Comments on Cross-Country Technology Adoption:
Making the Theories Face the Facts

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This is an empirical paper describing the speed with which new technologies are adopted around the world. The data that are analyzed consists of the Historical Cross-Country Technology Adoption Dataset, which is a dataset that was introduced in Comin and Hobjin (2003). This dataset tracks the evolution of 25 technologies in 23 countries during a span of 200 years. The principal findings are that (1) most new technologies originate in rich countries and (2) other countries are slow to adopt these new technologies. The authors find that the speed of adoption is positively related to per capital GDP, human capital, and openness to trade, and is also related to various measures characterizing the type of government.

Although not the explicit focus of this paper, a central question in this line of research is the following: Is the slow adoption of new technologies an efficient response to resource differences that lead to differences in the efficiency with which these technologies can be used, or is the slow adoption an inefficient outcome due to some distortion? The finding that poor countries are slow to adopt new technologies does not really shed light on this question, because one could just as easily argue that countries are poor because of an inefficiency that prevents the adoption of the latest technologies as one could argue that poor countries do not have sufficient resources to make efficient use of the latest technologies. The finding that countries with low levels of human capital are slow to adopt suggests that the speed of adoption is an efficient response to insufficient resources. On the other hand, the finding that relatively closed economies or economies with a strong executive branch are slow to adopt new technologies suggests that the slow adoption of technologies is an inefficient outcome.

While the finding that countries with low levels of human capital are slow to adopt suggests that the speed of adoption is an efficient response to insufficient resources, this result still falls short of providing a quantitative sense of this relationship. In Caselli and Coleman (2002), for example, we estimate a structural model in which lack of human capital inhibits the adoption of “sophisticated” technologies. While we find that this relationship is fairly pronounced in the data, we also find that most of the adoption of different technologies is not explained by differences in human capital. Generally, quantitative statements of this kind will require the estimation of a structural model.

Another factor limiting the conclusions of this study is that it is not clear if the new technologies are even the most efficient technologies. As they mention in the paper, for quite some time sailships had a distinct advantage over steamships in transporting goods across large bodies of water. Although I certainly do not know this for a fact, it seems reasonable to wonder if the essential difference is that sailships were for a long time on average
faster in crossing the Atlantic, but there was more uncertainty regarding this transportation time. Related to this comment, while it may be easy to identify now which technologies are the dominant ones, it may have been difficult to identify these technologies as they were just emerging. Perhaps the rapid adopters of new technologies inefficiently adopted these technologies too soon? Along these lines, it would be useful if the dataset could somehow be supplemented with information of the productivity of the various inventions that are tracked in the dataset.

One fascinating episode described at length in the paper is the adoption of technology in Germany following WWII. The central result is that, in terms of the intensity of usage of the various technologies considered in the paper, Germany evolved in much the same way as the rest of Europe following WWII. This speed of technology adoption occurred despite the large-scale destruction of capital using the existing technologies, and presumably also the destruction of at least some pre-existing barriers to technology adoption. This episode strongly suggests that there was something inherently efficient about the rate of technology adoption in Germany, and hence the rest of Europe, following WWII.

The paper acknowledges the limitation of the analysis due to the fact that all the countries in the sample later became successful developed countries. In terms of the question of the efficiency or inefficiency of the speed of technology adoption, this selection bias is likely to be particularly severe. Given that the countries are the successful ones, it seems likely that explanations for the slow rate of technology adoption would be biased towards finding efficiency-based explanations. If you wish to find countries that are more likely to be poor because of various inefficiencies, then surely you should include some of the currently very poor countries. In this sense the results of this paper complement well the paper of Caselli and Coleman (2001). Caselli and Coleman consider the adoption of one technology (computers) for a much wider selection of countries, but for a much shorter time span than that considered by Comin and Hobijn.

References