A working paper by Paul A. David has provided a second seminal contribution on the diffusion of new technology. David (1969) develops a theory in which the optimal decision to adopt new technology differs between farmers because of heterogeneity in one (or more) relevant dimension(s). In the case of farmers, the most prominent dimension is farm size. Suppose that the use of hybrid seed requires a partially size-independent, fixed investment, while the returns are mainly relative to the size of the harvest. For farms of different sizes a cost-benefit calculation might lead to different decisions about the use of hybrid seed. With costs and returns of the use of the seed changing over time, the decision threshold shifts. David shows that the within-state diffusion pattern of hybrid seed is a reflection of the cumulative density function of firm size. Farmers below the threshold would not benefit from using hybrid seed because production (e.g., the absolute number of crops) is too low. Between-state differences reflect differences in the cumulative density functions. Conditional on the distribution of firm size, this process generates between-farm income differences but does not reflect inefficiencies. As the further diffusion brings in smaller and therefore less productive farms, the aggregate effects might resemble the patterns predicted by a CES production function, but the long-run consequences will be very different.

Turning back to computer-technology diffusion, Figure 2 provides information about computer-technology diffusion in the United States, Germany, and Great Britain. The numbers mainly refer to the use in the workplace of personal(ized) computer technologies. The diffusion patterns follow a more or less similar pattern as those documented by Griliches (1957) for the diffusion of hybrid seed (see Figure 1). Interestingly, the diffusion of computer technology is slower than the diffusion of hybrid seed. In addition, while workers in the United States had the lead in computer use in the workplace in the 1980s, workers in the European Union overtook them in the 1990s. Between the middle of the 1980s and the late 1990s the use of personal computers in the workplace increased from 19.3 to 69.2% in Great Britain, from 19.3 to 56.2% in Germany and from 24.3 to 52.5% in the United States. In 2001, computer-technology use in the workplace in Great Britain reached 71% and 67% in the United States.