Drug makers engage in 'co-opetition' through drug middlemen

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Prescription drug consumers confounded by the cost of their medications can get a peek behind the curtain thanks to new Washington University in St. Louis research into the complex "co-opetition"—cooperation and competition—among drug makers in the middleman-controlled US drug supply chain.

But, as explained by Panos Kouvelis, the Emerson Distinguished Professor of Operations and Manufacturing Management at Olin Business School and director of The Boeing Center for Supply Chain Innovation, the system is so complex and opaque, it may be headed for government regulation.

Kouvelis' research describes the complicated dynamics between drug manufacturers and "pharmacy benefit management" firms—massive companies like St. Louis' Express Scripts or CVS Caremark that manage drug benefits and dispense medications for millions of patients as part of their employer-supplied healthcare coverage.

Kouvelis said his research shows that on one hand, drug makers compete with each other to build their brands and increase sales for similar medications. On the other hand, drug makers unwittingly cooperate. That's because their price competition and volume-leveraged negotiations with the PBMs lower costs to PBM clients—employers—which increases the market for PBMs and the patients they serve, thus benefiting all drug manufacturers.

Deciphering a Complicated System

In fact, Kouvelis said the industry is destined to end up regulated by the government because the system is more opaque than almost any other supply chain. Consumers can pretty easily discern how automobile manufacturers and their suppliers make money, for example. But fewer understand how their $20 copay for anti-cholesterol medication gets split between the drug maker, the insurance company, and the pharmacy benefit manager.

"In a complex environment, we have to figure out how the prices are set when drug manufacturers work with PBMs," Kouvelis said.

"This is exactly the time that the government has to decide," Kouvelis said, in light of the planned acquisition of Express Scripts by Cigna and the considered acquisition of Aetna by CVS.

"The PBM is controlling three things: The price its clients pay, the copay patients pay, and the negotiated wholesale price charged by the manufacturer," he said. "What we're finding out is that for a profit maximizing PBM it does make sense for some drugs, for the drug cost to be actually lower than the copay."

In the paper, entitled "Drug Pricing for Competing Pharmaceutical Manufacturers Distributing Through a Common PBM," Kouvelis and his coauthors created a mathematical model of interactions between drug makers with the PBM. They use that model to measure the effect of the many variables at play in the system, including drug prices, tiered formularies (the list of drugs the PBM provides) with different copay levels, rebates to PBMs, demand, price sensitivity among patients, and market size.

The researchers—who included Yixuan Xiao at the City University of

Hong Kong and Nan Yang at the University of Miami—used data from publicly accessible sources to test the mathematical model as much as possible. The paper has been published in the Production and Operations Management journal.

"The only thing we can calculate here are the profits of everyone in the game," Kouvelis said. "From a competitive perspective, what is going to happen when we have rational players in it? How will drug manufacturers set prices? How will PBMs leverage their formularies for rebates and controlling costs to clients? To what extent is everyone benefitting? And who finally pays most of the drug costs?"

More information: Panos Kouvelis et al. Drug Pricing for Competing Pharmaceutical Manufacturers Distributing through a Common PBM, *Production and Operations Management* (2018). DOI: 10.1111/poms.12867

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