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On

**“Your Doctor/Pharmacist/Insurer Will See You Now: Competitive
Implications of Vertical Consolidation in the Healthcare Industry”**

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Faced with rising costs and the potential for expanded government involvement in the market, many U.S. healthcare firms are undertaking meaningful transformations of their organizational form. Specifically, large parts of the industry are evolving a historical structure characterized largely by discrete firms undertaking specific tasks into a vertically integrated market in which large national firms have assembled assets across multiple stages of the value chain.ⁱ

This is, of course, not the first time we've witnessed some amount of vertical integration in U.S. healthcare. Throughout the 1990s, there was a surge in the popularity of integrated delivery networks (IDNs). These primarily involved hospitals (especially general acute care hospitals) and physicians merging together and, at times, those merged entities offering their own health insurance plans. With some notable exceptions, these IDNs largely failed to meaningfully reduce either spending or prices – and at times they caused higher prices.ⁱⁱ Absent true clinical integration between the merging entities, these results are largely unsurprising.

We continue to see mergers between hospitals and physicians, and we are also experiencing a recently renewed dabbling by these systems in sponsoring their own health plans. However, the vertical integration that is of greater interest is both national in scope and involves far more of the value chain. In 2018, the mergers of CVS Health-Aetna and of Cigna-Express Scripts focused attention on this more-expansive vertical integration movement. In reality, these mergers were just the most recent and largest of an ongoing series of economic activities that have created a far more integrated set of national healthcare firms.

Figure 1 depicts a number of the largest national firms that have recently integrated throughout various parts of the value chain. Each vertical column represents a set of commonly owned assets by a single large firm. These recent moves consolidate control over parts of the value chain that were largely not involved in previous waves of vertical integration. These new segments include: (1) the distribution and management of prescription drugs; (2) specialist and/or retail pharmacies; and (3) outpatient services such as retail health clinics, urgent care centers, and ambulatory surgical centers. If anything, these integration strategies to date have conspicuously avoided the general acute care hospitals that traditionally stood at the center of IDNs.

Perhaps the most striking example of this newly emerging vertically integrated healthcare market is United Health Group (UHG), which currently sits at number six on the Fortune 500 Companies list, with \$226 billion in revenue. Beyond its massive scale, UHG has a meaningful economic presence in

multiple stages of the healthcare value chain. This includes (but is not limited to) a health insurer (United Healthcare), a pharmacy benefit manager (OptumRx), a specialty pharmacy chain (BriovaRx), consulting and data analytics firms (e.g., Optum), and over 30,000 employed or contracted physicians and other medical providers (OptumCare). If the firm's attempted acquisition of DaVita medical group is approved, this number will increase to nearly 50,000.ⁱⁱⁱ This set of providers and outpatient facilities includes Surgical Care Affiliates, acquired in 2017, which at the time of acquisition operated approximately 200 surgical facilities in over 30 states. Earlier, in 2015, UHG also purchased the urgent care chain MedExpress.

While UHG stands as a frontrunner in the movement toward more vertical integration, other large national firms are quickly following suit. If the CVS Health-Aetna merger is ultimately approved, the combined firm will have a set of assets that rivals UHG (in scope if not size), including a retail pharmacy footprint that is unique among other national players. Similarly, Humana has assembled assets at multiple points of the vertical chain (including its acquisition of Kindred), which gives it a large presence in both the Medicare Advantage and hospice spaces.^{iv}

The combination of assets and activities within firms depicted in Figure 1 demonstrates a meaningful set of strategic choices by the nation's largest insurers. Given the potential ramifications of the economic incentives created by these changes in corporate structure, it is important for policymakers to consider both why firms are making these strategic decisions and the potential effects of their actions.

Understanding the impact of vertical integration in healthcare requires understanding the economic conditions that drive firms to vertically integrate in the first place. Broadly speaking, we can gather these strategies into two categories: (1) attempts to overcome economic inefficiencies and increase welfare; and (2) moves to enhance market power in order to capture a greater portion of the value created.

Obviously, policymakers should have different reactions to proposed integration efforts based on which of these two motivations drives a firm's decision. While overall, regulators need to be concerned about the ultimate effects of a merger (rather than the motivations of the merging entities), the economic rationales driving the merger decision are a fair starting point for understanding many of the economic issues at hand. It is also important to note that ultimately, any evaluations would need to be merger- and firm-specific – i.e., we cannot make generic

pronouncements about the effects of vertical integration. In addition, many strategies are combinations of strategies and thus require weighing the relative effects of each set of motivations. It is also important to note that we must consider not just what the intentions of the executives are for mergers but also how firms will optimally behave given the new configuration of assets. Thus, even well-intentioned mergers can have anti-competitive effects if they create economic conditions where firms will change their behavior in the future.

The distinction between the strategic rationales driving integration and the potential effects is all the more important given our broader concerns about the existing level of concentration in healthcare markets. This concern can be seen in the number of mergers successfully challenged by antitrust authorities in recent years.^v However, most of those mergers were primarily horizontal in nature. Economic theory and evidence about the impacts of horizontal mergers are relatively clear and allow authorities to more easily and reliably evaluate the likely anti-competitive effects of these mergers on a case-by-case basis. However, both the theory and the empirical evidence regarding the effects of vertical mergers are more ambiguous than for horizontal mergers, which complicates review.

Effectively, vertical integration is a strategic decision by a firm to complete an activity internally rather than avail itself of the external market of potential suppliers and customers. This is often referred to colloquially as a “make or buy” decision for a firm. The potential efficiency benefits of such decisions are often met with skepticism by economists and strategy professionals because *well-functioning* economic markets are efficient, in that they provide the appropriate incentives for a good or service of a particular quality level to be produced by the lowest-cost firm at the lowest possible price. In other words, under ideal market conditions firms should get the best price for services from other, separate parties by using the open market. For this reason, I, like many other economists, am broadly skeptical of the efficiency benefits of many vertical integration efforts. This skepticism is not healthcare-specific. For example, Delta Air Lines bought an oil refinery in an attempt to decrease its jet fuel costs, a move that has both increased the complexity of its operations and done little to truly benefit its economic prospects.^{vi} Similarly, I would strongly question a hospital that proposed backward-integrating into the manufacturing of commodities such as bandages, sutures, and other widely used products that are currently produced in an efficient and largely competitive market.

Ultimately, the question each firm evaluates when considering vertical integration is why it can't simply find a contractual solution to govern its economic interactions with other firms and reach the most efficient outcome. Such an arm's-length interaction would maintain the benefits of the market and allow firms to avoid the costly process of integration, which is uncertain, risky, and difficult to reverse. In contrast, complete contracts (i.e., contracts that account for the variety of ways in which each party might try and capture value from investments made by the other) allow firms to use well-functioning markets to create the greatest amount of social welfare; the choice to vertically integrate effectively forfeits these potential efficiency benefits. As a result, if firms were able to write a contract to reach the strategic goals proposed by integration but still attempted to merge, it would raise concerns that their strategies could have more anti-competitive or non-market motivations and subsequent effects.^{vii}

That said, there are clearly situations we can identify in which integration has the potential to create value rather than simply transfer value across parties. At a minimum, we know that firms often do not face the well-functioning and efficient markets that inhabit economic textbooks. For example, the presence of incomplete information, uncertainty, and non-trivial transaction costs are meaningful features of many parts of the healthcare value chain. Such situations make it hard (and at times impossible) to write complete contracts to govern the entirety of potential economic interactions. Facing these imperfect markets and contracting difficulties, strategic vertical integration may indeed hold the potential to increase welfare compared to a counterfactual of contractually engaging with the existing imperfect market conditions.

Given the ambiguity of the theory and evidence regarding vertical mergers, it quickly becomes clear that every instance of vertical integration is, effectively, unique; as a result, understanding the potential efficiency impact requires thinking carefully about the exact economic context of the proposed merger. This then requires understanding the potential reasons why integration can increase efficiency and the ways in which such integration can cause anti-competitive outcomes. I will discuss these points in turn, using examples of various integration efforts to demonstrate the underlying economic concepts.

Potential Welfare Benefits of Vertical Integration

As we consider the potential efficiency benefits of vertical integration, we note that undertaking activities within a single corporate entity can potentially increase welfare by addressing specific market conditions such as misaligned incentives, requirements to share information in order to coordinate, concerns about opportunism and uncertainty, poorly functioning supplier markets, and double marginalization.

Incentives

As firms consider how to obtain key inputs, they face the well-known “make or buy” decision: do they choose to produce a key input themselves, or do they avail themselves of the open market and secure inputs via a contractual relationship with a supplier? The benefit of using contracts to organize economic activity between firms that concentrate on their core economic competencies is that it provides strong incentives for suppliers to produce the highest-possible quality for a given low cost. For this reason, firms often promote competition among multiple suppliers to use market forces to secure the lowest costs.

In situations where quality can be relatively easily specified, measured, and monitored, such an arrangement likely maximizes welfare. However, in situations where it is harder and/or costlier to monitor the activities of suppliers, there are concerns that a supplier may make decisions that would not be in the best interest of the downstream firms (but would benefit the upstream supplier). To the extent that the actions of one firm create an unobserved (or difficult to observe *ex ante*) externality for another firm in the value chain, organizing the relationship via a contract can be inefficient compared to internally producing the key input. After all, when activities occur within the same firm, managers of different divisions should be focused on a common profit function.^{viii}

Such incentive concerns were one motivating rationale behind last year’s mergers between pharmacy benefits managers (PBMs) and payers (e.g., Cigna-Express Scripts and CVS Health-Aetna). Effectively, the decision by an insurer to work with a PBM is a choice to “buy” rather than “make” the activity of managing a prescription drug plan. There are a variety of reasons why this would make economic sense. For a long time, the management of prescription drug insurance was believed to be a discrete activity that was largely unconnected to the provision of insurance for medical services. In addition, it involved a number of scale-intensive activities that were themselves

unconnected to the provision of insurance for medical (as opposed to pharmaceutical) services. Based on these beliefs, in a world with a large number of small insurers, outsourcing the management of the pharmaceutical benefit made economic sense.

However, many insurers have now grown meaningfully in size, limiting the scale benefits of outsourcing.^{ix} In addition, innovations have made medicine far more complicated. With the rise of biologic and other specialty medications, the line between a “pharmaceutical” and a “medical” service is increasingly blurred. This is particularly true given that many biologic products are administered as infusions by physicians and therefore are covered under the medical, rather than the pharmaceutical, benefit.^x In addition, a number of pharmaceutical products now heavily influence medical spending.^{xi} As a result, formulary and cost-sharing decisions that minimize prescription drug spending (and thus likely benefit the PBM) may result in higher medical spending, which affects the final payer. As an example, consider a drug that costs \$1,000 but on average saves the medical insurer \$10,000 in future hospital costs. For a stand-alone PBM managing only the pharmaceutical benefits, this drug represents a \$1,000 cost. However, a combined insurer managing total health spending views this drug as a \$9,000 savings, and therefore has strong incentives to design contracts and systems that encourage the patient to take that drug. Importantly, these coordinated activities are likely welfare-enhancing, because they both improve health and lower healthcare spending.

In theory, a PBM and an insurer should be able to draft a contract to coordinate these benefits. However, such contracts have proven difficult and costly to write. Understanding this complexity requires some information about the variety of activities undertaken by different parts of the value chain and how they interact. PBMs manage the prescription drug benefits for payers. This involves activities such as negotiating rebates (i.e., confidential discounts from manufacturers), implementing utilization management programs, and establishing retail pharmacy networks. PBMs earn revenue through a variety of channels. At a high level, these firms contract with payers on a per-member-per-month (PMPM) fee and a pre-specified amount of the rebate that they retain.^{xii} Generally, in contracts where PBMs can capture more of the rebate, they receive a lower PMPM fee, and vice versa. An important point for understanding the potential benefits of vertical integration is that PBMs rarely bear risk for changes in medical spending for enrollees, and often don’t bear direct risk for pharmaceutical spending. However, PBMs do compete on their ability to offer lower prescription drug utilization.

Given that PBMs don't bear risk for medical spending, at the margin they may make decisions that benefit the PBM while increasing medical spending. The most compelling research about the nature and importance of coordination in this area comes from the Medicare program, where firms offer a stand-alone Medicare Part D prescription drug plan (PDP) and/or a Medicare Advantage plan (Medicare Part C) that covers both the medical and pharmacy spending of the beneficiary. Starc and Town (2018) find that enrollees in coordinated Medicare Advantage plans spend more on pharmaceuticals than similar enrollees covered with a stand-alone PDP.^{xiii}

These differences in spending appear to represent a purposeful (i.e., strategic) effort by PDPs to control their *own* spending, rather than controlling the overall health spending of enrollees. Certain types of pharmaceuticals have a greater ability to influence the medical spending of enrollees. Therefore, a coordinated firm that is attempting to minimize total health spending would likely focus on providing more access to drugs that have a greater ability to offset future medical spending. Figure 2 depicts the estimated differences in Starc and Town (2018) for spending for Medicare Advantage plans vs. PDP plans based on whether the pharmaceutical is identified as having a large or a small effect on medical spending. As evidence of higher spending being a strategic decision of a coordinated firm, the higher pharmaceutical spending for the combined Medicare Advantage plans is concentrated in the pharmaceuticals that are known to have a larger effect on medical spending (i.e., the "high offset" category). In considering the mechanism underlying this result, the authors also estimate systematically lower out-of-pocket payments for consumers for drugs in categories that are normally believed to have a high pharmaceutical offset. (These estimates are depicted in Figure 3.) Lavetti and Simon (2018) examined the same question and found consistent results that supported a strategic difference for firms offering a coordinated vs. an uncoordinated benefit product.^{xiv}

An insurer administering a health plan could write a contract with an external PBM that attempts to create the appropriate incentives for considering the interaction between these two types of health spending. Similarly, a payer could choose to outsource only a portion of the activities normally done by a PBM – e.g., the payer (or the firm administering the medical benefit) could internally design the formulary but outsource the negotiation with pharmaceutical firms, pharmacy network design,

and/or processing of claims to a PBM. Regardless of the degree of outsourcing and the attempts at contract design, it would be quite difficult to draft a complete contract in this setting.

As an example of the difficulty of crafting a complete contract, consider that even though it is known that decisions made by the PBM can affect medical spending, the exact magnitude of this relationship across products is uncertain. One solution may be to align incentives by forcing the PBM to bear all (or even a large portion) of the medical risk. However, a contract where the PBM bears medical risk creates a separate moral hazard problem in which the firm managing the medical benefit (i.e., the insurer) has reduced incentives to manage that medical spending.

Determining the correct mix of risk-bearing incentives is difficult, but without such a complete contract that offers each party the correct incentives to provide the optimal level of effort, each party may make decisions that focus more on value capture than value creation. In addition, expending resources to develop the knowledge and expertise necessary to craft and manage these contracts is costly and decreases the efficiency benefits of outsourcing this activity in the first place. However, if the PBM and the insurer are owned by one firm, all parties are inherently motivated by the same profit function (on plans where the insurer bears medical risk) and therefore, in a well-run firm of this configuration, the incentives for constructing the most efficient insurance benefit are aligned. This is one source of value creation that emerges from the combination of CVS Health (and particularly its PBM division Caremark) and Aetna into a single firm, as well as in the combination of Express Scripts and Cigna and in the current corporate structure of United Health Group.

Information and Expertise

As the complexity of economic interactions increases, firms organizing activities through arm's-length contracts must share increasing amounts of information in order to efficiently run their respective operations. This gives rise to two potential economic concerns. First, to the extent that there is meaningful and important asymmetric information across parties, efficient contracts between the two parties could be hard to write, and it is possible that combining the firms could lead to a more efficient outcome. Second, to the extent that effectively monitoring a supplier requires some degree of information or expertise about the underlying process, a firm may find that the cost of acquiring and maintaining that expertise outweighs the benefits of outsourcing in the first place.

An example of this situation is the set of relationships between payers and PBMs. In the U.S., there are many prices associated with pharmaceutical products. Broadly speaking, these drugs have a publicly available list price that is set by the manufacturer. Payers employ PBMs to, among other things, negotiate rebates (i.e., discounts) on the pharmaceuticals purchased by their enrollees. This is true whether the pharmacy benefit is carved into the medical benefit or carved out into a separate plan.

Over time, pharmaceutical rebates have become a large and important part of this market. Figure 4 shows that in 2016, pharmaceutical manufacturers paid rebates of approximately \$127 billion – an increase of 108 percent (\$66 billion) since 2011. The recent rise is larger in both absolute and relative terms than the history of this market. From 2007 to 2011, the total magnitude of these rebates increased only 42 percent, for a total increase of \$18 billion. While payers broadly care about the post-rebate price, and PBMs often point to these increasing rebates as evidence of their effectiveness, higher list prices can have more direct impacts on consumer out-of-pocket payments. For consumers whose cost sharing for pharmaceutical products is either tied to spending on pharmaceutical products within the deductible portion of the insurance contract or a percentage coinsurance rate, their share of the cost is based primarily on the list rather than the net price.^{xv} Thus, any inefficiencies that create incentives for high list prices (even if those are primarily offset by rebates) have clear impacts on consumer spending under existing contracts for this portion of customers.^{xvi}

PBMs are able to secure discounts based on their ability to shift customers across competing therapeutic substitutes. For example, if there are two brand-name statin medications that treat high cholesterol, the PBM can place the product offering a lower net price on a more preferential tier of its formulary, thus lowering the out-of-pocket payments from an individual enrollee. In extreme cases, a PBM could entirely exclude a product from its formulary if the firm is unwilling to provide a sufficiently low net price (i.e., unwilling to pay the PBM a large rebate). The use of exclusion lists has grown in recent years. Figure 5 shows the number of products that are excluded by the two largest PBMs, CVS Health and Express Scripts.

To understand potential inefficiencies in this pricing system, it is important to know how the net price of a pharmaceutical product is determined and who pays which price in the market. Payers

(either self-funded employers or insurance firms bearing risk) first pay the publicly known list price to the pharmaceutical firm. PBMs then negotiate a discount (or rebate) from this list price. PBMs transfer a portion of that rebate to the payer as dictated by a contract between those parties. Figure 6 provides a broad overview of the transfer of funds across parties in the pharmaceutical supply chain. The share of the rebate transferred to the payer is dictated by a contract that is the result of a bilateral negotiation between the PBM and the payer, and therefore depends on the relative bargaining power of the two parties. There are a variety of ways in which payers receive their share of the rebates, including receiving all of the rebate, a fixed percentage, or a flat fee. The majority of payers do not currently receive 100 percent of the negotiated rebate, and many simply receive a guaranteed flat amount regardless of the size of the rebate. The size of rebates paid to each PBM are kept strictly confidential, up to and including onerous audit restrictions in the contracts that limit the ability of the payer to monitor the financial activities of the PBM.^{xvii} As a result, payers often lack full insight into the magnitude of the rebates generated by their pharmaceutical spending – a lack of information that makes it difficult for them to understand the scope of the potential surplus over which they are negotiating.

If the PBM market were functioning well, the structure of the contract and the confidential nature of the rebates should have no effect on the final net price for the pharmaceutical. In fact, confidential rebates in a well-functioning market could be useful because they facilitate increased price discrimination and increase total output sold.^{xviii} In contrast, publicly transparent rebates mean that pharmaceutical firms know that any discount to a particular PBM would be known by the market; therefore, manufacturers would be less willing at the margin to give large discounts.

Importantly, in a competitive PBM market a payer would not actually need to know the full value of a specific rebate. Instead, each PBM would attempt to secure the payer's business by offering progressively larger amounts of the rebate to the payer (either directly or through a lower PMPM payment). The end result is that the total cost of the pharmacy benefit to the payer would be minimized and the PBM would no longer earn large economic profits. However, in a less competitive market, PBMs have weaker incentives to compete for a payer's business by lowering the total cost of the service. With a large number of firms in the market, each PBM understands that they all benefit by fully passing along the surplus to a payer in order to secure the business.

In its current form, the PBM marketplace is dominated by a few small competitors. Figures 7 and 8 contain the market shares for PBMs in 2011 and 2015, respectively. As a result of a series of mergers, this market is highly concentrated, with three firms having a combined market share of over 70 percent. The two most recent mergers were between Express Scripts and Medco in 2012 and OptumRx and Catamaran in 2015. To the extent that we have concerns about the current structure of the market, the dissenting opinion by FTC Commissioner Brill to the Express Scripts-Medco merger foreshadowed the potential negative effects of these types of mergers.^{xix}

High market concentration can be a cause for concern, but it is particularly worrisome in the PBM market because opaque pricing and the rebate structure provide both the pharmaceutical manufacturer and the PBM incentives for higher list prices and higher rebates. This incentive can be explained using a simple numerical example. Consider a manufacturer that proposes raising its list price by \$10 and offers the PBM a rebate of \$9. The manufacturer would be happy with this arrangement because its net price has increased by \$1. The question of whether the PBM accepts this price increase depends on how much of the rebate it must pass along to the payer. Without significant competition, the PBMs have less incentive to compete for the payer's business and thus pass along only \$8 of the rebate, causing the payer to spend \$2 more than it otherwise would have because it lacks the information to ask for the entirety of the rebate and/or list-price increase. These incentives may be strongest in a contract structure where the PBMs only pass along a fixed amount per prescription regardless of the size of the rebate, and the payer has no information about the size of the rebate. The result is that net prices rise to the benefit of the PBM and the manufacturer, and to the detriment of the payer.

One option that might be considered (though not one that I am proposing today) would be for some form of regulatory enforcement that increases the number of PBMs in the market. For a variety of reasons this is unlikely to occur, and upon studying this issue further we may likely find that this type of intervention is actually far costlier than the benefits (a common concern when considering post-merger enforcement when the horse has already left the proverbial barn).

Regulators could also look for ways to ease entry into this market. Specifically, policymakers could more carefully examine the existing contract structures to see the degree to which most favored nation clauses or delayed rebate payments may decrease the ability of a new entrant to emerge and

challenge existing players. Absent any direct regulatory action, we suggest in Garthwaite and Scott-Morton (2017) possible regulations or legislation that mandate that all financial payments to PBMs instead be initially directed towards payers.^{xx} Payers would then be free to contract with a PBM about an appropriate portion of the rebate to transfer. This would solve the existing information asymmetry about the size of the available rebates and allow payers to negotiate with the same set of information as their PBM counterparties.

A vertical merger of a PBM and a payer would address these information asymmetries and align incentives. Such a merged firm would no longer have strong incentives for an internal PBM to accept high list prices and high rebates. The current incentive misalignment and lack of transparency could be one reason why both United Healthcare and Humana have chosen to operate their own PBMs and why Anthem recently announced an attempt to end its contract with Express Scripts, the nation's largest PBM.^{xxi} Similarly, a combined CVS Health-Aetna would have a decreased incentive to strategically manipulate rebates and list prices for their jointly covered customers where they bear medical risk.^{xxii} This should result in decreased net prices and lower out-of-pocket payments for consumers.

Importantly, the potential net efficiency gains from the merger of a PBM and a payer are not certain and depend on two additional features. First, it is quite possible that the combined firm would not be as cost-efficient as using an external supplier. Perhaps more concerning, the degree to which any value created by this vertical integration is passed on to customers is a function of the amount of competition in the health insurance market. The improved information environment without high list prices and rebates may allow the merged firm to craft a more competitively priced insurance package for employers (either for contracts where they bear risk or those where they serve as a third-party administrator). However, the incentive to craft such a competitive package depends on the extent to which the merged entity must compete for business. This is a function of the toughness of price competition in the health insurance market. Thus, even if vertical integration creates value through improved information and incentives around pharmaceutical rebates and price, a competitive insurance market is still required to reach a more efficient outcome (as opposed to simply transferring economic rents between firms).

A second potential problem that emerges when firms have differing levels of expertise and information is that it makes it hard for one party to effectively monitor the other. Ensuring that a supplier is acting in your best interest and complying with the spirit of the contract means that a firm needs a certain amount of information about the underlying process. Without the expertise to effectively monitor a supplier, a firm may be worried that its agent will not act in its best interest. However, acquiring such expertise is costly and may outweigh the benefits of outsourcing in the first place.

Uncertainty and Opportunism

In addition to questions about information and incentives, a general lack of certainty about the future value creation and capture process can lead to suboptimal investments by all parties in the value chain. In order to create value, firms at each stage of the value chain often must make economically meaningful investments. In a value chain such as healthcare where the potential reimbursement system is in flux, there is a concern that investments made by one stage of the value chain will generate value for another firm at a different stage. For example, a provider that makes investments in preventive care and/or forgoes revenue from a specialist visit will effectively increase the provider's costs while decreasing a payer's medical costs. Unless the two firms can agree *ex ante* on a split of the surplus created by those investments, there will likely be underinvestment in value-creating activities. Determining the optimal split of the potential surplus (given the uncertainty of the process) is not an easy task.

Furthermore, some of these necessary investments are fixed, sunk, and at least partially relationship-specific to other members of the value chain. Given this fact, the firms required to make the investment will be concerned that they will never be able to truly write a complete contract that ensures they will not be subject to renegotiation after they have sunk their investment. This creates the economic phenomenon of "hold-up," and results in firms underinvesting in value-creating activities. In thinking about this second channel, it is important to consider carefully the degree to which the particular investments are truly relationship-specific. To the extent that they are, this second concern may be more present compared to the general point that in an uncertain economic world it is hard to predict exactly which activities in the value chain will be economically rewarded in the future.

In both of these cases, vertical integration may result in a more efficient outcome than a series of incomplete and renegotiable contracts. When payers and providers are vertically integrated, the firm earns greater profits for a given premium if patients use fewer medical services. In such a setting, a health plan's success over time is based on it being sufficiently attractive to patients at a given premium that it continues to attract those individuals. In other words, simply decreasing the amount of care available is unlikely to be a successful long-term strategy. In addition, if the health plan expects to cover individuals for a long period of time, it has greater incentives to invest in preventive healthcare since improved health could result in reduced medical expenditures in the future.

One method of decreasing health spending is to provide greater opportunities for individuals to receive care in a lower-cost setting. Ideally, these visits would either (a) displace care that would otherwise be inappropriately provided in a higher-cost setting; and/or (b) provide preventive care that improves health and avoids future hospitalizations or other high-cost care. One potentially lower-price site for care that has emerged in recent years is retail clinics. These facilities are often (but not always) located at existing retail establishments and are staffed by mid-level providers. In general, these facilities offer treatment for acute but non-life-threatening medical conditions such as ear infections, vaccinations, strep throat, etc.

The overall cost savings of existing retail clinics is unclear. While retail clinics have the potential to decrease medical spending by displacing visits that otherwise would have occurred in higher-cost settings (or by helping to avoid a second, more costly visit), it is also possible that the convenience of these clinics could actually *increase* spending by changing the number of visits at the extensive margin. Specifically, as these convenient locations for care decrease the costs of getting to a visit, individuals that may not have seen a provider (and have therefore incurred no cost) would now see a provider, thus increasing health spending. The existing evidence on the aggregate impacts of these clinics shows two salient facts: (a) visits to retail clinics are less expensive than similar visits to other providers^{xxiii}; and (b) the aggregate impact of access to retail clinics is *increased* rather than decreased spending.^{xxiv} We have little understanding to date as to the welfare consequences of these changes in utilization and spending. It could be that the increase in spending is welfare-increasing if it improves an individual's health and s/he values this improvement; however, it could also be evidence of moral hazard where individuals are consuming healthcare at below its value because they do not bear the direct financial cost of the visit.

What is important to realize is that these existing studies provide evidence about the effects of retail clinics operated by firms such as CVS and Walgreens, whose primary incentive is to maximize the revenue of the clinic and the surrounding retail footprint. Firms operating clinics facing these incentives would select service offerings that translate into increased pharmacy spending and retail sales with little direct concern for the impact on aggregate health spending. Therefore, it is perhaps not surprising that such clinics have not decreased overall spending, since the firms operating them have no financial incentive to do so.

However, a firm that is vertically integrated beyond simply a retail footprint would make different economic decisions. For example, the clinics operated by an integrated firm could offer preventive care services that are primarily intended to reduce health expenditures rather than increase retail revenue. This involves the direct costs of providing these services and, potentially, an opportunity cost as these firms shift their attention away from activities that would generate more direct revenue. For this to be successful, insurers must invest in analytics and benefit designs that identify, direct, and encourage specific subsets of patients to utilize these new sites for care. Importantly, simply directing expensive patients to these sites would not be optimal, since many of the most expensive patients likely will not see spending decrease even with interventions from clinics. Instead, payers must identify patients whose high spending can be moderated by the use of additional outpatient services.

The size and scope of, and potential return on, these investments is unclear. Frankly, it is uncertain whether retail clinics can truly decrease health spending in this way, even under optimal conditions. What is certain is that each firm would need to make fixed-cost investments that would generate savings, and those savings could initially accrue to another party in the value chain. It is also unlikely that the two parties could write a complete and satisfactory contract that would appropriately apportion the potential social value created by these activities to the firm whose investments were responsible. This concern is exacerbated by the uncertainty about the exact path between retail clinics and lower spending. As a result, each set of firms would underinvest compared to the optimal amount, out of concern that another party would capture the value created by its investment. This underinvestment is an example of the concept of hold-up described above.

To the extent that the investments in these clinics and/or the analytic capabilities to optimally exploit the clinic are relationship-specific, the concerns about hold-up only increase. For example, if the insurer has a disproportionate number of patients with conditions where the cost is moderated by a particular set of activities, the operator of the retail clinic may be concerned about the degree to which he or she will be in a disadvantageous position after sinking the fixed-cost investment. Similar concerns exist if the potential patients are clustered in specific geographic regions where the insurer has a dominant market share.

One potential solution for hold-up is vertical integration between different parties in the value chain. For a vertically integrated firm, there is no hold-up concern. Consider the potential case of a merged CVS Health-Aetna. If this firm changed its retail clinic strategy, and that change resulted in lower future health expenditures, there is no uncertainty that the merged entity would capture the value created. The only potential uncertainty might be whether the gains from a successful venture would be attributed to a particular division. Given this certainty about the potential value capture, hold-up is avoided and the firm has the appropriate incentives to make investments that maximize social value.

Addressing Poorly Functioning Supplier Markets

Firms, perhaps unsurprisingly, often find themselves paying more to suppliers than they desire. In such situations, firms are sometimes tempted to try to increase their profits by becoming their own suppliers, in order to avoid paying such a high margin on key inputs. However, this inclination is generally misguided and an example of what economists refer to as the “markup fallacy.” If the firm’s supplier is in a competitive market, then the margin it earns should approximate the normal rate of return that any firm would earn by undertaking those activities. Therefore, there is no actual markup to save. If a supplier has market power (and therefore is earning positive economic profits), a firm acquiring its supplier will almost certainly pay in advance for the discounted future value of those profits. Thus, it is not actually avoiding the markup; it is simply paying it in an initial lump sum when it acquires the supplier firm.

Of course, a firm could choose to develop the capabilities of its supplier as a de novo entrant. In that case, it should consider why another firm has not been able to enter the market with positive economic profits. That said, there are situations in which a downstream firm may be the most likely

potential entrant into the upstream supplier market. This could be because the downstream firm already possesses a set of internal assets and activities that make it easier for it to overcome existing entry barriers. Outside of healthcare, a reasonable argument can be made that this is the case for the decision of Boeing and Airbus to begin manufacturing some costly inputs following the merger of key suppliers.^{xxv}

It could also be that the supplier market can't profitably support multiple entrants, and thus would be unattractive to any entrant that was not a downstream customer. Effectively, entry becomes rational once the downstream customer accounts for the opportunity cost of not entering in its production function. A recent example of this economic rationale has emerged in the generic drug market. It has become apparent that a number of generic drug markets are effectively natural monopolies – i.e., the market size is so small that in equilibrium, the market cannot profitably support multiple firms. In such markets, the incumbent firm has meaningful pricing power without fear of attracting a competitor. There is evidence that some firms have realized this and meaningfully raised prices on these products (see Figure 9). Perhaps the most prominent example of such a case is Martin Shkreli and Turing Pharmaceuticals' pricing of the toxoplasmosis treatment Daraprim. Turing raised the price of this product by approximately 5,000 percent. For drugs that are inputs to inpatient hospital treatments, hospitals find it either difficult or impossible to pass along such price increases to customers. Instead, a group of hospitals have formed a new joint venture, CivicaRx, with the intention of supplying products that are subject to such large price increases without attracting entry. In this setting, hospitals are not simply vertically integrating to avoid paying a markup but are instead proposing integration to solve the market inefficiency in their supplier market.^{xxvi}

Double Marginalization

Many of the issues related to the competitive effects of vertical integration concern whether the incentives of the newly combined firm will be changed in a way that benefits or harms consumers. Clearly, one area on which we should focus our attention is the prices charged between the two firms, which are market-driven when the firms are separately owned and, in effect, internally determined transfer prices when the activities are undertaken by co-owned divisions of the same firm.

As discussed above, a firm that buys its supplier simply in order to avoid paying an existing markup is often unwisely paying in advance for the markup it is attempting to avoid. That said, there are other reasons why acquiring a supplier with market power could change pricing incentives in a way that would increase efficiency. This potential for increased efficiency comes from eliminating the compounding deadweight loss that occurs when multiple stages of the value chain charge a positive price-cost margin. This excess deadweight loss is often described as double marginalization. Recall that when firms with market power (which can't price-discriminate) charge a positive price-cost margin, there are value-creating trades (i.e., those where the willingness to pay exceeds the cost) that do not occur. When a supplier charges a margin to the downstream firm, the marginal cost of the downstream firm now includes the margin for its supplier. Therefore, the downstream firm's optimal price (which is a function of marginal cost) is now higher than it would otherwise be if its supplier were in a perfectly competitive market. Importantly, both firms would be better off if the upstream supplier transferred the input to the downstream firm at marginal cost and the firms agreed to a split of the surplus. These contracts are often hard to write because of disputes over how much of the surplus each firm should receive.

A classic example of vertical integration that could avoid double marginalization in healthcare is the relationship between health plans and hospitals. A hospital with market power is a critical input to a health plan. If the hospital charges a positive price-cost margin it effectively amounts to an increase in the marginal cost of the health plan. If the health plan also has market power, and therefore charges a positive price-cost margin, its premiums will be inefficiently high. As a result, the total available profits in the sector decrease and potentially valuable insurance plans also go unsold, resulting in a higher share of the U.S. population without insurance. In theory, the firms should be able to write a contract to solve this concern and achieve the efficient outcomes, but as I discuss below, these contracts have proven quite hard to write in practice.

Complicating matters regarding the estimation of the potential benefits of eliminating double marginalization is a question of what would truly be the optimal decision for the newly combined firm. Eliminating double marginalization in the context of a bilateral monopoly leads to a rather straightforward prediction of an increase in efficiency resulting from a decrease in the prices charged by the downstream firm. This is because the combined firm would find this optimal. However, in a situation where one or both firms is an oligopolist (which is more often the case in the real world),

the more textbook example of the efficiency benefits of double marginalization may not hold. In fact, there are cases where the combined firm would find that higher downstream prices are optimal. Thus, there should be caution in reflexively citing the elimination of double marginalization as a justification for all vertical mergers where firms have some degree of market power.

Concerns that Vertical Integration Can Decrease Efficiency

While I've detailed a number of ways in which vertical integration *could* increase economic efficiency, there are also reasonable concerns that some of these combinations of activities could raise prices without increasing welfare. These include (but are not necessarily limited to) the potential to foreclose access to a key input, the difficulty that results when mergers simultaneously involve vertical and horizontal components, and differences in billing by ownership status. As an overall point, I would note that the relative length of my description of these potential anti-competitive features compared to the potential economic conditions that would support vertical mergers should not be misinterpreted as an indicator of the relative importance or likelihood of these potential outcomes. Similar to horizontal mergers, the combination of firms along the value chain can have meaningful economic impacts, and therefore such mergers should be investigated by the relevant competition authorities. It is my understanding that other members of the panel today will also provide more detailed discussions of this question of enforcement regarding vertical mergers.

Foreclosure

Vertical foreclosure is an economic strategy of acquiring a competitor's key input in order to either deprive them of access to the input or increase the costs of the rival downstream firm's production process. For example, there could be concerns that a hospital acquiring local physician practices is doing so not to more efficiently provide care but instead to deprive a competitor of referrals they otherwise would have obtained.

While full foreclosure is a legitimate economic concern, as a strategy it is often very difficult to pull off successfully. There are three conditions that are necessary for foreclosure to increase profits over the long term. First, the acquisition must result in rivals facing higher input prices or decreased access to customers. Second, the acquisition price of the supplier must be less than the firm's expected future profits resulting from the attempted foreclosure.^{xxvii} Finally, there must be barriers to entry that prohibit another supplier from entering the market to serve the unmet demand.

Foreclosure by one firm creates an opportunity for above-average economic profits in the input market, which should attract new entrants. For it to be profitable, therefore, there must be some barrier that stops prospective entrants.

Given the lack of economic success from full foreclosure (i.e., refusing to sell to a rival downstream firm), in practice we are often concerned that a merged firm will face new incentives with respect to the optimal prices that it would charge to rival downstream firms. This can be thought of as partial foreclosure. To the extent that these higher input prices increase consumer prices, such partial foreclosure could harm consumers. In such a setting, any efficiencies from the merger could be outweighed by these anti-competitive effects, resulting in higher prices and decreased welfare. The degree to which we would expect such consumer harm depends on the specifics of the firms involved in the merger and the markets in which they compete.

When considering whether foreclosure is likely the true economic rationale driving a proposed merger (and therefore whether the effect of the merger would be more likely to be anti-competitive), a primary question is whether such a strategy is likely to be profitable in the first place. The answer will depend in part on the relative size of the firms. For example, some have raised the concern that a merged CVS Health-Aetna may attempt to decrease a competitor's access to a vital input, such as CVS retail pharmacy locations or Caremark's PBM services (perhaps by finding that raising the price of the service would be optimal). In this specific case, I find this to be an unconvincing concern. While it is true that this might make Aetna a more attractive insurance product, Aetna ultimately has a relatively small market share. Thus, while I don't have access to the full set of internal documents necessary to say this with complete certainty, it seems extremely unlikely it would be profit-maximizing for the merged CVS Health-Aetna to give up on the retail or PBM revenue from other insurers in order to craft a marginally better product for Aetna. This type of concern emerges when the supplier is of meaningfully different size than the downstream firm. (Of course, it is fair to note that this disparity in size could also decrease the potential efficiencies of such a merger in the first place.)

Horizontal/Vertical Combinations

While we often discuss mergers as being either horizontal or vertical in nature, the world is, unsurprisingly, more complex, and mergers often have both horizontal and vertical components.

This increases the complexity of analyzing the likely economic impacts. This is increasingly a question when we analyze the vertical integration of large firms, such as those depicted in Figure 1. For example, when a health system attempts to acquire physician practices in a local market, it introduces questions about both the horizontal and the vertical relationships (i.e., many health systems already employ physicians so acquiring more practices has both a horizontal and vertical component).^{xxviii} Furthermore, to the extent that consumers in a particular market are simultaneously selecting both a physician and a hospital, a combination of those two stages of the value chain can have fundamentally different consequences. However, this is often the case since physicians that are acquired by a hospital are perhaps more likely to shift their referrals to that particular facility over a rival.

All of these questions were at issue when St. Luke's Health System of Nampa, Idaho, acquired the Saltzer Medical Group. This merger was successfully challenged by the Federal Trade Commission, which alleged that the combination of these assets into a single firm diminished competition for adult primary care services in the local market. While there were many issues at play in this case, the court ruled that many of the proposed gains from more integrated care could be achieved by contract, and that the increased prices that would likely result from the merger outweighed any of these potential benefits. This case is illustrative of the difficulty of considering the increased integration of physicians and hospitals as purely a horizontal or a vertical question. Instead, each of these situations must be independently evaluated, as there are a number of market- and firm-specific factors that will determine the impact of the merger.

Differences in Billing by Ownership Status

Provider billing is a complex institution in which similar services can receive different prices based on the ownership of the facility. Historically, for example, many services performed in a hospital outpatient department receive higher payments than identical services performed in a physician office. This occurs by rule under Medicare but also occurs in commercial billing (either by negotiation or because many commercial payers adopt variants of the Medicare price schedule). The reimbursement differences stem from the attempt by Medicare to compensate providers at a rate that equals average cost and a belief that services actually provided in a hospital facility can have a higher average cost than those in a physician's office. However, the actual reimbursement is often based on the ownership of the facility rather than its location, which likely has far less of an effect

on the average cost of providing the service. For example, a hospital simply acquiring (but not relocating) a physician practice can bill as a hospital outpatient rather than a physician office visit, and receive more revenue without any change in the production function for the service.

As an example, consider the case of cardiology services such as myocardial perfusion imaging, echocardiograms, and electrocardiograms. In 2009, the Medicare reimbursements for these services were cut markedly, growing the existing spread between reimbursements for these services. After the cut, Medicare paid 141 percent more for an echocardiogram in a hospital outpatient department compared to a physician office.^{xxix}

Unsurprisingly, this disparity in reimbursement increases the benefits of financial integration between firms. By integrating with a hospital, cardiologists could see a marked increase in revenue with no actual change in work effort. Hospitals and the acquired physicians would be able to negotiate a split of that increased surplus. Song et al. (2015) examined the share of these services billed as a hospital outpatient procedure as opposed to a physician visit.^{xxx} Figure 10 contains this share over time and shows a marked shift towards hospital-based procedures post-2010.

Higher reimbursements for hospital procedures can cause an almost mechanical increase in prices following the integration of physicians and hospitals. Recent evidence has found that payment rules such as this are partially responsible for higher prices after hospital-physician mergers.^{xxxi} For this reason, Medicare has attempted to institute “site-neutral” billing that will not give higher reimbursements based on the site of care. Various hospitals have challenged these regulations in court.^{xxxii}

Why Can't Firms Simply Write Contracts?

Given the concerns about potential harms to competition, we should always return to the enduring question of why the various parts of the healthcare value chain can't simply write contracts to accomplish their integration goals. While many parts of the U.S. economy have successfully instituted contracts to govern relations throughout the supply chains, the success of firms in the U.S. healthcare system in writing such contracts has been limited.

One example of this difficulty can be found in the plethora of “alternative payment” or “value-based” contracts. These arrangements have largely failed to accomplish their promised goals, and instead serve to demonstrate the inherent contracting difficulties in this area. For example, the Accountable Care Organizations (ACOs) created as part of the Affordable Care Act (ACA) were promised as a contractual arrangement between payers and providers that would address many of these concerns. One member of the Obama Administration who helped draft these regulations, Ezekiel Emmanuel, proclaimed that health insurance firms would be extinct by the year 2020.^{xxxiii} As we stand here today on the precipice of that year, this prediction seems at best premature.

ACOs exist in both the commercial and the public insurance market. The structure of ACOs varies between contracts, but at a high level they are a way for payers and providers to share the risk of medical spending. Essentially, each ACO enrollee has an expected level of spending for the year that is often risk-adjusted. If the ACO is able to hold spending below that specific amount, it will share a pre-specified portion of the savings with the payer. However, if actual spending exceeds the expected amount, then the ACO may pay a penalty to the payer depending on whether the ACO contract involves downside risk. The size of the shared savings percentage varies by plan, and capitation (i.e., where a firm is provided a fixed payment and is responsible for all medical spending) can be thought of as an ACO with 100 percent “shared savings.” Medicaid Advantage would be an example of such a plan.

To date, public ACOs have generated at best moderate savings. For example, Figure 11 (taken from McWilliams et al. (2018)) shows the estimated savings from the Medicare Shared Savings Program (MSSP), which shows total savings to date of approximately \$250 million.^{xxxiv} Importantly, these savings are what Medicare has enjoyed, and do not account for any costs to providers to establish and implement the systems necessary to generate cost reductions. Such costs could be meaningful, and understanding their economic impact will depend on whether these costs are fixed or variable.

In terms of understanding the contracting environment for shared savings plans, the heterogeneity in savings across firms of different types is of more interest than the overall savings amount. While many health policy experts thought the size and scope of large health systems would allow them to generate the most meaningful savings under an ACO structure, these organizations have actually had

limited success to date in this program. As can be seen in Figure 12, the most successful MSSPs to date have actually been those led by primary care physicians.

Understanding why this is the case involves thinking about the incentives of the different parts of the healthcare value chain. Consider a large system that employs primary care physicians and specialty physicians, and owns hospitals. Under an ACO contract, if the health system reduces the use of its specialists and its hospitals, this will generate savings for the payer. Crucially, this also reduces the healthcare system's revenue. Therefore, this can only be profitable for the system if the amount by which spending is reduced is outweighed by the potential financial benefits – either directly from the shared savings payments from the payer or from an increase in quantity from patients steered to the lower-cost system. This is a high hurdle for such a health system. However, for a primary care physician-led ACO, each potential reduced hospital admission or specialty visit represents \$0 of direct foregone revenue and a potential for shared savings and greater quantity of patients in the future. Thus, the calculus is quite different for these practices. Unsurprisingly, the estimates in Figure 13 suggest that some of the largest differences between the two types of ACOs are in categories that largely mirror this incentives story.

In theory, the payer and the health systems should be able to write a complete contract that aligns incentives and promotes cost-savings behavior. In practice, this is a very complex contract to write, and it may instead be that vertical integration is able to align incentives in a way that generates a more efficient outcome.

While many national firms are choosing integration over contracting in the current market, it is important to note that Walgreens is attempting to accomplish its strategic goals through contracting and joint ventures rather than complete integration. For example, Walgreens and Humana have partnered to offer a set of retail health clinics targeting seniors.^{xxxv} Similarly, Walgreens is working in partnership with the PBM Prime Therapeutics in a joint venture for specialty pharmaceutical services. This strategic vision stands in stark contrast to the strategy of CVS Health, which has chosen to acquire both a PBM and a payer. Effectively, these two firms are making different bets on their respective ability to accomplish their respective strategic goals through contracts. Time will tell which of these two approaches will ultimately be successful, and the market is likely well served by having these different business models competing for customers.

Vertical Integration Might Ultimately Be Unsuccessful

Before we break out the champagne and start celebrating vertical integration as the solution to all U.S. healthcare spending concerns, it is wise to acknowledge the inherent difficulties in successfully implementing these strategies. While vertical integration can set the stage for potential cost savings, there are still a number of stumbling blocks. Furthermore, the history of these integrations should temper our expectations about success.

For example, IDNs were intended to offer better-coordinated care that would decrease costs and increase patient health. A broad review of the literature provides little empirical support for these theoretical benefits.^{xxxvi} Summarizing the literature, a National Academy of Social Insurance report states, “[t]here is little evidence that integrating hospital and physician care has helped to promote quality or reduce costs. Indeed, there is growing evidence that hospital-physician integration has raised physician costs, hospital prices, and per-capita medical care spending. Similarly, hospital integration into health plan operations and capitated contracting was not associated either with clinical efficiency (e.g., shorter lengths of stay) or financial efficiency (e.g., lower charges per admission).”^{xxxvii}

One example that should provide such caution is the case of Kaiser Permanente. As a fully vertically integrated payer-provider, Kaiser is often held up as an example of the promise offered by properly aligned incentives. In particular, there is a common belief that Kaiser is able to offer the lower cost and higher quality care that is the holy grail of healthcare reform. While the full nature of savings generated by Kaiser’s model is unclear (i.e., how much is treatment and how much is selection), it is safe to say that within its home markets, Kaiser is able to provide far more coordinated and, likely, lower-cost care. For this reason, many point to this model as a way forward for the U.S. healthcare system.^{xxxviii}

However, Kaiser’s attempts to expand beyond its home market in California have been fraught with difficulty, and in many instances the firm has been forced to retreat from these markets.^{xxxix} Kaiser’s difficulties as it attempted to expand into new markets have been the result of a multitude of problems, including a lack of adequate scale, an inability to adapt to local regulations, an unsupportive provider community, and a set of consumers requiring premium reductions that

exceeded the cost savings generated by the model in that market.^{x1} While there have been markets where Kaiser has been relatively more successful, it has broadly struggled to replicate the current level of success within its home market in expansion regions. Given its internal knowledge about the assets and activities necessary to successfully operate a vertically integrated payer-provider, Kaiser's expansion struggles should give pause to those expecting that vertical integration will easily solve the problem of growing healthcare spending.

That said, whether vertical integration ultimately creates value for shareholders is not truly a concern for policymakers. Capitalism is a messy process in which success is not guaranteed. If a firm's strategic bet doesn't pay off, that is a problem for its shareholders or private owners. Policymakers should focus their efforts on those mergers that could lead to inefficient price increases or anti-competitive actions.

Conclusion

Healthcare firms are clearly undertaking a wider range of vertical integration activities than has previously existed in this sector. This unique combination of assets and activities represents a strategic bet from firms about how to create and capture value in a changing market. While many economists are generally skeptical about the strategic benefits of vertical integration, there are many features of the U.S. healthcare market that are consistent with integration increasing economic efficiency.

That said, the complicated nature of vertical interactions means that policymakers must avoid having a generic view on these combinations of firms, and instead carefully examine each proposed merger based on the specific facts.

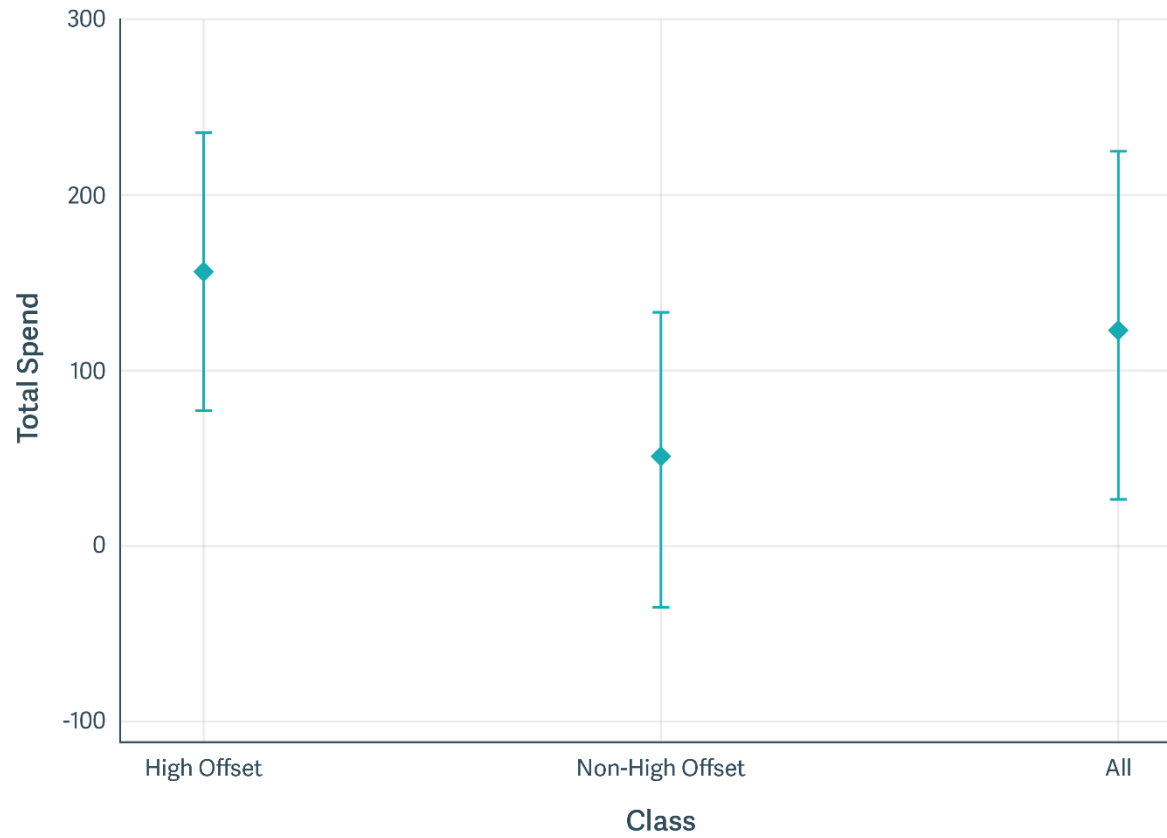
As we consider the potential for consumers to benefit, we must never forget that competition is an essential feature of a healthy marketplace. Therefore, even a world of increased integration requires a sufficient number of firms competing for consumers' business. One lingering concern about this degree of vertical integration is whether it limits the amount of competition that the market can sustain. In particular, it may be difficult for a large number of firms to successfully operate a PBM while having a set of retail clinics, running a specialty pharmacy, and/or employing a large number of physicians. If these activities become required to succeed in the market, it may be difficult for a

large number of firms to do so. If this is ultimately the case, then there are additional regulatory tools that can be brought to bear. However, this is a bridge that can be crossed if and when we come to it.

FIGURE 1
Examples of Integrated Healthcare Firms

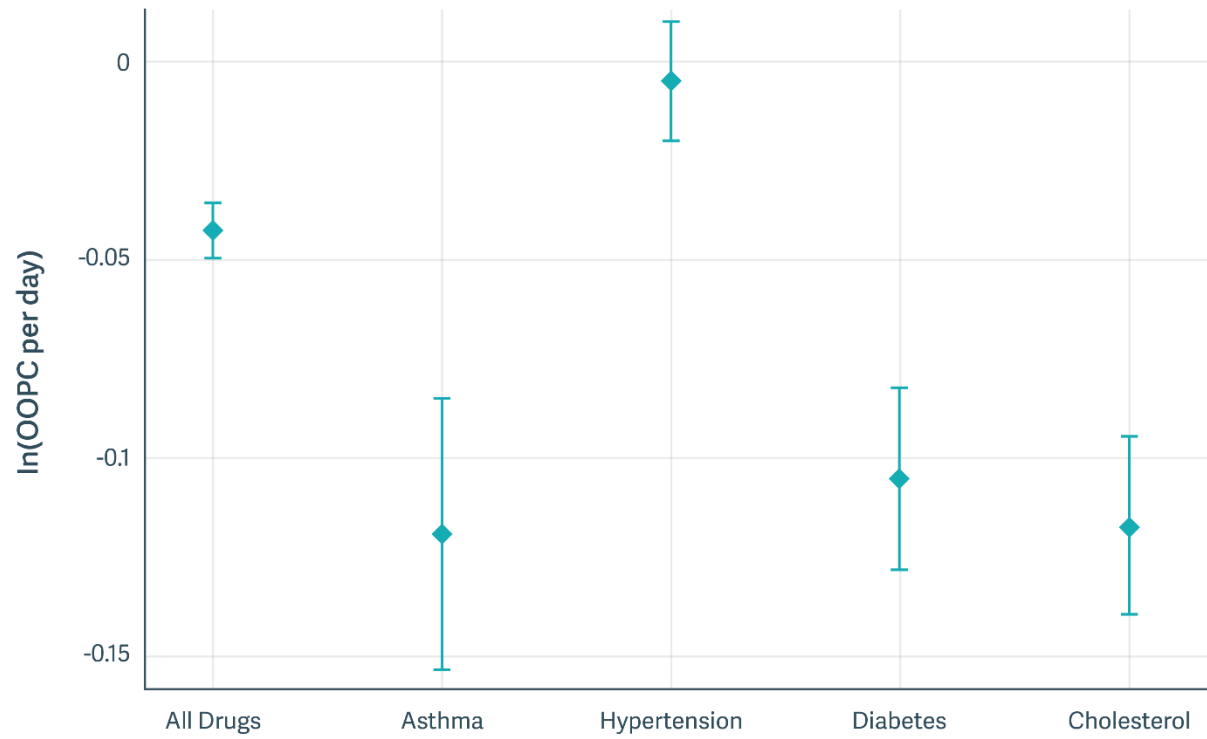


FIGURE 2
Impact of MA-PD Enrollment on Utilization by Drug Class



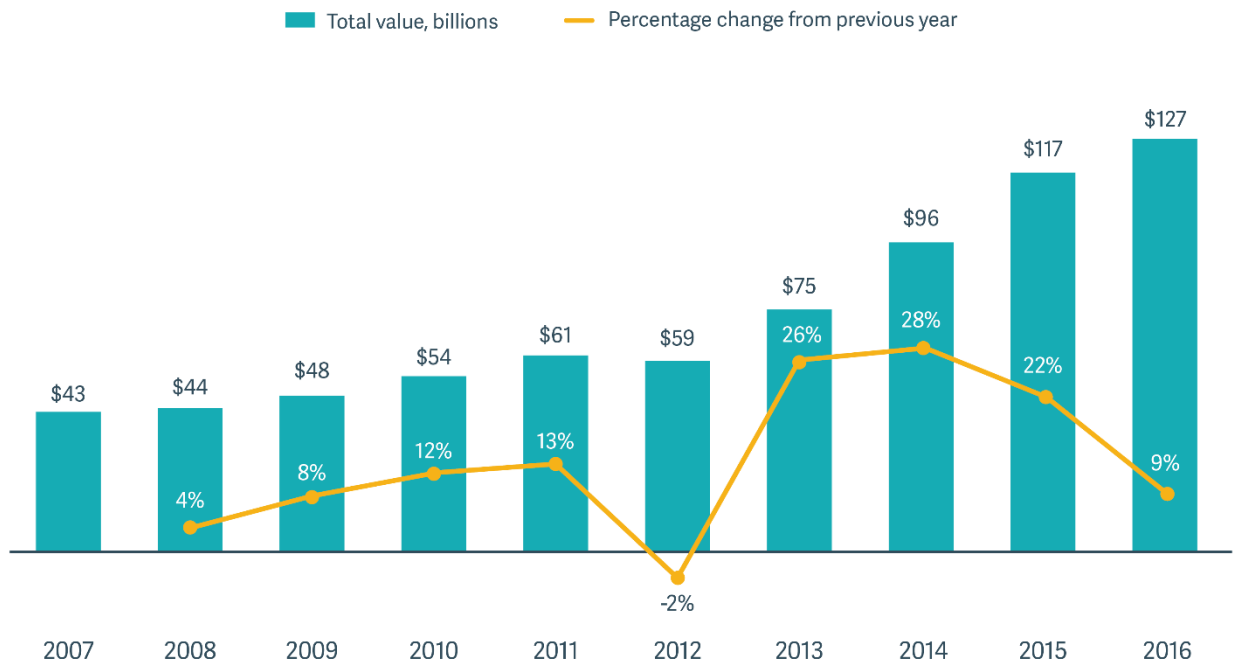
Source: Starc and Town (2018)

FIGURE 3
Out-of-Pocket Cost Effects by Drug Class



Source: Starc and Town (2018)

FIGURE 4
Pharmaceutical Manufacturers Off-Invoice Discounts, Rebates, and Price Concessions, 2007-2016

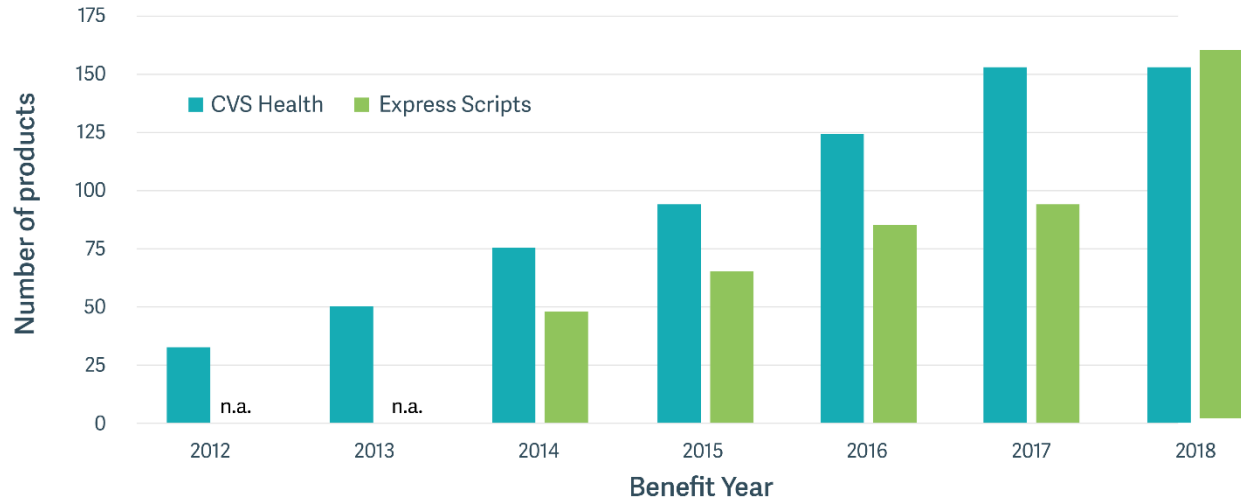


Source: Pembroke Consulting analysis of *Medicines Use and Spending in the U.S.: A Review of 2016 and Outlook to 2021*, QuintilesIMS, May 2017. Published on Drug Channels (www.DrugChannels.net) on June 14, 2017.



Source: Drugchannels.net, available at:
<http://www.drugchannels.net/2017/06/new-data-show-gross-to-net-rebate.html>

FIGURE 5
**Number of Products on CVS Health and Express Scripts
 Exclusion Lists, 2012-2018**

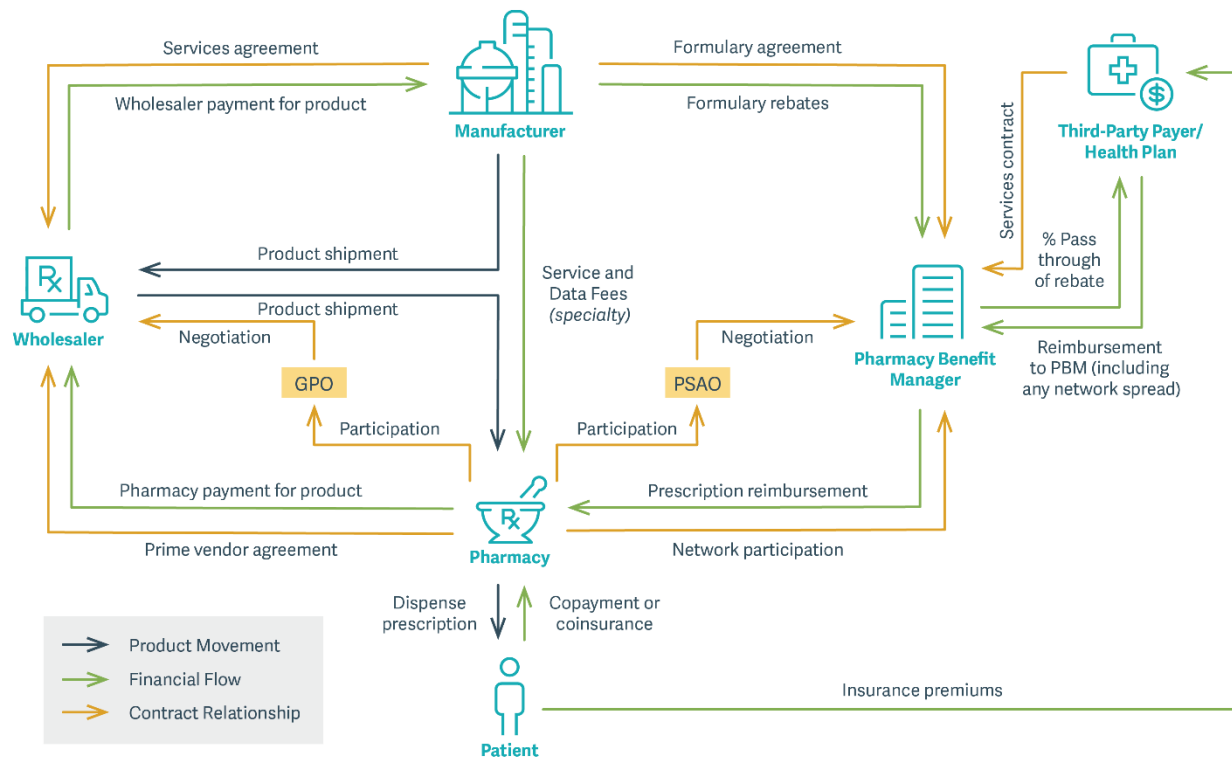


Note: Express Scripts did not publish exclusion lists for 2012 and 2013.
 Source: Pembroke Consulting analysis of company reports
 Published on Drug Channels (www.DrugChannels.net) on August 3, 2017.



Source: Drugchannels.net, available at:
<http://www.drugchannels.net/2017/08/whats-in-whats-out-new-2018-cvs-health.html>

FIGURE 6
**Flow of Payments and Contractual Relationships
 for U.S. Retail Outpatient Drugs**



Source: Fein, Adam J., *The 2017 Economic Report on U.S. Pharmacies and Pharmacy Benefit Managers*, Drug Channels Institute, 2017. Chart illustrates flows for **Patient-Administered, Outpatient Drugs**. Please note that this chart is illustrative. It is not intended to be a complete representation of every type of financial, product flow, or contractual relationship in the marketplace. GPO=Group Purchasing Organization; PSAO=Pharmacy Services Administrative Organization



Source: Drugchannels.net, available at: <http://www.drugchannels.net/p/about-blog.html>

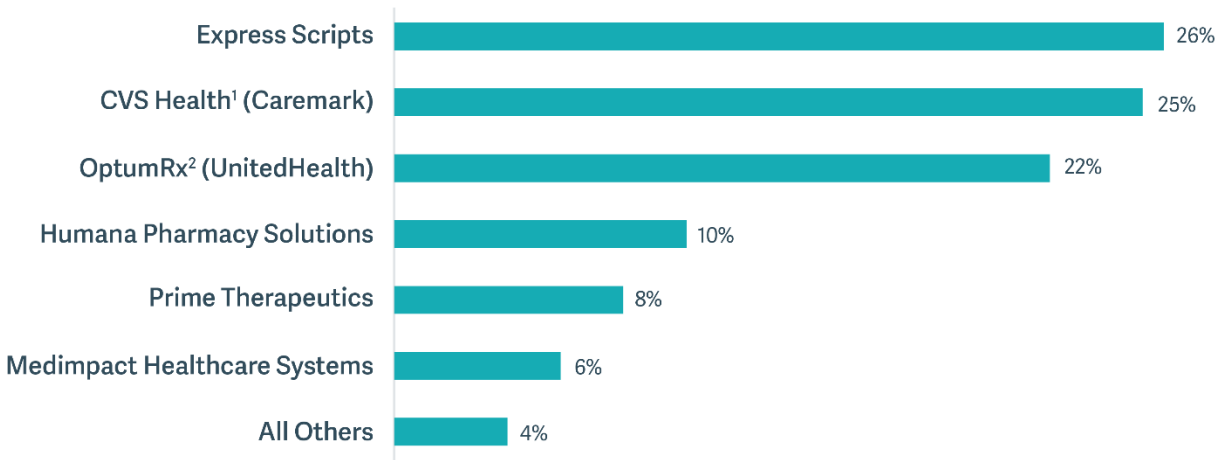
FIGURE 7
**Pharmacy Benefit Manager
 Total Adjusted Scripts/Share, 2011
 (scripts in millions)**

MHS	773.0	20.8%
ESRX	754.2	20.3%
ESRX with MHS	1,527.2	41.1%
CVS	1,034.3	27.8%
OptumRx	527.3	14.2%
Prime	171.0	4.6%
CHSI	181.6	4.9%
SXC	86.2	2.3%
Others	190.2	5.1%
Total	3,717.7	100.0%

Source: Company documents, IMS Health, Barclays Capital estimates

Source: Drugchannels.net, available at:
<http://www.drugchannels.net/2011/07/esrx-mhs-strategic-and-market-analysis.html>

FIGURE 8
PBM Market Share by Claims, 2015



Total prescription claims includes claims at a PBM's network pharmacies plus prescriptions filled by a PBM's mail and specialty pharmacies. Excludes cash-pay prescriptions. Total may not sum due to rounding.

- 1. Includes Aetna prescription claims volume.
 - 2. Includes pro forma combination of OptumRx with Catamaran. Includes Cigna prescription claims volume.
- Source: Pembroke Consulting estimates

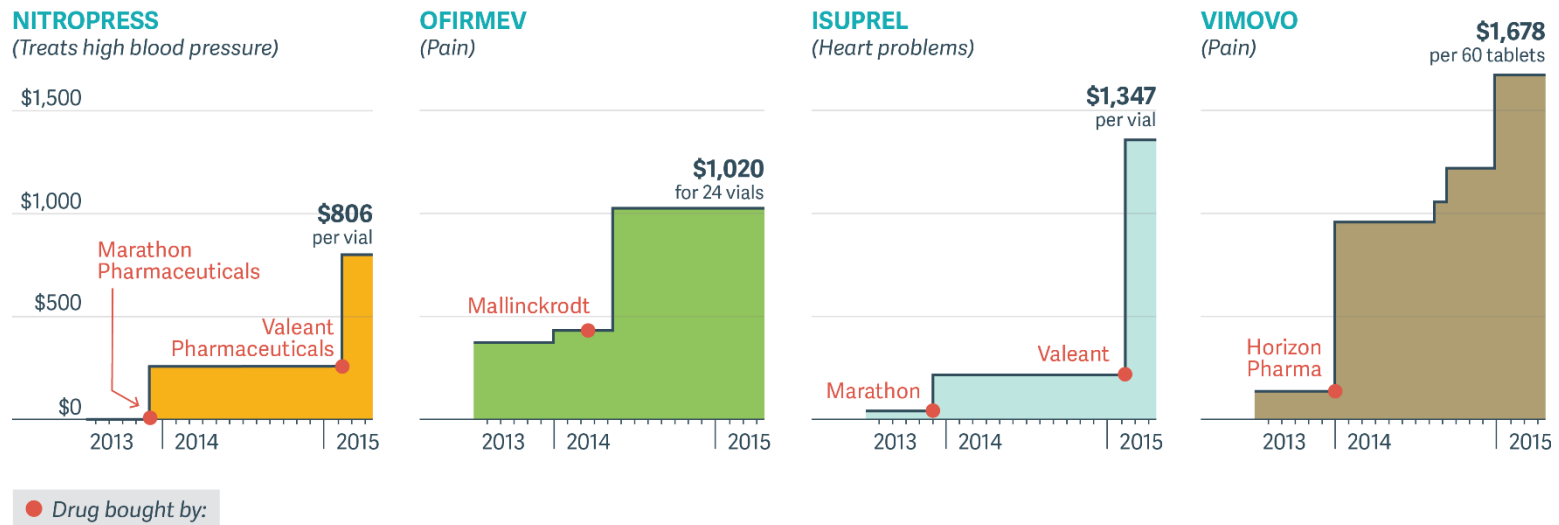
This table appears as Exhibit 59 in Fein, Adam J., *The 2016 Economic Report on Retail, Mail, and Specialty Pharmacies*, Drug Channels Institute, January 2016. Available at http://drugchannelsinstitute.com/products/industry_report/pharmacy/



Source: Drugchannels.net, available at:
<http://www.drugchannels.net/2016/09/why-walgreensprime-deal-could-transform.html>

FIGURE 9 Price Spikes

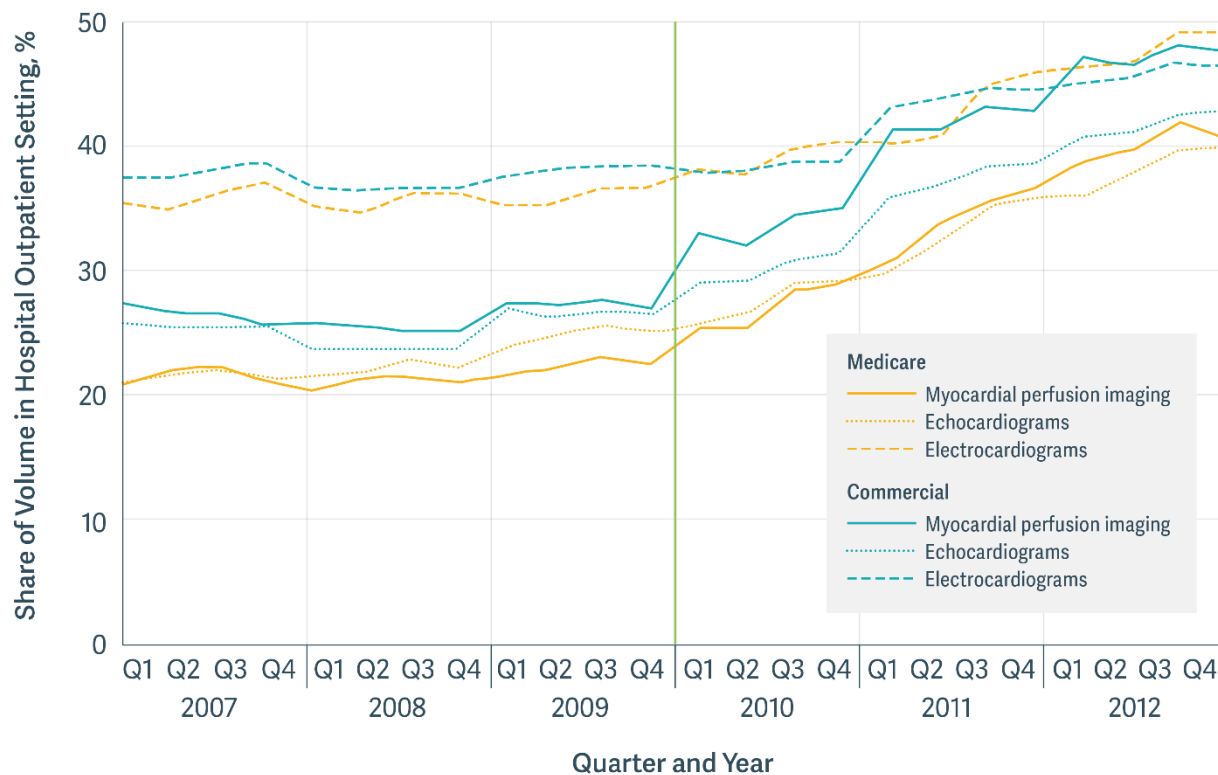
After some deals buying drugs from other companies, drug makers have hiked the prices significantly. Average wholesale prices:



Source: Truven Health Analytics

Source: <https://www.wsj.com/articles/pharmaceutical-companies-buy-rivals-drugs-then-jack-up-the-prices-1430096431>

FIGURE 10
**Shares of Sentinel Cardiology Services Billed in the
 Hospital Outpatient Department Setting**



The vertical line represents the onset of 2010 Medicare fee cuts. The Truven Medicare and Commercial databases comprise large convenience samples of Medicare beneficiaries with Medicare Supplemental coverage for whom Medicare is the primary payer, as well as adults and families with commercial insurance from large US employers, respectively.

Source: Song et al. (2015)

FIGURE 11
Net Savings to Medicare in 2015 on the Basis of Differential
Changes in Spending in ACO Cohorts*

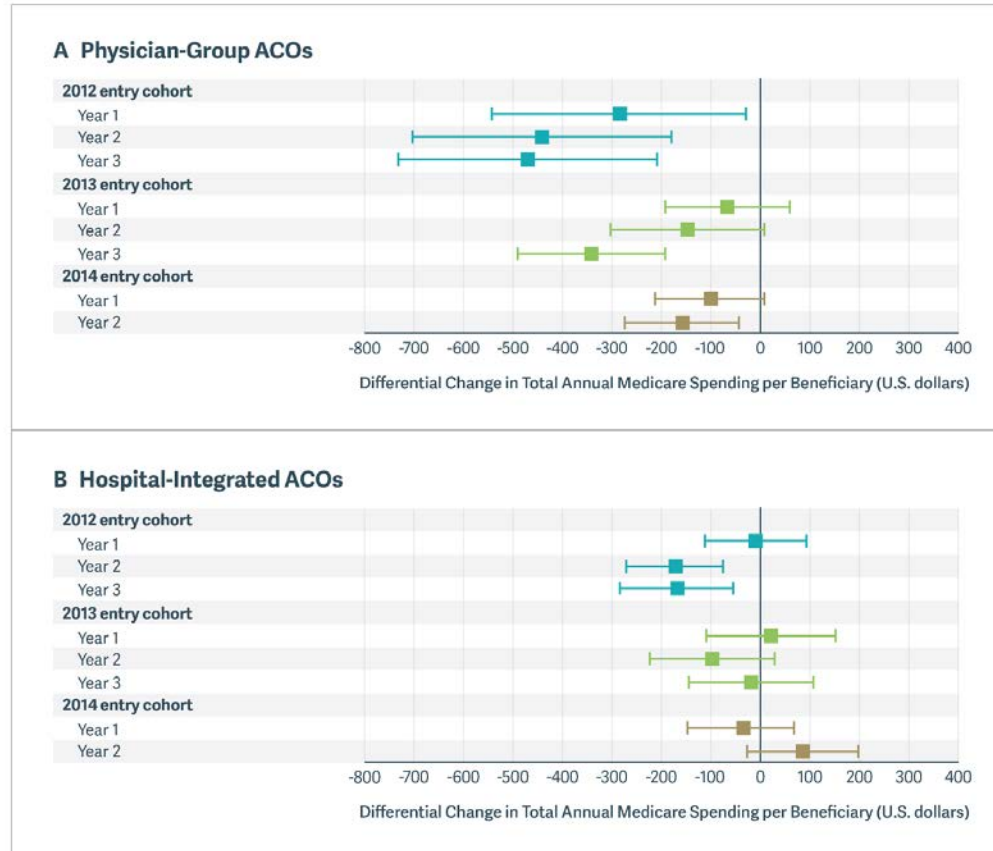
ACO Entry Cohort	Hospital-Integrated ACOs (N=132)				Physician-Group ACOs (N=203)			
	Differential Change in Spending per Beneficiary (95% CI)	Aggregate Differential Change in Spending	Total Shared-Savings Bonus Payments	Net Change in Spending†	Differential Change in Spending per Beneficiary (95% CI)	Aggregate Differential Change in Spending	Total Shared-Savings Bonus Payments	Net Change in Spending†
	<i>U.S. dollars</i>		<i>millions of U.S. dollars</i>		<i>U.S. dollars</i>		<i>millions of U.S. dollars</i>	
Total in all cohorts	—	-120.6	232.4	111.8	—	-583.4	327.0	-256.4
Entry in 2012	-169 (-286 to -52)	-167.7	162.1	-5.6	-474 (-737 to -212)	-288.7	148.6	-140.1
Entry in 2013	-18 (-144 to 109)	-16.8	35.7	18.9	-342 (-494 to -190)	-180.0	-115.9	-64.1
Entry in 2014	88 (-28 to 204)	63.9	34.6	98.5	-156 (-272 to -40)	-114.7	62.5	-52.2

* Of the 2,653,695 patients in hospital-integrated ACOs, 992,480 were in the 2012 cohort, 934,585 were in the 2013 cohort, and 726,630 were in the 2014 cohort; of the 1,870,665 patients in the physician-group ACOs, 609,075 were in the 2012 cohort, 526,240 were in the 2013 cohort, and 735,350 were in the 2014 cohort. Of the 335 ACOs, 114 (45 hospital-integrated and 69 physician-group) were in the 2012 cohort, 106 (47 and 59, respectively) were in the 2013 cohort, and 115 (40 and 75, respectively) were in the 2014 cohort. Because analyses used data on a random 20% sample of beneficiaries, the study sample sizes were multiplied by 5 to provide the expected numbers of attributed beneficiaries in the full Medicare population. The total number of attributed beneficiaries is approximately 20% smaller than that reported by the Centers for Medicare and Medicaid Services because beneficiaries who were attributed on the basis of office visits with specialists (i.e., with no visits to a primary care physician) were excluded from the study and because beneficiaries who were not continuously enrolled in fee-for-service Medicare in the study year and the year preceding the study year were also excluded from the study.

† Difference in aggregate spending between ACOs in the MSSP and the control group were calculated by multiplying the difference per beneficiary by the number of attributed beneficiaries. The net difference in Medicare spending was then calculated by subtracting the bonus payments from the difference in aggregate spending. Negative net changes indicate savings to Medicare.

Source: McWilliams et al. (2018)

FIGURE 12
Differential Changes in Total Medicare Spending for Patients in Accountable Care Organizations (ACOs), According to the Type of ACO, Year of Entry, and Number of Years of Participation



Shown are the results of difference-in-differences analyses for physician-group ACOs (Panel A) and hospital-Integrated ACOs (Panel B), according to the year of entry in the Medicare Shared Savings Program (MSSP). The differential change is the between-group difference in the change from the pre-entry period to the year of entry (2012, 2013, or 2014). For each entry cohort, estimates are provided for each post-entry year. For the 2012 entry cohort, year 1 refers to 2013 (the first full year of MSSP participation) because ACOs in that cohort entered the MSSP in April or July of 2012. The horizontal bars indicate 95% confidence intervals.

Source: McWilliams et al. (2018)

FIGURE 13

Differential Changes in Medicare Spending from the Pre-Entry Period to 2015 for ACO Patients, as Compared with the Control Group, According to ACO Type*

Spending or Utilization Measure	Unadjusted Sample Mean in the Pre-Entry Period†	Differential Change (95% CI)	
		Hospital-Integrated ACOs	Physician-Group ACOs
Annual per-beneficiary spending (U.S. dollars)			
Total spending	9,649	-37 (-110 to 37)	-300 (-404 to -196)
Acute inpatient care	3,411	-1 (-44 to 41)	-104 (-150 to -59)
Outpatient care	3,069	10 (-18 to 38)	-48 (-79 to -16)
Independent office	1,717	10 (-14 to 33)	30 (7 to 54)
Hospital-owned facility	1,353	1 (-34 to 35)	-78 (-101 to -54)
Post-acute care	1,177	-10 (-43 to 3)	-82 (-131 to -33)
Home health care	634	4 (-6 to 14)	-20 (-39 to -1)
Post-acute	110	3 (0 to 5)	0 (-4 to 3)
Outpatient	525	1 (-7 to 10)	-20 (-38 to -2)
Durable medical equipment	317	-5 (-11 to 0)	-8 (-15 to 0)
Hospice	172	-2 (-10 to 6)	-6 (-21 to 9)
Annual per-beneficiary utilization (no.)			
Hospitalization			
For any cause	0.350	0.001 (-0.002 to 0.005)	-0.008 (-0.011 to -0.004)
For ambulatory care-sensitive condition‡	0.044	0.000 (-0.001 to 0.001)	0.000 (-0.001 to 0.001)
Emergency department visits	0.468	-0.009 (-0.015 to -0.003)	-0.018 (-0.025 to -0.011)
Post-acute facility stays	0.201	-0.001 (-0.004 to 0.001)	-0.009 (-0.013 to -0.006)
Days in post-acute facility	2.29	0.00 (-0.03 to 0.04)	-0.14 (-0.23 to -0.04)
Primary care visits¶	4.27	-0.05 (-0.09 to 0.00)	0.05 (0.00 to 0.11)
Percentage of hospital admissions followed by readmission ≤30 days after discharge	17.58	0.37 (0.13 to 0.61)	-0.23 (-0.50 to 0.05)

* Estimates are pooled across the three MSSP entry cohorts of ACOs and represent the mean differential change from the pre-entry period to 2015 across cohorts in the ACOs as compared with the control group. The subcategories of annual per-beneficiary spending do not sum to the total because only major categories are listed here and values were rounded to the nearest dollar. Estimates of differential changes are reported with 95% confidence intervals rather than P values for statistical tests, because the primary purpose of these secondary analyses was to break down the observed effect on total spending into the contributions from its various spending and utilization components, rather than to conduct statistical tests for additional outcomes. For the four measures that could be considered additional outcomes (hospitalizations for ambulatory care-sensitive conditions, emergency department visits, primary care visits, and hospital readmissions), tests of statistical significance were adjusted for multiple comparisons with the use of the Hochberg procedure. For all differential changes in these four outcomes in which the 95% confidence interval did not cross zero, the adjusted P value was less than 0.05, except for the differential change in primary care visits among hospital-integrated ACOs.

† The period before entry in the MSSP differed for each cohort, but the years from 2009 through 2011 were used to calculate a single mean for each measure in the table.

‡ Hospitalizations for ambulatory care-sensitive conditions included two measures that are specified in ACO contracts (hospitalization for congestive heart failure and chronic obstructive pulmonary disease or asthma) as well as hospitalizations for diabetes or cardiovascular disease, conditions that are the focus of many other quality measures included in the contracts. (Additional details are provided in Table S4 in the Supplementary Appendix.)

Source: McWilliams et al. (2018)

NOTES

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- ⁱ <https://insight.kellogg.northwestern.edu/article/whats-behind-the-current-wave-of-vertical-integration>
- ⁱⁱ <https://journals.sagepub.com/doi/abs/10.1177/1077558717727834?journalCode=mcrd>
- ⁱⁱⁱ <https://www.beckershospitalreview.com/payer-issues/with-8k-more-physicians-than-kaiser-optum-is-scaring-the-crap-out-of-hospitals.html>.
- ^{iv} <https://www.nytimes.com/2018/06/22/health/hospice-humana-private-equity.html>
- ^v These include challenges to proposed mergers of Anthem and Cigna, Aetna and Humana and Advocate and Northshore, among others.
- ^{vi} <https://www.bloomberg.com/view/articles/2012-04-19/delta-s-oil-refinery-plan-flies-against-economic-sense>
- ^{vii} Of course, we should not rule out the possibility that it simply represents a poor economic decision by a set of firms.
- ^{viii} This also requires that the internal operations of the firm provide the right incentives for managers, something that is far easier to write in an endnote than accomplish.
- ^{ix} It is quite possible that many existing insurers are now of sufficient size that they have reached the minimum efficient scale of this activity.
- ^x For example, under Medicare, a physician-administered product is covered under Part B rather than Part D. Physicians acquire these products and are then reimbursed on a cost-plus basis.
- ^{xi} <https://www.aeaweb.org/articles?id=10.1257/aer.100.1.193>
- ^{xii} There are a variety of other features included in the complex contracts between PBMs and payers/insurers. While these complexities are not unimportant, for the purposes of understanding vertical integration we can abstract away from them.
- ^{xiii} <https://www.nber.org/papers/w21783.pdf>
- ^{xiv} <https://www.aeaweb.org/articles?id=10.1257/pol.20160248>
- ^{xv} This is mainly an issue for consumers enrolled in certain high-deductible health plans, as well as Medicare beneficiaries.
- ^{xvi} While the number of consumers with this type of cost-sharing has grown, it should be noted that customers in the pharmaceutical market are largely shielded from list prices.
- ^{xvii} <https://www.bloomberg.com/news/articles/2017-05-04/in-scorpion-room-auditor-gets-scant-look-at-drug-contracts>
- ^{xviii} <https://www.forbes.com/sites/craiggarthwaite/2019/05/23/what-marthas-vineyards-gas-stations-can-teach-us-about-drug-pricing/>
- ^{xix} Dissenting Statement of Commissioner Julie Brill Concerning the Proposed Acquisition of Medco Health Solutions Inc. (Medco) by Express Scripts, Inc. (ESI), FTC File No. 111-0210, April 2, 2012, available at https://www.ftc.gov/sites/default/files/documents/public_statements/dissenting-statement-commissioner-julie-brill/120402medcobrillstatement.pdf
- ^{xx} <https://promarket.org/perverse-market-incentives-encourage-high-prescription-drug-prices/>
- ^{xxi} <https://www.bloomberg.com/news/articles/2017-10-18/anthem-breaking-with-express-scripts-plans-own-benefits-firm>
- ^{xxii} Such a merger would not meaningfully change the incentives for insurance contracts where Aetna serves as the third-party administrator for a self-funded insurance plan.
- ^{xxiii} <https://doi.org/10.1377/hlthaff.2013.0544>
- ^{xxiv} <https://doi.org/10.1377/hlthaff.2015.0995>
- ^{xxv} <https://www.wsj.com/articles/boeing-airbus-look-to-land-profits-by-making-their-own-aircraft-parts-1504782001>
- ^{xxvi} <https://www.nytimes.com/2018/01/18/health/drug-prices-hospitals.html>
- ^{xxvii} This in turn raises two key points. First, we must realize that the downstream firm is paying for the expected future profits of the supplier. Second, it is worth asking why other downstream firms aren't competing for the opportunity to foreclose (or at least to halt the foreclosure).
- ^{xxviii} For example, the recently proposed acquisition of DaVita Medical Group by United Health Group would raise such horizontal concerns in markets where DaVita operates and United already employs physicians.
- ^{xxix} <https://jamanetwork.com/journals/jamainternalmedicine/fullarticle/2296012>
- ^{xxx} <https://jamanetwork.com/journals/jamainternalmedicine/fullarticle/2296012>
- ^{xxxi} <https://www.sciencedirect.com/science/article/abs/pii/S016762961730485X>
- ^{xxxii} <https://www.modernhealthcare.com/article/20181204/NEWS/181209973/hospitals-sue-over-site-neutral-payment-policy>
- ^{xxxiii} <https://opinionator.blogs.nytimes.com/2012/01/30/the-end-of-health-insurance-companies/>
- ^{xxxiv} <https://www.nejm.org/doi/full/10.1056/NEJMsa1803388>

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- xxxv <https://news.walgreens.com/press-releases/humana-and-walgreens-to-offer-senior-focused-services-in-kansas-city-area-via-primary-care-clinics-and-in-store-health-navigation-support.htm>
- xxxvi <https://www.academyhealth.org/node/2151>
- xxxvii <https://www.nasi.org/research/2015/integrated-delivery-networks-search-benefits-market-effects>
- xxxviii <https://www.nytimes.com/2013/03/21/business/kaiser-permanente-is-seen-as-face-of-future-health-care.html>
- xxxix <https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1530-9134.2009.00221.x>
- xl <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2690244/>