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ABSTRACT

US spending on prescription drugs has been growing rapidly, prompting calls for government intervention to slow the upward trend. But any intervention should be predicated on a clear understanding of the economic forces that drive price increases, and the parties responsible for them. We collect gross and net profit data from the 2015 US Securities Exchange Commission regulatory filings of the largest publicly traded companies in the pharmaceutical distribution system, and use them to describe the flow of funds across the drug distribution system to understand how much each sector profits from its transactions. Gross (net) margins average 71% (26%) for manufacturers, 22% (3%) for insurers, 20% (4%) for pharmacies, 6% (2%) for pharmacy benefit managers and 4% (0.5%) for wholesalers. These margins imply that for every $100 spent at retail pharmacies, about $17 compensates for direct production costs, $41 accrues to the manufacturer ($15 of which is net profit), and $41 accrues to intermediaries in the distribution system: wholesalers, pharmacies, pharmacy benefit managers and insurers (with $8 of net profit split among them). The allocations differ depending on whether the drug is generic or branded. Manufacturers have higher gross profit margins for branded drugs and intermediaries have higher gross profit margins for generic drugs. Gross margins on generic drugs are lower for manufacturers (50%), and much higher for pharmacies (43%). More than $1 in every $5 in spending on prescription drugs goes towards profits of firms in the pharmaceutical distribution system. While the current analysis cannot say definitively whether any sectors make excessive profits, greater scrutiny of pricing policies of each sector and more competition throughout the distribution system is warranted.

INTRODUCTION

Prescription drugs sold in retail pharmacies accounted for almost $325 billion or 10% of total healthcare costs in 2015, up 9% from 2014. Such dramatic growth has prompted calls for government intervention to regulate drug prices or otherwise control their rapid increase. But any intervention should be predicated on a clear understanding of the economic forces that drive price increases, and the parties responsible for them. Much attention has focused on the average wholesale or “list” price set by manufacturers prior to discounts. These prices have been increasing—the average list price of branded drugs rose 12.4% in 2015, and has increased 10% or more annually since 2012. Yet list prices rarely represent what manufacturers are paid for drugs, as they are routinely discounted and rebates paid to various parties in the distribution system.

Net prices—which include all discounts and rebates—have also risen, albeit more slowly to 2.8% in 2015. Yet even the net price that manufacturers receive does not fully represent what patients pay (through a combination of out-of-pocket payments and insurer reimbursements). The difference between what patients pay and what manufacturers receive is allocated among other stakeholders in the drug distribution chain, including insurers, pharmacy benefit managers (PBMs), pharmacies, and wholesalers. Contracts among these players govern the exchange of goods (drugs) or services (such as logistics or claims administration) for various fees, discounts, rebates, and chargebacks. Such arrangements are typically privately negotiated and undisclosed, making it difficult to determine precisely how these payments are distributed.

However, publicly traded companies in the distribution system must disclose annual financial information to the US Securities and Exchange Commission (SEC) and other regulatory agencies, and from those data we can examine the flow of funds from the insurer back to the manufacturer, and the relative profitability at each step. The results illuminate opportunities to reduce total drug spending.
CONCEPTUAL FRAMEWORK

Using information from four published sources, we developed a conceptual framework of pharmaceuticals distributed in retail settings, illustrated in Figure 1.\(^1\)\(^2\)

![Conceptual Framework Diagram](image-url)

**Figure 1:** Conceptual model of the flow of products, services and funds for non-specialty drugs covered under private insurance and purchased in a retail setting

**METHODS**

We estimated the flow of funds in the distribution system by first developing a conceptual framework to illustrate the flow of goods, services, and funds among system participants. Next, we used data from financial statements, regulatory filings and other sources to estimate the average gross and net profit margins of companies along the distribution system. We applied these estimates to calculate the proportion of funds retained at each step in the process, and used them to illustrate how $100 in retail prescription drug expenditures is allocated across players in the distribution system.

**DATA AND STATISTICS**

We collected data on the largest public companies for each sector described in Figure 1: insurers, PBMs, pharmacies, wholesalers and manufacturers. We used public sources to identify the largest publicly traded companies in each sector until at least half of the total market was represented.\(^3\)\(^4\)\(^5\) For health insurers, our sample only accounts for 48% of the premiums written, because many large insurers are private, not for profit, or mutual. Table 1 lists the included companies and their respective market shares.

**Table 1:** Publicly-traded companies included in analysis, with US market share

<table>
<thead>
<tr>
<th>MANUFACTURERS</th>
<th>US MARKET SHARE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company</td>
<td>AID</td>
</tr>
<tr>
<td>---------------</td>
<td>-----</td>
</tr>
<tr>
<td>GlaxoSmithKline (Brand)</td>
<td>6.5%</td>
</tr>
<tr>
<td>McKesson (Brand)</td>
<td>3.9%</td>
</tr>
<tr>
<td>Merck &amp; Co (Brand)</td>
<td>3.1%</td>
</tr>
<tr>
<td>Amgen (Brand)</td>
<td>5.3%</td>
</tr>
<tr>
<td>Pfizer (Brand)</td>
<td>4.7%</td>
</tr>
<tr>
<td>Fresenius Kabi (Generics)</td>
<td>4.6%</td>
</tr>
<tr>
<td>AbbVie (Brand)</td>
<td>6.6%</td>
</tr>
<tr>
<td>Sanofi (Brand)</td>
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</tr>
<tr>
<td>Novartis (Brand)</td>
<td>3.7%</td>
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<tr>
<td>AstraZeneca (Brand)</td>
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<tr>
<td>Allergan (Brand)</td>
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<tr>
<td>GlaxoSmithKline (Brand)</td>
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<tr>
<td>Pfizer-Teva (Generics)</td>
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<td>Teva (Brand)</td>
<td>2.7%</td>
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<td>Mylan (Brand)</td>
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<td>Teva (Generic)</td>
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<td>Novartis-Sandoz (Generics)</td>
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<tr>
<td>Allergan-Actavis (Generics)</td>
<td>1.6%</td>
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<tr>
<td>Allergan-Actavis (Generic)</td>
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</tr>
<tr>
<td>Aeger (Generic)</td>
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</tr>
<tr>
<td>Lupon (Generic)</td>
<td>0.7%</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td><strong>70%</strong></td>
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**PHARMACY BENEFIT MANAGERS**

<table>
<thead>
<tr>
<th>Company</th>
<th>Share*</th>
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<tbody>
<tr>
<td>Express Scripts</td>
<td>29%</td>
</tr>
<tr>
<td>CVS Health</td>
<td>24%</td>
</tr>
<tr>
<td>OptumRx</td>
<td>22%</td>
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<td><strong>TOTAL</strong></td>
<td><strong>64%</strong></td>
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**WHOLESAVERS**

<table>
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<tr>
<th>Company</th>
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<tr>
<td>Cardinal Health</td>
<td>20.3%</td>
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<td><strong>TOTAL</strong></td>
<td><strong>85%</strong></td>
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**PHARMACIES**

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<tr>
<th>Company</th>
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<tbody>
<tr>
<td>Walgreens</td>
<td>14%</td>
</tr>
<tr>
<td>CVS Retail</td>
<td>13.8%</td>
</tr>
<tr>
<td>Express Scripts Mail</td>
<td>11.0%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>54%</strong></td>
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**INSURERS**

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<th>Company</th>
<th>Share*</th>
</tr>
</thead>
<tbody>
<tr>
<td>UnitedHealthGroup</td>
<td>11.4%</td>
</tr>
<tr>
<td>Anthem</td>
<td>9.1%</td>
</tr>
<tr>
<td>Cigna</td>
<td>4.1%</td>
</tr>
<tr>
<td>Humana</td>
<td>8.2%</td>
</tr>
<tr>
<td>Centene</td>
<td>3.4%</td>
</tr>
<tr>
<td>WellCare</td>
<td>2.5%</td>
</tr>
<tr>
<td>Molina</td>
<td>2.0%</td>
</tr>
<tr>
<td>Magellan</td>
<td>0.2%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>43%</strong></td>
</tr>
</tbody>
</table>

**Gross and net margins**

A company’s gross profits are the difference between revenues received and costs of goods sold; gross margin is this amount expressed as a percent of revenues. For example, gross profits for wholesalers are revenues received primarily from pharmacies less payments made primarily to manufacturers. Some of these gross profits are spent on other

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business expenses such as marketing, R&D, depreciation, interest, and taxes. What remains after subtracting these expenses is net profits, which accrue to the shareholder owners of the firm.

We estimated gross and net margins as a fraction of net revenues for all companies using information from their 2015 SEC filings (forms 10K and 20F). To the extent that SEC filings allowed, we isolated financial data for US pharmaceutical operations and for the sector of interest. For example, for a company with both specialty pharmacy and PBM divisions that report separate financial results for each, we used PBM division data to estimate margins for the PBM business. In some cases, it was not possible to isolate the results of pharmaceutical business activities—for example, health insurers do not report financial results for their pharmaceutical claims activity separately from medical claims activity. In these cases, our margin estimates include activities of other types of business. When data did not permit a US-specific margin to be calculated, we used the global margin. (See Appendix Section A for more detail.)

We also calculated separate gross margins for branded and generic drugs for each sector. For manufacturers, we categorized each company as either a branded or generic producer, and calculated separate gross and net margins for each.2

### Simulating the Flow of Funds

To illustrate the implications of our estimates, we explore a hypothetical scenario in which $100 is spent on prescription drugs acquired at a retail pharmacy using commercial insurance. We apply the average sector gross margin to the incoming funds to each sector to identify how much is retained in each sector, and apply the average sector net margins to identify the funds that are kept as net profits. This process was applied throughout the distribution system, as detailed in Section D of the Appendix. The funds passed through the last step are assumed to be production costs to manufacture the drugs.

The first step in the chain requires further explanation. Of a $100 expenditure on prescription drugs obtained at a retail pharmacy, some portion is paid out-of-pocket by the patient, in the form of copayments and co-insurance, and goes directly to the PBM. The remaining funds originate with the insurer as premium revenue, and the insurer’s gross margin is applied to this amount, rather than the full $100, to calculate the amount retained in the insurance sector.

The proportion of total drug expenditures originating as premiums was estimated using data from the 2014 Medical Expenditure Panel Survey (MEPS), which provides annual total prescription drug expenditures and out-of-pocket payments (see Appendix Section C for detail). For all other sectors, all funds flowing into the sector are assumed to come directly from the sector immediately upstream—that is, all manufacturers’ revenue is passed through from wholesalers, all wholesalers’ revenue is passed through from pharmacies, etc.

Finally, we compare the average net margins estimated for pharmaceutical distribution system participants to the average net margins of public companies in similar industries, which are published annually. Drug manufacturers are compared to other consumer and business product manufacturers, drug wholesalers are compared to food wholesalers, health insurers to other types of insurance companies, and pharmacies to other retail businesses. PBMs are compared to the category of real estate operations and services, which includes real estate agents and brokers, who also negotiate and act as intermediaries in transactions between third parties.

Table 2 provides net margin estimates in Table 2 to illustrate the average flows of funds to distribution system participants for branded and generic drugs combined. Of a $100 expenditure on pharmaceuticals by consumers (composed of both out-of-pocket and insurer payment), roughly $17 goes to drug production costs, $41 accrues to the manufacturers (a third of which is net profit), and $19 accrues to insurers ($3 of which is net profit). PBMs keep about $5 ($2 net profit), pharmacies keep $15 ($3 net profit), and wholesalers keep about $2 (30 cents net profit). Total net profit on a $100 expenditure is $23, of which $15 is captured by manufacturers and the remaining $8 by intermediaries.

Figure 3 shows the results of similar analyses conducted separately for branded (Panel A) and generic (Panel B) drugs, and demonstrates important differences in how funds accrue to distribution system players across these market segments.

### RESULTS

Average US sales-weighted gross and net margins for each sector in the distribution system are reported in Table 2, as are gross margins for the branded and generic markets separately. For all drugs combined, gross margins are highest for manufacturers (71.1%), followed by insurers (22.2%), pharmacies (18.2%) for brand drugs and 18.2% for generics. For all drugs combined, gross margins are highest for manufacturers (76.3%), and lower manufactur-
While manufacturers make about three times the gross profits on branded vs. generic drugs ($58 vs. $18, consistent with the market exclusivity granted to patented drugs), other segments make much more on generic expenditures: PBMs make four times as much on generic drugs compared to brands, while wholesalers make eleven times as much, and pharmacies almost twelve times as much, $32 compared to $3.

Figure 3: Flow of a hypothetical $100 expenditure on drugs through the US retail distribution system

Panel A: Expenditure on branded drugs

Panel B: Expenditure on generic drugs

Drug manufacturers and pharmacies had higher margins than most comparator industries.13 Margins for all participants were validated with previously published estimates of average net margins for 100+ industries whenever possible. See Appendix Section B for more details.

Figure 4 compares the net margins for players in the pharmaceutical distribution system to those in similar industries, based on published estimates of average net margins for 100+ industries.16 Drug manufacturers and pharmacies had higher margins than most comparator industries. Margins for all participants were validated with previously published estimates of average net margins for 100+ industries whenever possible. See Appendix Section B for more details.

Figure 4: Average sector net margins for players in the pharmaceutical distribution system and comparable industries

DISCUSSION

Given large and increasing expenditures for pharmaceutical drugs in the US, an understanding of who profits from this spending—and by how much—is of great policy salience. Identifying these flows is challenging because available data are highly aggregated and permit only a high-level view of a complex distribution system. Despite these limitations, we argue the aggregate picture can illuminate features of the distribution system and guide further inquiry.

We demonstrate that gross and net margins vary widely across distribution sectors, prompting the question whether companies are making excessive returns. Market concentration is an important indicator of companies’ ability to earn extraordinary returns, and several segments in the US pharmaceutical distribution system are highly concentrated. The top three PBMs, wholesalers and retailers account for 85%, 66% and 49% of their markets, respectively. Barriers to entry are another source of market power, and Joseph Stiglitz has argued that “[t]oday’s markets are characterized by the persistence of high monopoly profits,” citing pharmaceutical manufacturing as one example.17

This market power manifests in practices that might raise consumer prices. For example, pharmacies charge widely varying prices for exactly the same product, and the uninsured often pay higher prices than insured consumers.18 Some players claim...
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market concentration is good for consumers. For example, PBMs argue that their large size gives them bargaining power to negotiate lower prices for their clients.16,17 Less clear is the extent to which these savings are passed on to health plans and consumers. PBMs carefully guard information about the size of negotiated rebates and discounts, which may enhance their ability to negotiate lower prices, but also masks whether they are indeed lowering the prices paid by patients and insurers as claimed. In fact, recently proposed legislation intended to lower drug prices would require PBMs to disclose rebates and the share passed on to health plans.18

While the market for manufacturers is less concentrated, patents and market exclusivity for many products confer a complete monopoly for those drugs. Brand manufacturers’ net profit margins fall at the upper end of the distribution for manu-

facturing industries, suggesting excessive returns. Estimated net margins for the other distribution system segments except pharmacies are comparable to those of similar non-pharma industries. However, returns for manufacturers, particularly branded drugs, must compensate for the risks taken in drug development. Other manufacturing industries where intellectual property protections are important, including software, semiconductors, and computer equipment also demonstrate higher margins.

Nonetheless, manufacturers also engage in some question-
able practices. Manufacturers of branded drugs faced com-
petition from new generic entrants that could fund copy assistance programs that reduce patients’ out-of-pocket costs, dissuading them from switching to cheaper generics and circumventing insurer formularies designed to encourage such switching.19,20 Manufacturers have also been scrutinized for off-label promo-

tion of drugs and anticompetitive pricing practices, including

manufacturers to provide more price transparency are welcome.27-29 In

fact, many doctors believe that the potential exists to considerably lower drug prices.20

In summary, we find that more than $1 in every $5 in

the pharmaceutical distribution system. While the current

practice also doubly penalizes those who do not respond to less

expensive therapies.24

While the market for manufacturers is less concentrated,

interest in reporting each sector’s financials, which is required to

other means would benefit from greater transparency and granu-

larly in reporting of each sector’s financials, which is required to

fully understand the dynamics in specific market segments. In

this work there are several limitations, many resulting from data

shortcomings. Key data are not always publicly available, and

even the data presented in financial statements may be reported in inconsistent and opaque ways.20 Some of the largest players in certain sectors are privately held and make no financial data public. Thus, all our estimates are to some extent incomplete and inexact.

Also, this analysis shows an aggregated picture of the retail

pharmaceutical distribution system. It does not represent the

flow of funds for any particular drug or firm, and indeed, those

pictures may vary across settings and from that presented here.

An important category that is not well characterized here is that of specialty drugs, such as biologics for rheumatoid

arthritis or expensive HIV therapies. Some manufacturer and

insurer margin estimates here may include specialty drugs, but

they are generally not distributed through retail pharmacies.

Instead, they are handled through specialty pharmacies, the

largest of which are owned by PBMs. Physician administered

specialty drugs often add another player to the distribution

system, the group purchasing organization, which negotiates on

behalf of hospitals and physicians for volume discounts.

Any policy effort to control drug prices through regulation or

other means would benefit from greater transparency and granu-

larly in reporting of each sector’s financials, which is required to

fully understand the dynamics in specific market segments. In

this regard, recent initiatives by several pharmaceutical manu-

facturers to provide more price transparency are welcome. In

any case, efforts to control drug costs should focus on the rents

enjoyed by all players in the distribution system.

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19. Liss S. Express Scripts CEO addresses drug pricing ‘misinforma-


The appendix as well as this white paper is available online here: http://healthpolicy.usc.edu/Flow_of_Money_Through_the_Pharmaceutical_Distribution_System.aspx

Disclosures

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The mission of the Leonard D. Schaeffer Center for Health Policy & Economics is to measurably improve value in health through evidence-based policy solutions, research and educational excellence, and private and public sector engagement. A unique collaboration between the Sol Price School of Public Policy at the University of Southern California (USC) and the USC School of Pharmacy, the Center brings together health policy experts, pharmacoeconomics researchers and affiliated scholars from across USC and other institutions. The Center’s work aims to improve the performance of health care markets, increase value in health care delivery, improve health and reduce disparities, and foster better pharmaceutical policy and regulation.