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Mergers and innovation in the pharmaceutical industry

F M Scherer and William S Comanor
Harvard University, USA

The pharmaceutical industry has encountered a period of dramatic structural change. The first manifestation has been a productivity shock, as the number of new molecular entities approved for introduction into the United States market between 1970 and 2010 grew only slightly despite an increase in inflation-adjusted research and development expenditures at a rate of roughly 7% per year. As a result, the R&D cost of an average new molecule has skyrocketed from roughly $40 million at year 2000 price levels in clinical testing costs alone for drugs introduced during the 1980s to $280 million for 1990s drugs, and even more recently. This has occurred despite the emergence of radically new means to discover candidate molecules -- DNA analysis combined with gene splicing and the growth of a new biotech industry oriented around those techniques. Third, because of the expiration of key patents without commensurate replacement, legal changes, and insurance mandates, generic fulfillment of prescriptions has risen from 17% in 1980 and 30 percent in 1990 to upwards of 70% by number in 2009. Post-patent-expiration price competition has become more intense, compelling main-line drug companies either to innovate or fade away. Fourth, and not unrelated to these trends, the traditional pharmaceutical industry has experienced a wave of mergers, causing the disappearance of many companies that once were at or near the industry's innovative vanguard.

While industry leaders explain their mergers as a response to these shocks and a partial solution to the declining productivity problem, this paper advances the reverse hypothesis: that instead of enhancing R&D productivity, the merger wave has jeopardized it. Our central thesis emphasizes the uncertainties inevitably encountered in new drug discovery and development and the role of "parallel paths" i.e., the pursuit of multiple approaches to solving any given medical problem in coping with those uncertainties.

Mike_Scherer@harvard.edu