Your Money or Your Life

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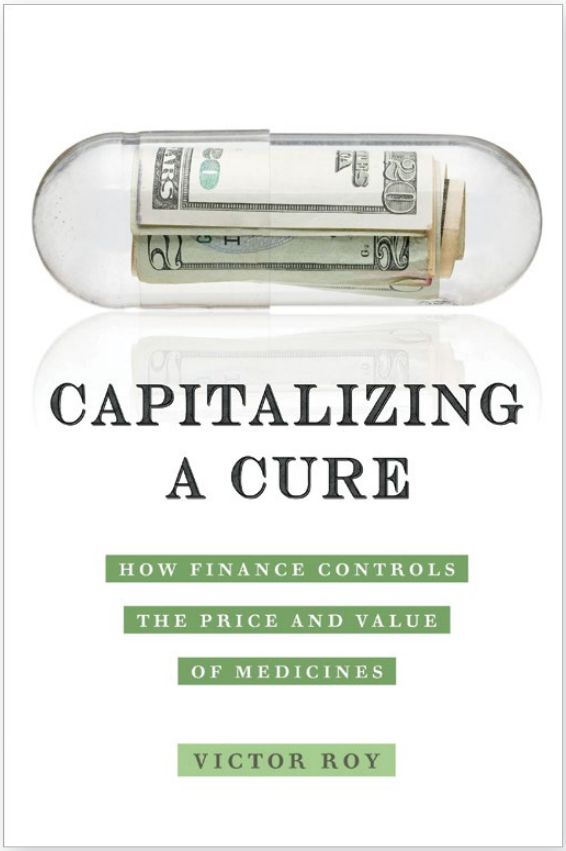

Capitalizing a Cure: How Finance Controls the Price and Value of Medicines
by Victor Roy. Oakland, CA: University of California Press, 2023, 200 pp. Available open access at https://doi.org/10.1525/luminos.141.

Victor Roy's *Capitalizing a Cure* is not a beach read. Its 136 pages of text are a dense, thoroughly researched analysis of drug discovery and development, a deep dive into how the miracle drugs to cure hepatitis C were developed—but failed to reach most patients infected with the virus, which can cause liver failure and death. It's a trenchant critique of a system that did the work of innovation and then failed to deploy the results. Roy's book is aimed at understanding how this happened, the first step toward a better system.

And better systems are possible. Egypt, for example, once had among the highest prevalence of hepatitis C in the world—one in ten Egyptians were infected with the virus in 2014—but it now has a shot at eliminating the virus. In the United States, by contrast, the incidence of new cases and death rates continued to rise during the decade after drugs with 95% cure rates were put on the market in the early 2010s. Over 5 million people were diagnosed with acute hepatitis C in the United States in 2021, but only one in three were treated. The upshot: a poor country nearly eliminated a killer virus while the richest country the world has ever known left most of its infected untreated.

Roy explores how drugs that were conceived and developed in the United States—building on decades of virology and nanotechnology research and incubated in the vibrant US biotechnology ecosystem—could reach so few patients in their nation of origin. The book is required reading for those concerned about drug pricing, but its findings have implications beyond just drugs. It's well known that the US health care system is the most expensive and least fair in the developed world. This book is a case study helping explain why the United States achieves such mediocre health outcomes at great cost.

Roy's story centers on one central question: Where does the money go? Roy is both a family practitioner and a PhD sociologist whose graduate work at the University of Cambridge focused on hepatitis C drugs, leaving him uniquely placed to untangle this important, tortuous story.

Even if Milton Friedman's name doesn't appear in *Capitalizing a Cure*, it's quite clear that the main actors in this story took the economist's exhortation to heart: "The Social Responsibility of Business Is to Increase Its Profits." In that 1970 essay, Friedman scoffs at the notion that "business has a 'social conscience'" as "pure and unadulterated socialism." He chides soft-brained, lily-hearted souls for "analytical looseness and lack of rigor." Friedman did leave one opening for corporate social responsibility ("a corporation for an eleemosynary [or charitable] purpose—for example, a hospital or school"), but he left it completely unexplored. Making money for shareholders is the only purpose of a corporation, according to Friedman and his acolytes.

Friedman's arguments have taken root in the business of making drugs, and pharmaceutical companies have become exceptionally skilled at enriching their executives and their shareholders. Decades of government-funded virology research at institutions such as Emory University and the Atlanta Veterans Affairs (VA) Medical Center laid the foundation for breakthrough hepatitis treatments. However, patents on the lead

hepatitis C compounds were held not by the government or academic research institutions, but by a startup company, Pharmasset, that was never intended to make drugs (notice its name) but only to hold rights that could be sold to another firm. And, indeed, Pharmasset did the hard work of narrowing the chase to the most promising drug candidates. The patent assignments avoided any government-use rights or march-in authority that might have attached to research at Emory or the VA labs. Such provisions under the 1980 Bayh-Dole and Stevenson-Wydler Acts give the federal government the ability to intervene to make inventions developed with publicly funded research more affordable or accessible. (The US government, I should note, has never exercised its march-in rights.)

Pharmaceutical giant Gilead Sciences won the bidding war for Pharmasset in 2011 with an $11.2 billion bid. Gilead continued clinical testing and proceeded to manufacture, market, and distribute the hepatitis C drugs Sovaldi and its successor, Harvoni. Gilead initially charged $1,000 per pill for Sovaldi, or $84,000 for a full course of treatment, and even more for Harvoni. The company's investment was rewarded with $46 billion in sales of its hepatitis C treatments from December 2013 to the end of 2016, of which over $30 billion was returned to shareholders through stock buybacks and dividends. The lion's share of revenue came from US health systems, with a huge fraction coming directly or indirectly from the government: from Medicare, Medicaid, prison health systems, the VA, and tax-subsidized private health plans.

Even though US taxpayers funded the scientific foundation for the treatments and the firms that brought the products to market were based in the United States, Gilead executives did not want to pay US taxes. Why would they, when instead they could retain the money and reward themselves and their stockholders? Gilead thus transferred its patent rights on the hepatitis C compounds to an Irish subsidiary, allowing it to report lower US profits. This accounting trick, Roy reports, saved the company $10 billion in US taxes.

Outcry over Sovaldi's $84,000 price tag prompted the US Senate to investigate Gilead's drug pricing in 2015. The investigation found that the company believed payers would be willing to pay more for better outcomes and shorter treatments. That is, Gilead claimed the drug's cost was reasonable, given the fact that it averted deaths and health care costs from advanced liver disease and supplanted far less effective interferon treatments, which were protracted, highly toxic, and expensive. Discovery, development, and manufacturing costs appeared to play little role in Gilead's "value-based" price-per-cure framework. It would be generous to say the pricing models demonstrated myopia on the part of Gilead leadership, and fair to say the models were deeply cynical, but unconsciously so. Rather, the impact of high pricing was couched in abstract financial terms that obscured the death and misery that resulted from making the cure unaffordable.

The irony is that the high US price led to rationing among the health care payers responsible for those infected, especially prison health systems on their fixed budgets and Medicaid with its hypercomplex federal-state payment schemes. Such rationing was completely predictable given the demography of patients (hepatitis C is most often transmitted by sharing needles), but the suits on Wall Street failed to anticipate it—or did and didn't care. When stock analysts did realize the prospect of rationing, the response, as quoted by Roy, was purely venal: "Our conversations with investors over the last week is [sic] peak revenues might be less near-term but long-term tail is much longer … so this is much more attractive.… So if anyone including Medicaid starts to limit to only sicker patients, this wouldn't dramatically worry us and could be better long-term." In other words, rationing medicine to treat only the sickest patients meant "the virus could be transmitted to more patients and linger for longer in the population," writes Roy.

This grim calculation proved accurate.

Rationing to the very sick alleviated investors' worries that a cure would deplete the drug's own market and dry up the revenue stream. Indeed, rationing meant that infected patients who were ineligible for the drugs due to rationing continued to spread the disease until they were permanently debilitated, and then joined the "long-term tail" of patients taking the drugs.

This reverse triage of authorizing drugs only for the very sick also meant that the costs of health care continued up to the point of cirrhosis and beyond, undermining the promised cost offsets. Instead, the United States got cost additions while most of the health benefits never materialized. New hepatitis C cases continued to mount in the United States despite availability of a cure. It was horrible for public health, but great for revenue.

I can imagine Milton Friedman doing a fist pump over Roy's analysis: privilege the rights and interests of those putting up "risk capital" foremost, even if it means letting human beings suffer irreversible organ damage. Leverage publicly funded health programs to channel money to those with the wherewithal to let funds ride on the stock market; worry about

death and disability later. It's easy to view Gilead executives as villains, but they're just cogs pursuing self-interest in a hugely inefficient machine that honors the Friedman dictum without acknowledging alternatives, trivializing the possibility of "eleemosynary purpose."

So how did Egypt—whose gross domestic product of $404 billion is less than the $577 billion the United States spent on pharmaceuticals alone in 2021—manage to tame hepatitis C? Egyptian authorities negotiated with Gilead to bring the cost of its hepatitis C drug regimen down to $10 per pill. Even at that price, writes Roy, Gilead "still garner[ed] sizable profits, given the modest manufacturing cost and large patient numbers, while also supporting a flagship public health effort." Egypt mounted a public campaign of screening, diagnosing, and treating hepatitis C, covering the drug treatment at a fraction of its cost in the United States.

Egypt went for public health; the United States privileged business interests and shareholders. Is it possible to envision a middle ground? How about a system that rewards genuine biomedical innovation while also enabling universal treatment? Could US patients have spent those $46 billion more effectively? Of course. Roy does a great service in explaining how the story unfolded. He is less persuasive about what can be done about it. I hope a different book can be written sometime in the future, perhaps after policies are in place to better align public health with financial reward. But given the strong incentives and legions of stakeholders whose careers and livelihoods rest on the status quo, I'm not holding my breath.

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