Bart Hobijn opened the discussion by noting the inherent difficulties in any empirical study that attempts to distinguish among theories of long-run growth. He acknowledged the need for further consideration of some of the alternative hypotheses presented by the discussants, but he reiterated the value of explicitly articulating a channel of growth and presenting an empirical analysis using technical assistance as an instrumental variable. Responding to comments about the types of technologies tracked in their work, Hobijn noted that data availability restricted their options. They used both consumer and producer technologies to assemble sufficiently long time series. He also agreed with James Robinson that technical assistance expenditures were linked to broader mutual security efforts undertaken by the United States at the end of World War II.

Diego Comin responded to Chang-Tai Hsieh’s concerns about simultaneity bias in the determination of GDP growth and technology adoption. He argued that using a structural model helps to deal with this issue by identifying restrictions for balanced growth and using the curvature of the path of TFP (rather than the level or trend) to identify adoption lags. With respect to Hsieh’s concern that the reduction in utilization of old technologies may simply reflect higher incomes, Comin responded that initial income is included to control for this possibility. He acknowledged that technical assistance programs were quite small in magnitude but were representative of other types of technology transfer (such as Deming’s work in Japan) that occurred at the same time and were likewise exogenous. He also liked Robinson’s example of the Meiji Restoration in Japan as a historical instance of technology diffusion and growth acceleration. Comin argued that adding controls for polity and institutions did not affect their results but acknowledged that these controls may be insufficient if institutional changes had asymmetric effects on the adoption of new versus old technologies.

Daron Acemoglu criticized the instrumental variable approach used by the authors. He stated that, regardless of the structural model, the
instrumental variable did not satisfy the essential exogeneity requirements. The technical assistance program was part of the Marshall Plan and was tightly linked to political aspects and broader goals of reconstruction. He did not see how the distinction between old and new technologies helped their argument, and he noted that some European countries, such as Germany, were important leaders in many of the new technologies tracked in the paper. Acemoglu added that their mechanism of technological diffusion finds support in the historical record but that their econometric evidence was not credible. He cited a paper by William Kerr (2008) as a good example of an empirical strategy showing the causal effects of knowledge diffusion.

Comin responded that he could use Marshall Plan expenditures as an additional control and described the calculation of adoption lags based on the diffusion curves for each technology. Comin emphasized that the diffusion curves for different technologies are fitted to the available data for each technology. Acemoglu and Comin also disagreed on whether shocks orthogonal to technological adoption and diffusion would have differential effects on old and new technologies. Comin argued that a political or institutional change that improved efficiency would result in higher utilization of all technologies, which they do not see in the data.

Alan Taylor was supportive of the aims of the paper—particularly the effort to decompose neoclassical convergence (in capital) and technological convergence (in productivity). He cited a paper by Bosworth and Rogers (2003) that attempts to do this. However, he echoed concerns about technical assistance as an instrumental variable. Taylor noted that Germany, Japan, Italy, and France appear to be key drivers of their results, and two of these countries have their institutions essentially replaced at the end of World War II. Comin responded that these effects should be captured by polity controls and controls for initial conditions.

Taylor also expressed concerns about the modeling of investment, suggesting a putty-clay approach. He noted that Japan and Germany could rebuild their capital stock while Britain continued to operate with an older capital stock, perhaps accounting for growth differentials. Finally, Taylor also noted that these countries became part of the General Agreement on Tariffs and Trade, and lower trade barriers might have had important effects on growth. On the modeling assumptions, Hobijn responded that he was sympathetic to the putty-clay mechanism, but he noted that putty-clay models converge too quickly to steady state much like standard neoclassical models of reconstruction. Comin added that capital is subject to adjustment costs in the model, which
are estimated in the data. Also, trade was explicitly controlled for in the regression analysis and had little effect on their results.

Samuel Pessoa asked whether adoption costs as a share of GDP were too high in their model along the transition path. Comin was unsure as to what data Pessoa had in mind and the corresponding measure in his model. Hobijn suggested discussing further offline.

Valerie Ramey also reiterated Acemoglu’s view that the degree of technical assistance was strongly tied to political changes desired by the United States. She suggested looking at whether country total factor productivity growth can be tied to the number of students from a given country studying in the United States or Europe. Hobijn agreed with this suggestion, and Acemoglu noted that Kerr conducted this type of study, examining industry growth in China and the number of Chinese students studying in different areas. He agreed that the tacit knowledge mechanism identified by Kerr is consistent with Comin and Hobijn’s hypothesis.

On putty-clay modeling, Simon Gilchrist noted that, if new technology was available with delay, then the speed of convergence in growth could be brought closer to the speed of convergence exhibited in the data. He also noted that Germany and Japan were excluded from many new industries developed in the 1930s and early 1940s, and this knowledge spread quickly after the end of the war. He agreed with the view that the Marshall Plan was primarily designed to induce political and economic changes and, as such, makes inferences based on technical assistance difficult. Comin added that the licensing program in 1950 in Japan mentioned by Gilchrist was not explicitly part of the technical assistance program, but the same mechanism of technology diffusion was at work.

Robinson noted that the German economy was heavily cartelized before occupation, and the United States sought to break up these monopolies. Acemoglu added that the United States tried something similar to break up the Japanese zaibatsu. These changes may have had effects on growth quite apart from technology diffusion. Lawrence Christiano wrapped up the discussion by asking whether a similar story would apply to other postwar economies such as France and the Netherlands.