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Is US economic growth over? Faltering innovation confronts the six headwinds

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1. Introduction

The prospects for future long-run US economic growth were already dismal in 2007 but were little noticed in the continuing euphoria over the invention of the internet and the related developments in information technology and communications (ICT). This Policy Paper pulls back from the past five years of financial crisis to pose a question with implications that will persist for decades even if the current international economic disorder is eventually resolved.

This paper is about US economic growth through 2007 and the future post-2007 path of potential or trend output for the subsequent 20 to 50 years. The analysis abstracts almost entirely from the negative events that have occurred since 2007. We deliberately ignore the separate questions of whether the recession and slow recovery have pulled down the trend growth rate output, and the size of the "gap" between the trend path and actual real GDP.

The ideas developed here are unorthodox yet worth pondering. They are applied only in the context of the US, because the worldwide frontier of productivity and the standard of living have been carved out by the US since the late 19th century. If growth of the US productivity frontier slows down, other nations may move ahead, or the slowing frontier could reduce the opportunities for future growth by all nations as the pace of productivity growth in the US fades out.

The paper makes these basic points:

1. Since Solow's seminal work in the 1950s, economic growth has been regarded as a continuous process that will persist forever. But there was virtually no economic growth before 1750, suggesting that the rapid progress made over the past 250 years could well be a unique episode in human history rather than a guarantee of endless future advance at the same rate.

2. The frontier established by the US for output per capita, and the UK before it, gradually began to grow more rapidly after 1750, reached its fastest growth rate in the middle of the 20th century, and has slowed down since. It is in the process of slowing down further.

3. A useful organising principle to understand the pace of growth since 1750 is the sequence of three industrial revolutions. The first (IR1) with its main inventions between 1750 and 1830 created steam engines, cotton spinning, and railroads. The second (IR2) was the most important, with its three central inventions of electricity, the internal combustion engine, and running water with indoor plumbing, in the relatively short interval of 1870 to 1900. Both the first two revolutions required about 100 years for their full effects to percolate through the economy. During the two decades 1950-70, the benefits of the IR2 were still transforming the economy, including air conditioning, home appliances, and the interstate highway system. After 1970, productivity growth slowed markedly, most plausibly because the main ideas of IR2 had by and large been implemented by then.

Author's note: This research has been supported by the Kauffman Foundation. Many facts and relationships highlighted here are based on my book in progress, *Beyond the Rainbow: The American Standard of Living Since the Civil War,* under contract to the Princeton University Press. To limit the scope of this short paper, only a limited number of historical references and citations are included here. All others are provided in the book manuscript. I am grateful to Marius Malcevicius and Andrew Sabene for their indispensable research assistance, to Jordan Jones for creating the graphs, and to David Warsh for helpful comments. This paper originates in a presentation that has been given to numerous audiences over the past year, and I am grateful to members of those audiences for asking provocative questions and making helpful suggestions in the Q&A sessions.