects of x-inefficiency, does not provide a definitive list for its causes. This case study on two near-monopolies, IBM and Xerox, adds to economic literature by providing possible causes for the observed x-inefficiency that led to the decline of these companies.

Four main causes were identified as contributing to the decline of IBM and Xerox: not predicting market trends, mismanagement, behavior when faced with regulatory barriers, and wasting resources looking for new markets. Through review of economic literature company histories, financial data, and legal anti-trust action, these factors were identified, and subsequently explored and proven. Though these factors should not be taken as a definitive and exhaustive list of the causes for monopoly x-inefficiency, they certainly contributed to the specific declines of IBM and Xerox.

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