The Big Cost of Big Medicine:
Calculating the Rent in Private Healthcare

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Abstract: As a country, the United States spends significantly more on healthcare than other advanced industrialized countries, and Americans have comparably worse health outcomes. Both are developments of the last four decades. In this paper, we present a macro, long term explanation of these adverse changes by looking at the evolution of antitrust and patent laws in the United States, surveying the literature on how change in concentration and patent laws have led to increased prices, and constructing a counterfactual national health expenditure series for 1980 through 2006. We find that the cumulative excess cost of private healthcare spending on hospitals, physician groups, prescription drugs, and net insurance from 1980 until 2006 is between $3 and $6 trillion.

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Introduction

As a country, the United States spends an incredible amount on healthcare. In 2017, total healthcare spending amounted to more than seventeen percent of gross domestic product (GDP). This represents both a high historically and relative to other advanced industrialized countries. For example, France spent only 11.46 percent of GDP on healthcare in 2017; Germany spent 11.27 percent, and other developed countries spent even less. This dramatic difference in health spending between the United States and other industrialized countries is a phenomenon of the last forty years. In 1980, developed countries spent between 4.74 and 8.23 percent of GDP on healthcare. While the United States represents the upper bound in this range, Germany spent the same percentage of GDP on healthcare as the United States in 1980, and, in general as can be seen by the more compact range, there was no dramatic difference in spending between developed countries. However, since 1980, spending on healthcare in the United States has rapidly increased – moving away from its developed counterparts. At present, there is an almost nine-percentage point difference between spending on healthcare as a percentage of GDP in the United States and the average for all other member countries of the Organization of Economic Cooperation and Development (OECD), and there is a five-percentage point difference between the United States and the advanced industrialized country that spends the second most on healthcare, France.

Despite spending vastly more on healthcare, many health outcomes in the United States are significantly worse than those of other developed countries. For example, over the same period that total spending on healthcare as a percentage of GDP has dramatically outpaced other advanced industrialized countries, life expectancy at birth in the United States has lagged more and more behind. At present, life expectancy at birth for Americans is 78.7 years – two years less than Germany and more than five years less than Japan with other advanced industrialized countries falling somewhere in between. Indeed, the United States ranks 28th among all 36 OECD countries in life expectancies at birth. Like with healthcare spending, these developments are relatively new. In 1980, life expectancy at birth in the United States was comparable to other OECD countries.³

³ Data on total healthcare spending as a percentage of GDP and life expectancy at birth is taken from the OECD database (https://data.oecd.org/).
Thus, we must ask: why does the United States spend so much on healthcare as a percentage of GDP compared to other countries while many health outcomes for Americans are comparatively worse? Also, what has happened over the last four decades that has led to dramatically increasing costs in the United States with comparatively worse outcomes? And, finally, if the increase in cost is not coming from increase in quality, how much are Americans overpaying for healthcare? Otherwise said, what is the economic rent – the income not commiserate with marginal social benefit – accruing to some in the healthcare industry?

There is a rich and developed health economic literatures which looks at a range of potential answers to these questions. For example, there is literature on asymmetric information and its effect on prices. There is also an array of studies on increased market concentration in hospitals, physician groups, and health insurance and the effect on price. In addition, some health economists have looked at the changing organization of healthcare from preferred provider organizations (PPOs) to health maintenance organizations (HMOs), and others have studied the difference and interaction between public and private provision and payment of healthcare. While this literature is incredibly informative, indeed we use it to construct our own study, it is often very fragmented in terms of geography, time, and subsector of healthcare. Thus, the macro, long term answer to the above posited questions is often unclear, and the answer to the latter question on the overall rent in healthcare has still been left unanswered.

In this paper, we attempt to provide such a macro, long term answer. First, we integrate developments in healthcare into larger changes in antitrust administration in the United States. Second, we survey the literature on change in concentration in hospitals, physician groups, and health insurance and show how these changes have led to increased prices. We also use the literature to illustrate how parallel developments in patent laws have allowed pharmaceuticals to increase the price of prescription drugs. Fourth, utilizing growth accounting, we project a trend for what costs would have been from 1980 until 2006 if these changes in law had never taken place. We find that the cumulative excess cost of private healthcare spending on hospitals, physician groups, prescription drugs, and net insurance from 1980 until 2006 is between $3 and $6 trillion. This value is on par with estimates by other economists on the excess cost of our financial system over the same period and goes a good distance in explaining why Americans pay so much for healthcare and achieve relatively less in terms of comparative health outcomes.
Antitrust deregulation

Developments in antitrust administration have been important in remaking the rules of the game faced by healthcare providers. As we will see in the following sections, these changes have led to an increase in concentration and thus prices in hospitals, physician groups, and health insurance which are central to understanding the increase in cost of healthcare over the last forty years. To better comprehend these developments, we first take a step back and look at the overall, non-healthcare specific, changes in administration of antitrust laws in the United States.

Antitrust law falls under the Sherman Antitrust Act, the Federal Trade Commission Act, the Clayton Antitrust Act, and the number of amendments to these laws. In terms of mergers and acquisitions, Section 7 of the Clayton Act prohibits mergers and acquisitions that substantially “lessen competition, or to tend to create a monopoly.”\(^4\) The very broad language of this law gives the courts and antitrust authorities, the Federal Trade Commission (FTC) and the Antitrust Division of the Department of Justice (DOJ), significant room in deciding exactly what classifies as a substantial reduction in competition.

In Table 1, we reproduce data on the DOJ’s definition of unconcentrated, moderately concentrated, and highly concentrated markets. First published in 1968 and redefined in 1982 and 2010, the change in the Herfindahl-Hirschman Index (HHI), a commonly used measure for market concentration,\(^5\) inside each of these market categories represent the DOJ’s definition of a substantial reduction in competition per the Clayton Antitrust Act. As we can see, policy changed dramatically between 1968 and 1982. Indeed, under the 1968 Horizontal Merger Guidelines (HMGs), the DOJ did not even define unconcentrated markets – meaning that consolidation in even thinly concentrated markets could be contested. Also, the definition of moderately and highly concentrated markets was lower, the change in HHI inside these categories that triggered contestation was also lower, and the wording on the likelihood of contestation by the DOJ was much stronger.

In the 1982 and 2010 guidelines, the DOJ outline more grey area; some mergers could “potentially” lead to DOJ contestation, those highlighted in Table 1, and other mergers were


\(^5\) HHI is the measure of the sum of the market shares of all producers in an industry: \(HHI = \sum_{i=1}^{N} \theta_i^2\). \(\theta_i\) is the market share of the \(i\)th firm in the industry. \(N\) is the total number of firms. Market shares always sum to 100: \(\sum_{i=1}^{N} \theta_i = 100\). Thus if \(N = 1\), i.e. there is a pure monopoly, the HHI of the industry is 10,000. In perfect competition, where it is assumed that each firm has an infinitesimal market share, the HHI for any industry is zero.
“likely” to lead to contestation, not outlined in Table 1. The degree of consolidation needed to trigger the latter wording being significantly higher. Furthermore, the 1968 HMGs also had a “trend toward concentration” category which essentially lowered the bar for DOJ contestation of mergers and acquisitions in both moderately and highly concentrated markets when the market share of the top four firms had increased by seven percentage points over the last five to ten years. This category was eliminated from later HMGs.

Table 1: Department of Justice Horizontal Merger Guidelines

<table>
<thead>
<tr>
<th></th>
<th>1968</th>
<th>1982</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Definition of Category</strong></td>
<td><strong>Challenge mergers</strong></td>
<td><strong>Definition of Category</strong></td>
<td><strong>Challenge mergers</strong></td>
</tr>
<tr>
<td><strong>Unconcentrated Markets</strong></td>
<td>--</td>
<td>HHI &lt; 1000</td>
<td>--</td>
</tr>
<tr>
<td><strong>Moderately Concentrated</strong></td>
<td>HHI &lt; 1406 &lt;sup&gt;6&lt;/sup&gt;</td>
<td>1000 ≤ HHI &lt; 1800</td>
<td>HHI ≥ 1800</td>
</tr>
<tr>
<td></td>
<td>ΔHHI ≥ 50&lt;sup&gt;7&lt;/sup&gt;</td>
<td>ΔHHI ≥ 100</td>
<td>ΔHHI ≥ 100</td>
</tr>
<tr>
<td><strong>Highly Concentrated</strong></td>
<td>HHI ≥ 1406</td>
<td>HHI ≥ 1800</td>
<td>HHI ≥ 2500</td>
</tr>
</tbody>
</table>


In 2010, the HMGs were again dramatically redefined. The definition of unconcentrated markets was stretched from an HHI of less than 1000 to include HHIs of 1500, and highly concentrated markets were defined to only start with HHIs greater than 2500 – up from 1800 in the 1982 HMGs. Also, the change in HHI that “potentially” triggered contestation inside a highly concentrated market was increased to 100, and the change in HHI that was “likely” to lead to contestation was increased to 200.

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<sup>6</sup> The 1968 HMG were defined in terms of market shares. The DOJ defined moderately concentrated market in 1968 as where the largest four firms had a market share of less than 75 percent. The lower bound HHI equivalent for such a market share is 1406 – where the top four firms each have a market share of 18.75 percent and the rest of the firms in the market have an infinitesimally small share.

<sup>7</sup> The 1968 HMG defined which mergers and acquisitions would be challenged inside each category based on size of the acquiring and acquired firms. For example, if the acquiring firm had a market share of five percent or less, then the DOJ would only challenge the merger if the acquired firm had a market share of greater than five percent. The different thresholds for firms with different market shares led to different HHI thresholds for challenging mergers and acquisitions inside moderate and highly concentrated markets.
While the DOJ’s 1982 and 2010 definitions of a substantial reduction in competition represent significant relaxations in antitrust administration, they underrepresent the degree to which antitrust policy has been deregulated. Stelzner and Chaturvedi (2018) show that the DOJ’s activity in blocking or modifying mergers and acquisitions through the courts represents an even greater relaxation of antitrust administration. In Figures 1 through 3, we reproduce data from Stelzner and Chaturvedi on yearly means and standard deviations and a five-year moving average for pre, post, and change in HHI levels for all DOJ horizontal merger cases from 1968 through 2015, respectively. These values allow for visualization and estimation of the de facto definition of permissible mergers. The five-year moving average and yearly means in each figure represent two different ways to estimate the focus of DOJ antitrust policy and thus two estimates of the acting definition of a substantial reduction in “competition, or tend to create a monopoly.”

**Figure 1: Pre-Merger HHI for DOJ Case Filings**

Figure 2: Change in HHI from Merger for DOJ Case Filings


Figure 3: Post-Merger HHI for DOJ Case Filings

By focusing on these mergers and acquisitions, the DOJ effectively demonstrates to the private sector the threshold for contestation. Mergers and acquisitions below the threshold are essentially deemed permissible and those above are essentially deemed illegal by the DOJ. As we can see from Figures 1 through 3, in the late 1960s through the mid-1970s, the bar for DOJ contestation of a merger or acquisition was much lower and more well defined. The antitrust division at the Department of Justice contested mergers and acquisitions in even thinly concentrated markets making clear to companies that mergers that would more severely reduce competition were not permissible. The average change in HHI of mergers and acquisitions contested through the courts by the DOJ was just over 100 between 1968 and 1974.

In the late 1970s, the DOJ seems to have already been moving in a more permissive direction. The average change in HHI for mergers and acquisitions contested by the DOJ increased to over 320 in the late 1970s and it continued to increase in the 1980s. Thus, it seems that the change in the HMGs in 1982 only marked a formalization of change in de facto antitrust policy already underway. Throughout the 1980s, 1990s, and early 2000s the mean level of pre, post, and change in HHI of DOJ horizontal merger cases moved upwards. In doing so, the Department of Justice opened up more ground for permissible mergers and acquisitions. Thus, like with the late 1970s, between 1982 and 2009, horizontal merger policy was made more permissive even though the operating HMGs did not change during this period (Stelzner and Chaturvedi, 2018).

Hospital consolidation and price change

Deregulation of antitrust policy led to an increase in mergers and acquisitions across the economy, consolidation in healthcare being one part of this larger development. In this section and the following two sections we look at change in concentration in hospitals, physician groups, and health insurance, respectively. We then use the vast literature on change in concentration and price movements specific to each of these subsectors of healthcare to identify the effect consolidation had on healthcare prices.

As a result of the change in antitrust administration, hospitals consolidation increased. Gaynor (2011) calculates HHIs for hospitals defining a market as a metropolitan statistical area
(MSA) with a population of less than three million. He then calculates average hospital market concentration for the United States as a whole weighing each MSA based on its population. The results are displayed in Table 2. As we can see, hospital consolidation increased from the late 1980s through 2006 with the most dramatic changes taking place in the mid-1990s. Other economists have found similar results. Vogt and Town (2006) calculate average HHI by region in 1990 and 2003. These results are replicated in Table 3. As we can see, they arrive at a similar conclusion – hospital concentration increased significantly. Indeed, from Vogt and Town’s data, we can see that some regions, like the South, started from a higher level of concentration and have seen more dramatic increase in concentration. For the nation as a whole, Vogt and Town find that the market concentration has increased from an average HHI of 1,576 in 1990 to 2323 in 2003.

**Table 2: Hospital Concentration in the United States, 1987 – 2006**

<table>
<thead>
<tr>
<th>Year</th>
<th>Mean HHI</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1987</td>
<td>2,340</td>
<td></td>
</tr>
<tr>
<td>1992</td>
<td>2,440</td>
<td>100</td>
</tr>
<tr>
<td>1997</td>
<td>2,983</td>
<td>543</td>
</tr>
<tr>
<td>2002</td>
<td>3,236</td>
<td>253</td>
</tr>
<tr>
<td>2006</td>
<td>3,261</td>
<td>25</td>
</tr>
</tbody>
</table>

*Source: Gaynor (2011)*

There is overwhelming evidence, summarized in Table 4, that increases in hospital concentration lead to an increase in price. In each study listed in Table 4, we provide data on the period and geography covered by the study and distil their final results. As we can see, although different studies find different intensities of price change, all find that an increase in hospital concentration leads to an increase in hospital prices. These studies use a number of

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8 Gaynor (2011) leaves out MSAs with a population of more than three million because large cities may have multiple hospital markets for their constituents inside the same MSA.

9 Indeed, this is exactly what we would expect from empirical studies of change in concentration and prices in other industries and from economic theory. In terms of the latter, analysis of the Nash equilibrium price and quantity in an N firm Cournot oligopoly shows that market power increases when concentration increases – even if firms make production decisions in a decentralized manor. Market power is the ability of firms to influence the market price of the goods they buy or sell.
different methods from event study of price increase from a merger and acquisition in a single market to broad statistical studies looking at the relationship between hospital prices and concentration across time and county or MSA while controlling for other variables that might affect price (like quality of healthcare provision, concentration of medical insurance companies in the same area, the amount of Medicare and Medicaid patients, etc.). For example, Dafny (2009) calculates the price effects on rival hospitals rather than the merging hospitals to address selection problems and finds that nearby rival hospitals also raise prices when competitors merge. The relationship between market concentration and prices is even robust across types of hospitals (Keeler et al., 1999; Simpson and Shin, 1997; Dranove and Ludwick, 1999; Capps et al., 2003; Gaynor and Vogt, 2003). For example, Keeler et al. (1999) find that both non-for-profit and for-profit hospital mergers lead to an increase in prices. Indeed, they find that non-for-profit mergers lead to higher prices and that the price increases resulting from a non-for-profit merger are increasing over time.

**Table 3: Changes in Hospital Concentration by Region, 1990 - 2003**

<table>
<thead>
<tr>
<th>Region</th>
<th>Mean HHI in 1990</th>
<th>Mean HHI in 2003</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>East</td>
<td>1,285</td>
<td>1,982</td>
<td>697</td>
</tr>
<tr>
<td>Midwest</td>
<td>1,613</td>
<td>2,356</td>
<td>743</td>
</tr>
<tr>
<td>South</td>
<td>2,077</td>
<td>3,016</td>
<td>939</td>
</tr>
<tr>
<td>Southwest</td>
<td>1,820</td>
<td>2,494</td>
<td>674</td>
</tr>
<tr>
<td>West</td>
<td>1,694</td>
<td>2,242</td>
<td>548</td>
</tr>
</tbody>
</table>

**Source:** Vogt and Town (2006).

As can be seen from Table 4, the price effect from a given change in concentration can be incredibly high. For example, Hass-Wilson and Garmon (2011) find that an increase in HHI of 384 points in a hospital market leads to a twenty percent increase in hospital prices. Likewise, Tenn (2011) finds that a merger which resulted in a hospital with a market share of fifty percent increased prices by 28 to 44 percent. While a few studies have found a much smaller price effects, some of these findings might be statistically biased. For example, Cooper et al. (2015) calculate the price effect from consolidation using dummy variables for monopoly, duopoly, and triopoly. At the same time, as a proxy for quality of healthcare provision, they control for the
number of hospital beds. However, it is unclear how more beds represents better quality, and, it is possible that this more flexible variable is picking up some of the price effect from their rigidly constructed dummy variables for concentration. If this was the case, their value for the price effect from an increase in concentration would be downwardly biased.

Table 4: Impact of Hospital Market Concentration Studies

<table>
<thead>
<tr>
<th>STUDY</th>
<th>AREA OF STUDY</th>
<th>PERIOD OF STUDY</th>
<th>CHANGE IN CONCENTRATION</th>
<th>PRICE CHANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>TENN (2011)</td>
<td>California</td>
<td>1999-2003</td>
<td>Post-merger combined market share of 50%</td>
<td>+28.4%~44.2%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ΔHHI:2500</td>
<td>+6.4%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ΔHHI:7500</td>
<td>+15.3%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ΔHHI:800</td>
<td>+7.3%</td>
</tr>
</tbody>
</table>

Source: Authors compilation of literature.

These studies have uncovered several other interesting results. For example, Gaynor et al. (2015) find no significant relationship between clinical quality of services provided at hospitals and prices in the United States. A report by the Office of the Attorney General of Massachusetts (2010) finds that the large price variation inside the state is not correlated with quality of health services. Likewise, a report by Pennsylvania HealthCare Cost Containment Council (2007) finds the same for the price and quality of heart surgery in Pennsylvania. While other studies have found mixed results in the connection between price and quality (for example, see Cooper et al. (2015)), these findings show, like with the divergent national trends in
healthcare costs and outcomes, that higher quality is not the central reason for variation in hospital prices.

**Physician consolidation and price change**

While there is less data, that available points to similar increases in concentration for physician groups. For example, Liebhaber and Grossman (2007) present data, depicted in Table 5, on the percentage of physicians practicing in groups of different sizes between 1996 and 2005 in the United States. As we can see, although solo or two-physician practices are still the most common, such practices have decreased in prominence between 1996 and 2005. Likewise, practices with between three and five physicians have also decreased in prominence with only 9.8 percent of all physicians in such practices in 2005. On the other hand, larger physician groups have increased in prominence. The percent of physicians in practices that contain between six and fifty physicians increased from 13.1 percent in 1996 and 1997 to 17.6 percent in the mid-2000s. And physician in practices with more than fifty members have increased from 2.9 percent to 4.2 percent over the same period. Indeed, at present physician groups seem to be very concentration. For example, Schneider et al. (2007) calculate the concentration of physician groups across counties in California in 2001. They find a third of the counties in California have physician group markets with an HHI between 1800 and 3600 and a half have an HHI of greater than 3600 with an average county HHI for physician organizations of 4,430.

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1 – 2</td>
<td>40.7%</td>
<td>37.4%</td>
<td>35.2%</td>
<td>32.4%</td>
</tr>
<tr>
<td>3 – 5</td>
<td>12.2%</td>
<td>9.6%</td>
<td>11.7%</td>
<td>9.8%</td>
</tr>
<tr>
<td>6 – 50</td>
<td>13.1%</td>
<td>14.2%</td>
<td>15.8%</td>
<td>17.6%</td>
</tr>
<tr>
<td>&gt; 50</td>
<td>2.9%</td>
<td>3.5%</td>
<td>2.7%</td>
<td>4.2%</td>
</tr>
</tbody>
</table>

**Source:** Libhaber and Grossman (2007).

Like with hospital concentration, a number of studies have shown that an increase in concentration in physician group markets results in an increase in price for physician services. To get an idea of the literature, in Table 6, we summarizes serval of the studies including
information on geography and period of study and distill the final results from each. As we can see, while there is variation in the price effect, each finds a positive relation between change in concentration and price in the physician group markets.

**Table 6: Impact of Physician Market Concentration on Prices Studies**

<table>
<thead>
<tr>
<th>STUDY</th>
<th>AREA OF STUDY</th>
<th>PERIOD OF STUDY</th>
<th>CHANGE IN CONCENTRATION</th>
<th>PRICE CHANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SCHNEIDER ET AL. (2007)</strong></td>
<td>California</td>
<td>2001</td>
<td>ΔHHI: 1%</td>
<td>+1 to 4 %</td>
</tr>
<tr>
<td><strong>BAKER ET AL. (2014)</strong></td>
<td>United States</td>
<td>2003 – 2010</td>
<td>ΔHHI: 2606</td>
<td>+8.3 to 16.1 %</td>
</tr>
<tr>
<td><strong>DUNN AND SHAPIRO (2014)</strong></td>
<td>United States</td>
<td>2005 – 2008</td>
<td>ΔHHI: 10%</td>
<td>+0.5 to 1%</td>
</tr>
</tbody>
</table>

**Source:** Authors compilation of literature.

*Insurance consolidation and price change*

Like with hospital and physician group markets, medical insurance has also seen an increase in concentration. For example, Dafny (2015) calculates the national market share of the top five medical insurers from 2006 through 2014. The results are displayed in Figure 4. As we can see, even if we define insurance markets nationally, there is significant concentration, and concentration is increasing. However, as pointed out by Dafny, these figures underestimate the degree of insurance concentration because most medical insurance markets are local or regional. To look at medical insurance concentration from another angle, Dafny (2010) calculates market concentration for medical insurance for fully insured employees at large companies in the United States between 1998 and 2009. The results are displayed in Table 7. As we can see, this series shows both that market concentration has been increasing over a longer period and that concentration is higher when we more accurately define the market. Indeed, market concentration for medical insurance for fully insured employees at large companies increased from an HHI of 2,984 in 1998 – an already high degree of concentration – to 4,126 in 2009 – a value representing something very close to a duopoly for medical insurances markets in the United States.10

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10 This is essentially twice as high as national figures. For example, the market share of the top five firms depicted in Figure 4 would equal a lower bound HHI of 1708.
Figure 4: Estimated National Market Shares of the Top Five Medical Insurers, 2006 – 2014

Source: Dafny (2015).

Table 7: Fully Insured, Large Employer Insurance Market Concentration, 1998 - 2009

<table>
<thead>
<tr>
<th>Year</th>
<th>Mean HHI</th>
<th>Change in HHI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td>2,984</td>
<td>--</td>
</tr>
<tr>
<td>1999</td>
<td>2,835</td>
<td>-149</td>
</tr>
<tr>
<td>2000</td>
<td>3,092</td>
<td>+257</td>
</tr>
<tr>
<td>2001</td>
<td>3,006</td>
<td>-86</td>
</tr>
<tr>
<td>2002</td>
<td>3,158</td>
<td>+152</td>
</tr>
<tr>
<td>2003</td>
<td>3,432</td>
<td>+274</td>
</tr>
<tr>
<td>2004</td>
<td>3,706</td>
<td>+274</td>
</tr>
<tr>
<td>2005</td>
<td>3,951</td>
<td>+245</td>
</tr>
<tr>
<td>2006</td>
<td>4,072</td>
<td>+121</td>
</tr>
<tr>
<td>2007</td>
<td>4,056</td>
<td>-16</td>
</tr>
<tr>
<td>2008</td>
<td>4,201</td>
<td>+145</td>
</tr>
<tr>
<td>2009</td>
<td>4,126</td>
<td>-75</td>
</tr>
</tbody>
</table>

Source: Dafny (2010).
Increased concentration in medical insurance markets leads to a decrease in prices paid to medical providers (Cooper et al., 2015; Moriya et al., 2010; Dafny et al., 2011 and 2015; Kate and Ho, 2017). For example, Dafny et al. (2011) shows that a merger in the insurance market reduces physician earning growth by three percent. Kate and Ho (2017) show that after two insurance companies combined, hospital prices fell as the remaining insurers exercised increased monopsony power, and Moriya et al. (2010) show that an increase in HHI of 1000 reduces purchase prices by 8.4 percent, and an increase in HHI of 800 decreases hospital prices by 6.7 percent.

However, these cost savings do not translate into a reduction in premiums paid by consumers. For example, Kate and Ho (2017) show that increases in medical insurance premiums accompany increases in consolidation of medical insurance – even when insurance companies decrease the prices they paid to medical providers. Dafny et al. (2011) show that an increase in HHI of 698 in medical insurance markets leads to a seven percent increase in premiums. Robinson (2004) shows that increased concentration in medical insurance led to a decrease in the medical cost ratio – medical cost divided by premium revenues – from 85.1 to 82.1 percent. Finally, Guardado et al. (2013) found that premiums increased by 13.7 percent when Sierra Health and UnitedHealth merged in Nevada. Thus, like with hospital and physician group markets, increase in concentration in medical insurance markets hurts the ultimate consumers of health services. To some degree recent changes in law have put an upper limit on medical insurers’ ability to increase premiums even in the face of decreasing cost of medical care. Under the Affordable Care Act of 2010, insurers are required to spend at least 80 percent of their premiums on medical care. However, both Obama and Trump granted some waivers allowing for certain insurers to spend less than the required 80 percent.

Indeed, we can see the price setting power of private medical insurance agencies by looking at the difference between the user cost of health insurance for private insurance and for Medicare and Medicaid. The user cost of health insurance is the net costs of health insurance – total revenue from premiums minus total amount paid out in claims – divided by the total claims paid. In Figure 5, we use national health expenditure data to show the user cost of medical insurance for private insurance and Medicare and Medicaid. Although the user cost of public insurance is increasing, the cost of private insurance is significantly higher – around 100 percent higher at present. To some degree this under represents the benefits insurance companies accrue
from market power. For example, Medicare Advantage, which is part of Medicare, is privately provided and has seen significant increases in concentration (Dafny, 2015). Also, Starc (2010) shows that the Medigap market for insurance is highly concentrated – the top two and top four firms control 70 and 83 percent of the national market, respectively. Starc finds that the large variation in Medigap prices are positively correlated with concentration. Thus, some of the recent increase in the user cost of Medicare, depicted in Figure 5, is most likely a result of increased market power also.

**Figure 5: The User Cost of Private and Public Health Insurance**

![Figure 5: The User Cost of Private and Public Health Insurance](image)

**Source:** Authors calculations from nation health expenditure data.

*Patent laws for Pharmaceuticals and price change*

During the same period that antitrust administration was deregulated, patent law was made more stringent. While this might seem contradictory in terms of underlying political ideology, more stringent patent laws have the same effect as deregulating antitrust law; they increase the market power of medical providers, in this case pharmaceutical and medical instrument companies, allowing them to dramatically increase prices.

The foundation of patent law in the United States is written into Article 1, Section 8 of the Constitution. However, there have been many legislative, adjudicative, and administrative changes over the years. During the mid-twentieth century, like with treatment of merger and acquisitions, the federal government and the courts abrogated certain patent rights to increase the
dissemination of technology throughout the economy. For example, in the 1940s and 1950s, the federal government aggressively pushed private companies to license patents more liberally – affecting between 40,000 and 50,000 patents. While at a reduced pace, in the 1960s and into the 1970s, the federal government continued to pursue compulsory licensing of patents when companies were seen to restrain trade (Scherer, 2009).

Starting in the late 1970s and solidifying in the 1980s, the federal government and the courts changed direction. Much of the change in patent law flowed from Congress. For example, reversing previous policy that government held title to inventions from contracts with the private sector and ending two decades of debate, the Bayh-Dole Act of 1980 gave research entities control of patents derived from work carried out on government contracts. This allowed institutions and private companies to reap huge private benefits through public giveaways. While the government maintained the ability to exercise “march-in” rights if unsatisfied with the use of the patent. Scherer (2009) reports that no government agency had utilized such a provision as of 2005, even when companies dramatically increased price above costs at the expense of the greater public good. This should not have been much of a surprise. Responding to criticism of the Bayh-Dole Act, its congressional sponsors, Birch Bayh and Bob Dole, argued that “march-in” rights are not triggered by a high price of patented good or by profits of the company holding the patent but only “when the private industry collaborator has not successfully commercialized the invention as a product.”

In 1982, Congress moved patent cases from appellate court panels to the newly created United States Court of Appeals for the Federal Circuit (CAFC) which proved to be much friendlier in a number of ways to patent holders than the previous setup (Scherer, 2009). First, while the appellate court had rejected around two thirds of patents on grounds of validity, CAFC only reject one third of cases. This figure underrepresents the change in leaning under CAFC, because increased friendliness to patent holders greatly increased case load and comparatively reduced case quality (Allison and Lemley, 1998). Second, CAFC was more willing than the appellate courts to utilize injunctions to stop patent infringement, and third, CAFC significantly changed assessment of damages from infringement of patent rights to the benefit of the patent holder – leading to much larger assessed damages (Quillen Jr, 2006).

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The Hatch-Waxman Act of 1984 increased the duration of patents from 10 to 13 years on average, postprocessing time, to 17 years extending the amount of time a firm could legally exclude competition and thus hold prices above market values. In 1995, to comply with the Trade Relations Aspects of Intellectual Property Rights (TRIPS), Congress again extended the duration of patents from 17 to 20 years from the time of filling and made it easier to extend the duration of a patent if process time took longer than average (Baker, 2016).

Apart from the legislative changes highlighted above, there were other developments in patent law that were purely administrative. For example, in the 1970s, the Antitrust Division of the Department of Justice was critical of and likely to contest patent licensing agreements that stipulated minimum prices. This view immediately came under criticism in the 1980s, and in 1995, the DOJ and the FTC issued new guidelines that were much more permissive to minimum prices in patent licensing (Scherer, 2009).

**Figure 6: Generic Price of Drug as a Percentage of Brand Price**

![Graph showing the generic price of a drug as a percentage of the brand price](source)

**Source:** Food and Drug Administration (2015).

All these changes increased the market power of patent holders allowing them to increase price above costs without worrying about losing customers to competition. Indeed, Kesselheim et al. (2016) explain that the most important factor in the determination of prescription drug prices in the United States is the market exclusivity given to patent holders. Caves, Whinston, and Hurwitz (1991) show that the price of pharmaceutical drugs dramatically moved away from the cost of labor and material inputs starting in 1982 – when patent law was first being remade.
And the Food and Drug Administration (FDA) (2015) show that drug prices decrease dramatically when a patent expires and generic competitors are allowed to enter the market. In Figure 6, we reproduce FDA findings. The horizontal axis shows the number of generic competitors and the vertical axis shows the price as a percentage of its value when under patent. As we can see, the entrance of 17 or more competitors can drive prices below ten percent of the price when the drug was protected by a patent. Indeed, this result is not unexpected; it mimics theoretical modeling of firm entrance in an N-firm Cournot oligopoly.

Thus, with patent support, prescription drug prices can be held very high. For example, after large government support in the synthesizing and clinical trial stages, the company which obtained “method of use” patents for the first effective antiretroviral for acquired immunodeficiency syndrome (AIDS), sold the drug for around five times more than the production costs (Scherer, 2009). Likewise, because of the more stringent patent protection in the United States and thus greater market power of pharmaceutical companies, drugs in the United States are much more expensive to their equivalents abroad. For example, the drug used to treat hepatitis C, Sovaldi, has a list price in the United States of $84,000 for three months treatment while a high-quality generic in India is available for around $300 to $500 (Gokhale, 2015). In general, the average percentage saved by an American from purchasing commonly used prescription drugs in Japan, the United Kingdom, Canada, and France would be 43, 57, 65, and 67 percent, respectively, in 2017 (Miller, 2018). Restating this same information in terms of the windfall prices for pharmaceutical companies, Baker (2016) calculates that rents on prescription drugs grew from 0.1 percent of GDP in 1980 to 1.8 and 2.1 percent in 2018.

*Estimating the Cost of Big Medicine*

Thus, there has been dramatic changes in antitrust and patent law which are central for understanding the increase in cost of healthcare. In this section, we bring all this information together and calculate the amount Americans have overpaid for private healthcare between 1980 and 2006 because of price movements stemming from increased market power of hospitals, physician groups, medical insurance carriers, and pharmaceutical companies. To do this, we set up a basic growth accounting framework to compute a counterfactual for what price movements would have been if antitrust and patent laws had not seen the changes highlighted above. The
rent – the degree to which Americans have overpaid – is the difference between the actual series and the counterfactual.

The increase in healthcare expenditure over the last forty years is a result of both price and non-price factors. Let’s say national health expenditure for one subsector, \( \varphi_i \), equals price of healthcare times quantity consumed, \( P_i Q_i \). The subscript \( i \) denotes the subsector of healthcare (hospital, physician group, medical insurance, and prescription drugs for the analysis here). Non-price factors include the increase in consumption from increased intensity per capita and from a growing population. Price factors include increases in price from increased market power and from other factors, like a change in the quality of a good or inflation. For our purposes, let’s say that the price, \( P_i \), is an additive function of price movements from change in market power, \( g_i(t) \), and from other factors, \( h_i(t) \); \( P_i = g_i(t) + h_i(t) \). If we take the derivative of national health expenditures by sector and divide both sides of the equation by \( \varphi_i \), we get the percent change in national health expenditures per unit of time:

\[
\hat{\varphi}_i = \frac{\partial g_i}{\partial t} + \frac{\partial h_i}{\partial t} + \hat{Q}_i
\]

\( \hat{Q}_i \) is the rate of change of quantity – i.e. the rate of change of non-price factors. \( \frac{\partial g_i}{\partial t} + \frac{\partial h_i}{\partial t} \) is the rate of change of price from change in market power, \( \frac{\partial g_i}{\partial t} \), and from other price factors, \( \frac{\partial h_i}{\partial t} \).

Using this basic framework, we can create a counterfactual for the rate of change of healthcare expenditure by subsector by subtracting out the increase in price from increased market power.

\[
\hat{\varphi}_{\text{hypothetical}} = \hat{\varphi}_{\text{Actual}} - \hat{P}_{1MP}
\]

Data on the actual rate of change in healthcare expenditures by sector, \( \hat{\varphi}_{\text{Actual}} \), comes from the Center for Medicare and Medicaid Services.\(^{12}\) Data on the increase in price from change in market power, \( \hat{P}_{1MP} \), comes from imputing a series using the studies on the price

effects highlighted above and from data on actual change in concentration. For hospital expenditure, we use the Gaynor’s (2011) national concentration series, replicated in Table 2. For the price effect of change in concentration, we use both the median and high values from the studies surveyed in Table 4 for a lower bound and upper bound calculation, respectively. For physician group expenditure, we use Schneider et al. (2007). For medical insurance concentration, we compute net healthcare expenditure using the high and mean public user cost over the period as the lower and upper bound, respectively. The net health insurance expenditure is calculated as a percent of the newly imputed cost of hospital and physician group services and prescription drugs. Because of lack of data in all these series, we take the Department of Justice’s maximum for a moderately concentrated market from the 1962 HMGs, an HHI of 1405, to define concentration in 1980. For prescription drugs, we use the rate of change of price from the Canadian prescription drug index as the counterfactual price change series.

Using actual spending in 1980 as the starting point and the counterfactual series on the rate of change of expenditure if patent and antitrust laws had not changed, we calculate the nominal and real counterfactual series for national health expenditure by subsector. In Figures 7 through 10, we display these estimates, based off the lower bound price effects, for hospitals, physician groups, net insurance, and prescription drugs in real 2016 dollars. The solid blue line in each represents actual, national, private health expenditure in the respective subsector. The dotted blue line represents what national, private health spending would have been if the United States had not seen the changes in antitrust and patent laws highlighted above.

As we can see, without the changes in law and the resulting changes in price, private national health expenditures would have been much less. Indeed, the lower bound estimate for the total rent accrued to hospitals, physician groups, medical insurance carriers, and prescription drugs companies between 1980 and 2006 is equal to $3.4 trillion in 2016 dollars – equivalent to 18.06 percent of GDP in 2016. The upper bound estimate for the total rent, which utilizes the higher estimated price effects from the series surveyed above, is $5.7 trillion in 2016 dollars – equivalent to 30.9 percent of GDP in 2016.

The total rent in health is similar in magnitude to the total rent in finance. Epstein and Montecino (2016) calculate that between 1980 and 2005 the total rent in finance in the form of excess wages and profits was between $3.7 and $4.3 trillion in 2016 dollars. The similarities with finance do not end there. The centrality of deregulation of finance to make possible this
multi-trillion-dollar rent is eerily similar to the deregulation of antitrust and the increase in regulation of patent law which made increasingly large rents possible in healthcare.

**Figure 7: National, Private Hospital Expenditure – Actual and Counterfactual**

![Graph of National, Private Hospital Expenditure – Actual and Counterfactual](image1)

**Source:** authors.

**Figure 8: National, Private Physician Expenditure – Actual and Counterfactual**

![Graph of National, Private Physician Expenditure – Actual and Counterfactual](image2)

**Source:** authors.
Figure 9: National, Private Medical Insurance Expenditure – Actual and Counterfactual

Source: authors.

Figure 10: National, Private Prescription Drug Expenditure – Actual and Counterfactual

Source: authors.
While these figures are significant, even the upper bound calculations for the rent in healthcare most likely underestimate total rents for several reasons. First, we have not calculated rents in all subcategories of healthcare (for example in durable and nondurable medical equipment, in nursing care, in the public provisions of medical care, etc.) In terms of the former, medical equipment has also benefited from the change in antitrust and patent laws. In terms of the latter, the private elements of Medicare – like Medigap and Medicare Advantage – have also seen increases in concentration and corresponding increases in price. Second, the price effects highlighted above do not include change in quality from increased concentration – a secondary way to utilize market power. Indeed, many studies have found a negative relationship between concentration and quality. For example, Kessler and McClellan (2000) and Kessler and Geppert (2005) find that increased market concentration significantly increases mortality. Third, the figures above do not include the negative effects from misallocation of resources. For example, the huge rents to be earned through consolidation or through winning a patent incentivize medical providers to dedicate significant resources to lawyers to usher patent cases through the courts and to probe the many exceptions to the Department of Justice’s Horizontal Merger Guidelines. These investments represent resources diverted from other activities that might be more beneficial to society.

Coming back to the initial motivating question: why does the United States spend so much on healthcare as a percentage of GDP compared to other countries while many health outcomes for Americans are comparatively worse? We have seen here that it is largely because we have created a system that is great for healthcare providers but at the expense of the greater society. Indeed, these calculations go a long way in understanding the difference in healthcare expenditures in the United States compared to other advanced industrialized countries. For example, in the 1990s and 2000s, national health expenditure would have been between two and three percentage points of GDP less per year if we had not remade antitrust and patent laws and the quantity of health services consumed stayed the same. In Figure 11, we display data on total healthcare spending by country as a percentage of GDP between 1970 and 2006. The solid blue series is the United States, and the dotted blue series is what healthcare spending would have been if antitrust and patent laws didn’t change.
As we can see, the counterfactual national health expenditure series represents a significant decrease in relative health expenditure. While the United States would still have been spending more on healthcare as a percentage of GDP than other developed countries, the relative difference would have been much less. For example, the difference between total health expenditure in the United States and Germany and France in 2006 would have been on the order of one percentage point of GDP as opposed to 4.5 percentage points – definitely a big cost for our embrace of big medicine.

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