

Pharmaceutical innovation and the burden of disease in developing and developed countries

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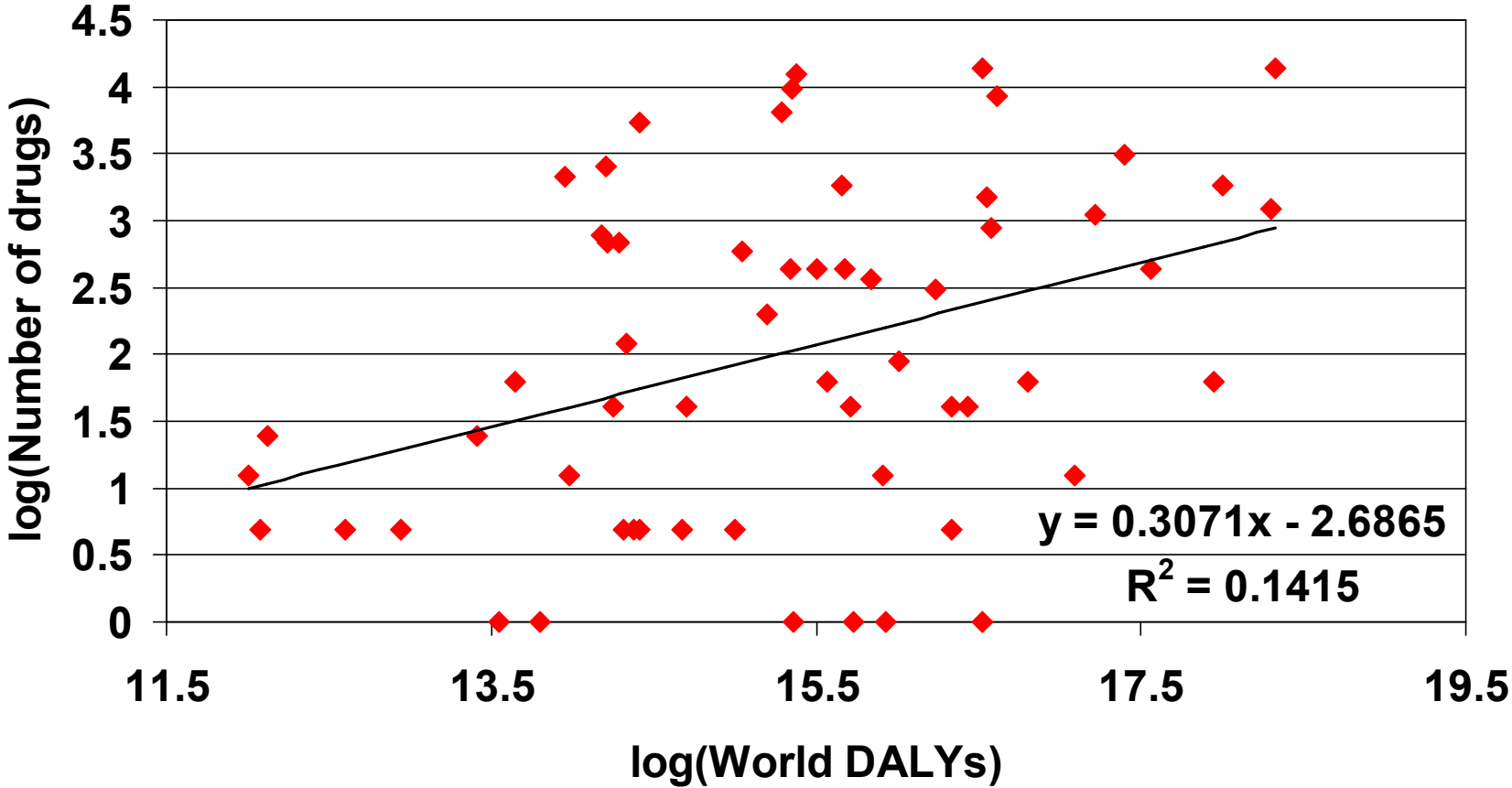
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Pharmaceutical innovation and the burden of disease

I performed three different analyses of the relationship across diseases between pharmaceutical innovation and the burden of disease in developed and developing countries.

- I examined the relationship between the number of disability-adjusted life-years (DALYs) attributable to a disease in 2001, by region, and the number of drugs that have been developed to treat the disease and that are sold in the U.S.
- I examined the relationship between the number of DALYs attributable to a disease in 2001, and the number of drugs launched to treat the disease in approximately 50 countries during the period 1982-2002.
- I examined the relationship between cancer incidence (the number of people diagnosed with a particular form of cancer), and the number of articles published in scientific journals pertaining to drug therapy for that form of cancer.

Relationship between log(World DALYs) and log(Number of drugs)



- All three analyses indicate that the amount of pharmaceutical innovation is positively related to the burden of disease in developed countries but not to the burden of disease in developing countries.

Other medical innovation

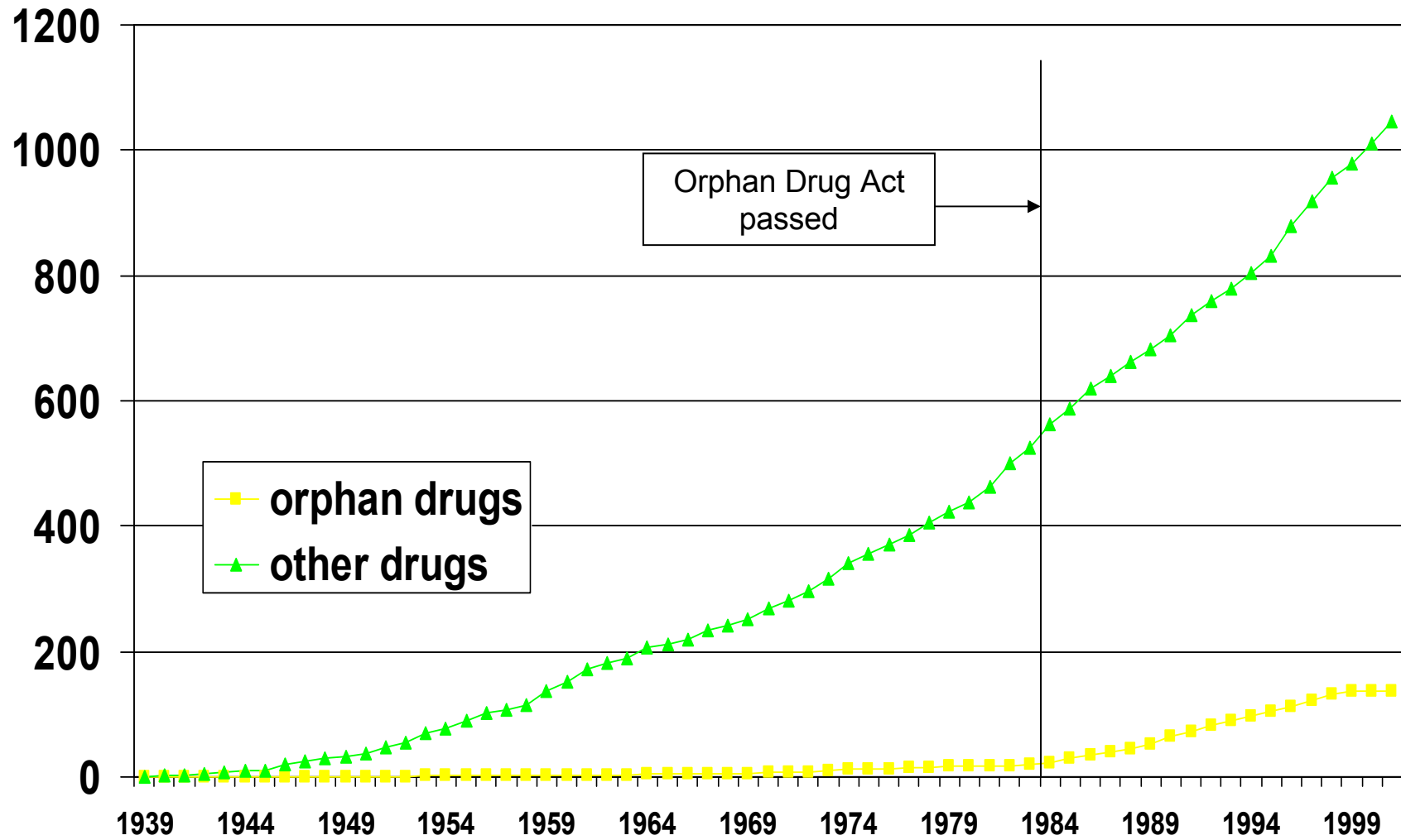
The amount of other medical innovation also appears to be positively related to the burden of disease in developed countries but not to the burden of disease in developing countries, although the developed-vs.-developing difference is smaller than in the case of pharmaceutical innovation.

- Empirical evidence indicates that the supply behavior of physicians and other health care providers, not just drug companies, is affected by exogenous changes in financial incentives (including changes in reimbursement).

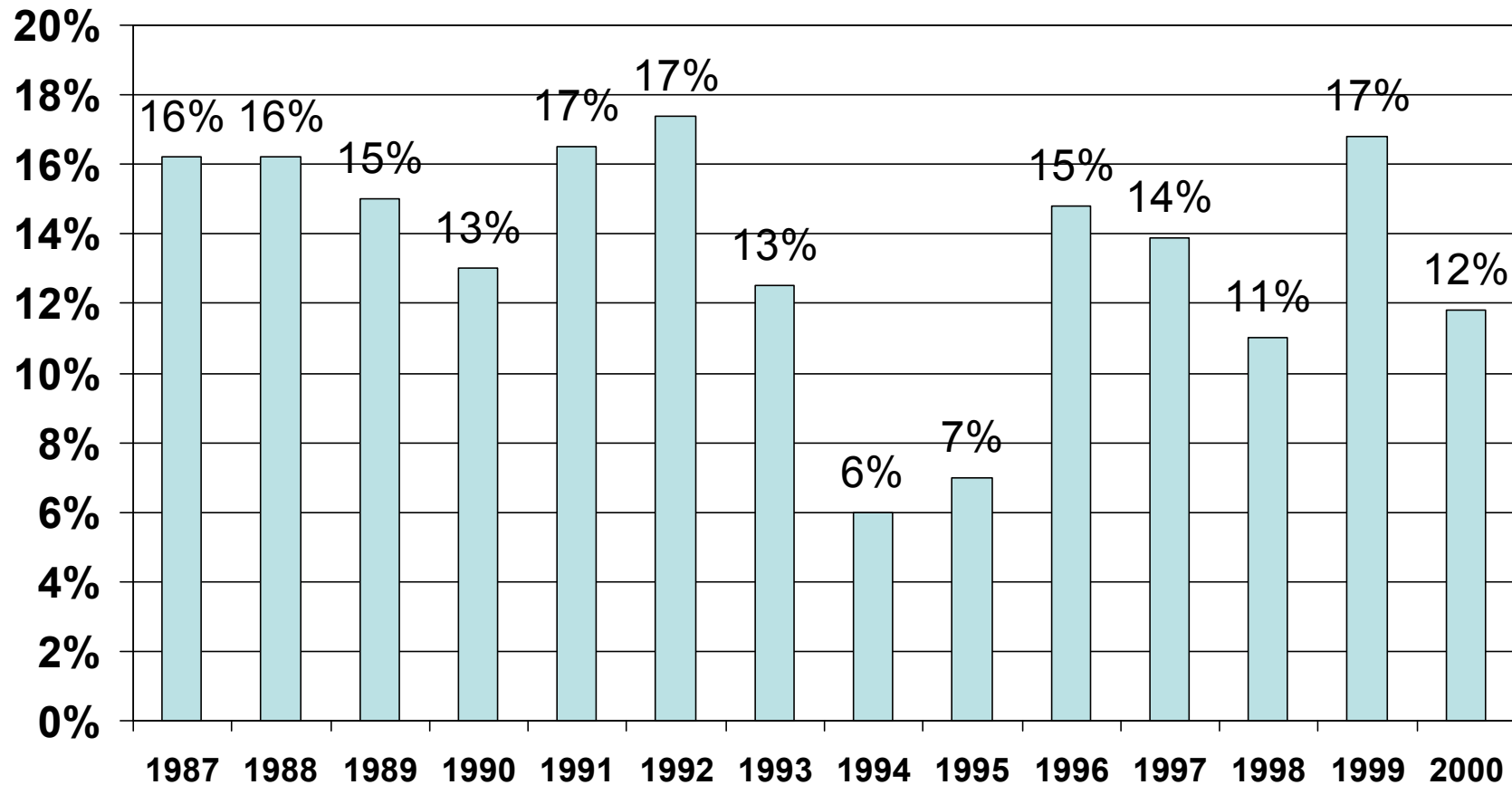
- Hadley (1979): the percentage of physicians participating in Medicaid in a given county, and the average number of non-elderly, Medicaid patients treated by each participating physician, both depend on the level of Medicaid reimbursements
- Currie, Gruber, and Fischer (1995): the ratio of Medicaid fees to private fees for obstetrician/gynecologists affects infant mortality rates
- Ellis and Gurol (2002): health *plans* are also quite responsive to changes in financial incentives. Plans are more likely to participate in the Medicare program when the counties that they are expected to serve are profitable

- The most plausible explanation for the lack of a relationship between the burden of disease in developing countries and the amount of pharmaceutical innovation is that incentives for firms to develop medicines for diseases primarily afflicting people in developing countries have been weak or nonexistent.
- Economic research has demonstrated that investment in R&D is greatly affected by incentives that are offered for R&D.

Cumulative number of orphan drugs and other drugs approved by the FDA, 1939-2001



Annual % change in Pharmaceutical R&D, 1987-2000



- To increase the rate of development of drugs for diseases primarily afflicting people in developing countries, incentives for developing these drugs must be strengthened.
- The establishment of purchase commitment funds may be the most efficient way to stimulate the development and production of these drugs.

Puzzle

- The fact that medical innovation has been related to diseases in developed countries but not in developing countries suggests that the gap in health (e.g. longevity) should be widening
- However, data indicate that the gap is *narrowing*

Life expectancy at birth, both sexes, by region

