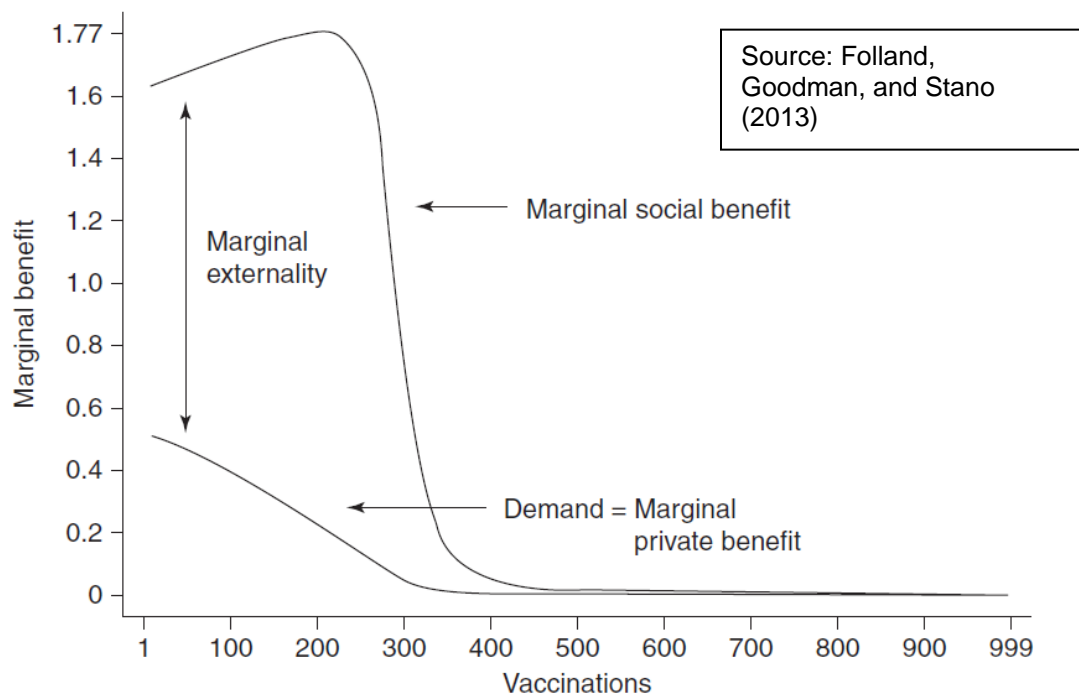


## Public Health, Epidemics, and Economics – 10 out of 10?

Most economic analysis starts with individuals who make decisions usually having to do with buying and selling. Although our decisions involve someone on the other side they don't usually effect other people directly. There is a class of decisions that refer to so-called *externalities*. A smoker lighting up a cigar alone in a park would bother no one else; in a crowded room the smoker would become a pariah because of the pollution. Epidemics such as Covid-19 provide just this kind of externality. Although market-based bargaining solutions (many referring to Nobel Laureate Ronald Coase) exist, no one seriously believe that they could work in epidemics of the current scale.

Epidemics represent profound externalities that can only be solved by public health methods. Although a vaccination for Covid-19 is nowhere near, it is useful to look at models that apply vaccinations to influenza. Folland, Goodman, and Stano (2013) present a model by Boulier and colleagues (2007) that examines the vaccination externality in more detail. It starts with the Susceptible-Infective-Removed (SIR) model of epidemiology originally developed by Kermack and McKendrick (1927) and reinterpreted mathematically by Hethcote (2000). This model relates the disease incidence to its *infectiousness*, *the size of the population*, and *the percentage of the population that is susceptible*.



**FIGURE 25-2** Marginal Private and Social Benefits of Influenza Vaccination  
 Source: Bryan L. Boulier, Tejwant S. Datta, and Robert S. Goldfarb (2007) "Vaccination Externalities," *The B.E. Journal of Economic Analysis & Policy*: Vol. 7: Iss. 1 (Contributions), Article 23. Available at: <http://www.bepress.com/bejeap/vol7/iss1/art23>, with permission from publisher.

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In the accompanying figure, from the first vaccination, the initial marginal private benefit is a little less than 0.6 cases of influenza prevented. The marginal external benefit is a little more than one additional case prevented, giving a marginal social benefit of 1.6 cases prevented. The marginal external benefit curve “balloons out” to be as high as 1.58, equaling  $(1.77 - 0.19)$  additional cases prevented, before falling toward zero, as the number vaccinated increases, and the number who could catch the disease correspondingly falls. Interestingly, the first person vaccinated does not generate much external benefit because that first vaccination has small preventative impact. The last person “doesn’t need” to be vaccinated because there is no one to infect him or her.

One does not have to be a Marxist or Socialist to argue that epidemic-related public health (i.e. government) interventions such as information, quarantine policies, or vaccines produce profound economic good. On March 16, President Trump rated his administration’s performance thus far as 10 out of 10. Based on the information given, readers may wish to give their own ratings.

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