Book review

Technological Revolutions and Financial Capital: Carlota Perez, Edward Elgar, Cheltenham, UK, 2002, 224 pp., Hardcover, ISBN: 1840649224

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In his Business Cycles (1939), Joseph Schumpeter put forth the interesting proposal that economic growth, as it had been experienced in the West since the time of the Industrial Revolution, proceeded in the form of “long waves.” Each wave was associated with the rise, development, and maturation, of a cluster of important new technologies and industries. Schumpeter proposed a long cycle length of approximately fifty years.

Until relatively recently, the scholars taking this proposal seriously were off in a corner of economics, for the most part isolated from mainstream research and writings on economic growth. Schumpeter’s proposal clearly suggested it was essential in studying growth to see the process as involving a variety of different industries, with the advent of new cycles associated with the surge of new ones. However, empirical research on economic growth after World War II tended to focus on the newly available time series for Gross National Product, and the new neoclassical growth theory also tended to orient researchers to the aggregate time series. Within this frame of reference, Schumpeter’s long wave hypothesis tended to be interpreted as a proposal about the regularity of long run cycles in the macroeconomic growth rate. At this level of analysis, the support for tight regularity of long swings was ambiguous at best. Nor did neoclassical growth theory give any reason to believe that there were periodic swings in the growth rate. Given this orientation, it is not surprising that only a few scholars paid much attention to long wave theory.

Over the last twenty years, this situation has changed. A major reason is that economists studying technological change, which economists of nearly all theoretical stripes recognize as the principal driver of growth, increasingly have come to recognize that the phenomena needs to be studied at a sectoral or industry level. At this level of aggregation and disaggregation, a number of individual technologies do seem to have gone through a “life cycle” from birth, to rapid growth, to maturity, and in some cases after that to decline. (I should note that years before these developments, scholars at the National Bureau of Economic Research, and in particular Simon Kuznets, recognized an industry cycle.) Of course the fact that particular technologies and industries seem to have a life cycle does not mean that there are long waves at the level of an economy. But this finding made the possibility more interesting to explore. And there has been a renaissance of interest in long wave growth theory.

Over the past few years, two important books developing long wave theory (but downplaying temporal regularity) have appeared. One is by Christopher Freeman and Francisco Louca, As Time Goes By: From the Industrial Revolution to the Information Revolution. The other is the book reviewed here, by Carlota Perez, Technological Revolutions and Financial Capital. Perez’ book provides an excellent general review of modern long wave theory as it is emerging, partly as a result of her own earlier contributions. And in this book Perez makes an important new contribution to that theory, regarding the changing roles of financial institutions over the long wave.

The basic shared premises of long wave theory are that economic growth, as it has been experienced largely in western countries, can be roughly divided into a number of eras, with each era (as Schumpeter proposed) being marked by the introduction and development of a cluster of new technologies that come to have widespread impact and drive economic progress, and which go through a “life cycle” of rapid development, and then maturity. Perez’ specification of these different eras is quite standard in this literature. According to this characterization, there was the “first industrial revolution” beginning in the 1770s and driven by cotton textiles and related new mechanical technologies, the age of steam and railways beginning around 1830, an age of steel, electricity, and heavy engineering which comes into being around 1875, an era of oil, automobiles, and mass production starting early in the twentieth century, and an age of information technologies and telecommunications beginning in the late 1960s or early 1970s. Each of these eras starts with (to use Perez’ terms) an irruption, followed by a period of erratic but very rapid growth which she calls a “frenzy,” then a period of sustained coherent growth where there is “synergy,” and then a period of slowdown and maturity. Then, after an uncertain period of time, a new wave begins.

Perez has made two important contributions to the development of long wave theory. The first, which she introduced about twenty years ago, was to stress that the introduction of a new driving set of technologies tends to require for economic effectiveness, and to force, very major changes in an economy’s institutional structure. She highlights that institutional change often is a painful, wrenching process. In this book she argues that while the institutional changes needed to accompany the new technologies begin to occur during the period of rapid frenzied growth, they then are incomplete. The shift over to the period of synergy is made possible by, among other things, a more complete institutional transformation.

Perez’ new contribution, which is highlighted in this book, is concerned with the changing role of finance over the course of a long cycle. What she presents here is original, provocative, and to me at least persuasive.

Her proposal is that after the early “irruption” stage when the new technologies that will drive an era come into view, an important part of the financial system comes to bet on them, speculatively. Finance goes to new firms and new industries driven by great hopes of getting rich, fast. This clearly is the stuff of “bubbles.” The bubble in the Internet and related technologies that rose in the 1990s and broke at the turn of the century is a model. But Perez argues that the historical record shows very similar patterns of speculative, “get-rich” financing in the early stages of the other long waves. She notes a similar bubble in the 1920s, and an earlier one in the 1890s, each associated with the very rapid development and expansion of new industries, a belief by investors that they could get rich fast if they bet on the right firms, the development of financial arrangements to support the speculation, and ultimately a collapse of the bubble.

Perez then goes on to note that in the earlier eras after the bubble burst, and after a period of recession and shake out, economic growth resumed based on these no longer completely new industries, productivity and living standards rose for a period of time, and finance settled in to more sustained and less speculative modes of supporting economic activity. In these earlier eras, after a run of fifteen to twenty years, with the maturity of these industries, there was diminishing returns to capital, and another recession, but of a very different kind than the one associated with the bursting of the bubble earlier in the era.

As I said, I find the propositions put forth here fascinating, and plausible. They are important to reflect upon, and almost certainly will stimulate a body of research probing whether they hold up under closer scrutiny.

Perez concludes the book by returning her focus to the present and discussing what she thinks are the policy implications of this theory about what is happening today. She proposes, first of all, that the institutional changes that are called for by the information era still are incomplete, and that recovery and the development of synergy await their further development. She argues, second, that there are important lessons in this theory for what is needed in the world of finance. In particular, financial institutions, and investors, need to understand that the period where many could get rich fast is over, and that now is the time for more patient steady funding of productive investment, which can yield significant if not spectacular returns. Perez also argues that to get the new economy going again on a steadier track also will require that demand be expanded. She proposes that this needs both increases in income for those groups in the advanced industrial economies who have not benefited thus far from the new wave, and an expansion in income and participation in the new economy in those countries that thus far have been left behind.

I find the policy discussion here less interesting, less novel, than I find the general analytic argument of the book. However, it does not detract from it. This is a fascinating book, well worth reading, and reflecting on. And I might note in conclusion, that if the reader finds the Perez book interesting and provocative, a next step might be to pick up and also read the book by Freeman and Louca, As Time Goes By.