The markup over costs in the pharmaceutical industry

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Because the profit maximizing markup ratio depends on the extent of competition that a firm faces, it differs substantially among firms, across different industries and over time. The markup ratio for firms in the U.S. economy as a whole, for example, shows a sharp increase from around 0.2 during the mid 1980s to almost 0.6 three decades later.

For some firms the markup ratio is much greater than these economy-wide averages. A reason is the limited competition facing firms selling products in which they hold intellectual property rights such as trademarks, copyrights, or patents. These prevent other firms from competing directly (only Nike can sell Nike shoes).

An example is the pharmaceutical sector, in which patents on drugs or ingredients of drugs constitute barriers to entry by competing firms. Only Bristol-Myers-Squibb (BMS) or those companies that it licenses can sell the hepatitis C drug declatasvir. But BMS still competes with Gilead Sciences, the only company that can sell another Hepititus C drug, sofosbuvir.

Companies are reluctant to provide cost information, but we can estimate the markup on some important drugs because a team of pharmaceutical scientists devised a measure of the "minimum cost" of producing them. And prices at which these drugs are sold are publicly available. The team of researchers used an online data base for tracking actual shipments of the necessary chemicals ("active pharmaceutical ingredients") and their prices to find the least cost inputs. Their cost estimates include these ingredients (the major part of the cost), and the costs of production (called "formulation and tabletting") and packaging.

They also included a ten per cent markup over accounting costs that represents the opportunity costs of the capital goods used, and the cost of a profits tax. They assumed that production was at at a level to exploit the possible economies of scale in production.

Their estimate is a measure of the marginal cost (and the average variable cost). It does not include costs unrelated to the production of the particular drug such as advertising, lobbying, legal, and other expenditures attempting to promote a favorable legal and regulatory environment for the companies concerned, research and the costs of trials required for regulatory approval.

The price data that the researchers used to calculate the markup ratios in Figure 1 came from national drug price databases or online pharmacy sites. Where more than one price was available, the lowest price was used.

Using these data we have calculated estimates of markups on the drugs shown in Figure 1. We have included only those drugs that have been produced at sufficient scale to justify the assumption that neither learning by doing nor economies of scale are an important factor.

SOURCE: This note is an adaptation from Bowles, Samuel, and Simon Halliday. 2020. Microeconomics: Competition, Conflict and Coordination. Oxford: Oxford University Press.

THE COST DATA BECAME AVAILABLE IN THE MIDDLE OF THE COVID-19 PANDEMIC. Andrew Hill of the Pharmacology Department at the University of Liverpool and his research team estimated these costs to provide guidelines for what drugs to address the COVID-19 might cost to produce, once they were developed.

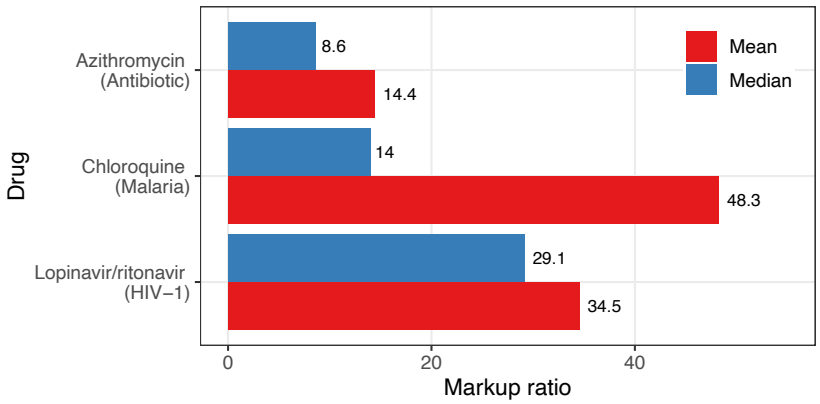

Figure 1: **Estimated markup ratios for drugs** The data shown are are measures of the markup ratio, namely, $= (p - c)/c$, based on a single minimum cost estimate per drug along with, for the each drug shown, prices charged in the 7 to 11 countries for which this information was available We show both the mean and the median because extraordinarily high prices in the U.S makes the mean markup not very representative of the countries taken as a whole.

Source of estimated costs and prices: Hill, Andrew, Junzheng Wang, Jacob Levi, Katie Heath, and Joseph Fortunak. 2020. "Minimum costs to manufacture new treatments for COVID-19." *Journal of Virus Eradication* 6.

The top set of bars in Figure 1 is for a treatment of malaria, which the pharmaceutical scientists estimated has a cost of $\$0.30$ for a 14-day course of the drug. The lowest price at which the drug was being sold was less than that, in Bangladesh, and considerably more than that in India, Malaysia, Sweden, South Africa, China, and the U.K, where the same 14-week course of the drug was sold for $\$8$. In the U.S. the same course of the drug sold for $\$93$. The estimated markups are based on these prices, which for the other drugs shown also include data from France, Brazil, Malaysia, Sweden, Turkey and other countries.

We do not know if the firms in question actually achieved markup ratios of the amounts shown. For example they may have been using production methods that are *not* the least cost solution to their cost minimization exercise. Remember, the cost curve indicates the *minimum* cost of producing a particular amount, and firms may not have implemented this in combining the "active pharmaceutical ingredients" to produce their "final finished product."