This is an interesting and informative paper about productivity and potential output in the United States in the aftermath of the Great Recession. It remains a puzzle why US economic growth has been so slow to recover in the post–Great Recession period. A feature of the relatively anemic growth is sluggish productivity growth whether measured by labor or total factor productivity growth. This has led to conjectures about how both the causes and consequences of the Great Recession may have led to a new normal where US economic growth is lower. This paper explores these issues with careful measurement and empirical analysis. The main points are quite striking and clear. First, the slowdown in productivity growth preceded the Great Recession. Second, the slowdown is concentrated in the information technology (IT)-producing and IT-using industries. Third, there is not much evidence that the housing bubble and collapse is closely tied to the productivity slowdown.

The author’s interpretation of this evidence is that the Great Recession had little to do with the productivity slowdown. Instead, he argues that the evidence supports the hypothesis that the productivity surge from the recent advances in information technology was relatively short lived. The United States in particular saw a surge in productivity in the 1980s and 1990s, as it was both an intensive IT producer and user. But as this was short lived, IT-producing and IT-intensive-using industries have exhibited a return to a lower rate of productivity growth rate.

There are two sets of questions worth exploring about whether to accept this interpretation. First, is the evidence itself convincing? Second, is the argument that other factors (such as the factors that led to the financial crisis itself) are not driving this slowdown in IT-producing
and IT-using industries convincing? On the first question I think the evidence is mostly convincing, although I have some quibbles about the facts that also raise some questions about interpretation. On the second question, I think the reasons underlying the productivity slowdown in IT and IT-using industries are still quite open issues.

Before turning to these questions directly, it is useful to think about what the mechanisms are for IT to influence productivity growth. For the IT-producing industries, the mechanism is straightforward. Technological progress that enables the IT-producing industries to produce greater (quality adjusted) output per unit of input is a direct potential contributor to productivity growth. As discussed below, the reason for the slowdown in the IT-producing industries is an open question but the evidence is not. For the IT-using industries, the mechanism linking technological progress in IT (both the period of the surge and then the slowdown) to the using industries is more indirect. The author rightly calls these mechanisms “nuanced and complex.” The arguments that have been made is that IT has changed the way businesses organize themselves. Put differently, investments in IT are complementary with investments in intangible capital (the latter are part of what is measured as productivity growth).

To be able to evaluate the impact on IT-using industries, one needs data on which industries are the most IT intensive. At first glance this does not seem problematic, since the National Income and Product Accounts (NIPA) include what is known as a capital flows table produced by the Bureau of Economic Analysis (BEA). The latter provides information about investment flows by detailed asset type by industry. It is this capital flows table that is used to produce investment flows and capital stocks by industry. Moreover, since the capital flows data permits breaking overall investment into detailed asset classes by industry, industries with intensive investment of IT can be readily identified.

The problem is that the capital flows table is one of the weak links of the National Income and Product Accounts. In the United States, the investment flows and capital stocks are measured on a supply-side, top-down basis. That is, for each asset type, the nominal investment flow is measured by the domestic production of the asset less exports plus imports. Investment deflators and depreciation rates by asset type are computed from a variety of sources and this permits constructing real investment flows and capital stocks by asset type. The capital flow table that allocates the assets to industries is mostly not based on
direct collection of information about expenditure patterns on assets by industries, but rather on assumptions. As Meade, Rzewnick, and Robinson-Smith (2003) describe it, “[c]ertain occupations or sets of occupations are assumed to be good indicators of which industries use a specific type of capital good; for example, machine tools are allocated to industries by the employment of machine tool operators” (p. 28). The implication for the present purpose is that so-called IT-intensive-using industries are better interpreted as industries with high shares of IT-related occupations. Also, Becker et al. (2006) used alternative source information on actual IT use by industries that shows that there are many industries where actual IT use is much higher than suggested by the occupational data. For example, their evidence suggests that the business services sector has much higher IT use than indicated by the BEA capital flows table.

A related problem with the BEA capital flows table is that it is quite dated. The most recent capital flows table is based on 1997 data. As such, it reflects the occupational distribution of industries in 1997. So it could be that some of the industries that were IT-intensive worker industries in the 1990s are no longer so IT-worker intensive in the post-2000 period. Likewise, some of the industries that became more IT-intensive worker industries in the post-2000 period are not being classified as being IT intensive during the period of the slowdown.

I think these data limitations imply that we know much less about IT-using industries than we know about IT-producing industries. I would reinterpret the evidence in the paper as indicating that the productivity slowdown is in IT-producing industries and in industries with a higher than average concentration of IT-related occupations (based on the 1990s occupational distribution). Since we do not really understand yet the mechanisms for how IT influences productivity growth in the using industries and we do not measure accurately who are the IT-using industries, this raises some questions about how to think about the argument made in this paper that this is all about IT.

Now turning to the role of alternative factors that may have influenced the slowdown in productivity, at least in the IT-producing industries, the paper mostly takes the view that technological surge and in turn slowdown in IT was exogenous, but the process of innovation itself is complex and undoubtedly endogenous. Consideration of those issues, I think, influences how one thinks about other factors that may be at work.

One factor that the author mentions is that there has been a decline
in the pace economic dynamism in the United States over the last few decades. This decline is evident in a secular decline in the pace of job and worker reallocation. A key factor underlying the decline in the pace of reallocation is a decline in the pace of business entry. Evidence has shown that high pace of job reallocation with the accompanying high pace of business entry has been an important contributor to productivity growth. In the United States, the high pace of reallocation is associated with resources being shifted away from less to more productive businesses. The evidence suggests that entrants and young businesses play a critical role in these dynamics. While most entrants fail or do not grow, a small fraction of young businesses grow very fast. The evidence indicates that these high-growth young businesses are highly innovative and productive. Given the decline in the pace of reallocation and entrepreneurial activity, it may be that this is part of the story for the productivity slowdown.

The author acknowledges this evidence, but mostly rules it out due to timing considerations. The author rightly points out that the decline in the pace of reallocation and business entry rates predates the decline in productivity, but I think that is a premature conclusion once one looks more closely at the evidence. For one, the decline in the pace of worker and job reallocation accelerated in the post-2000 period. For another, the nature and character of the decline in reallocation and business entry changed in the post-2000 period. Prior to the year 2000, much of the decline in business entry and reallocation was concentrated in the retail trade and service sectors. For retail trade, the decline arguably was driven by IT. During the last few decades, the retail sector has been increasingly dominated by large national and multinational firms. IT has enabled such firms to develop more efficient acquisition and distribution networks. Such firms and their underlying establishments are both more stable and productive than the “Mom and Pop” retail trade firms that they have been displacing. So I would agree that the decline in dynamism in the 1980s and 1990s is not the source of the decline in productivity growth, and if anything, is attributable to the same factors leading to the surge in productivity over the same time.

In the post-2000 period, the sectors with the largest declines in business entry and dynamism is the information sector as well as related high-tech sectors (e.g., the manufacturing sectors of high-tech goods). Through the 1990s the high-tech sectors exhibited a high pace of job reallocation and a high pace of business entry. Both of these indicators peaked in the late 1990s in the high-tech sectors during the dotcom
bubble, but perhaps more interestingly both have fallen below mid-1990s levels since early in the twenty-first century.

There is an open question about causality here. It may be that what is driving the slowdown in dynamism and entrepreneurship in the high-tech sectors is the decline in technological progress in IT. Rapid technological progress can induce lots of entry and experimentation. But on the other hand, since innovation is endogenous and young businesses are innovation intensive, the slowdown in business entry may be the core proximate reason that innovation has slowed down in IT. Of course, if the causality runs in this direction then the question is, what caused the slowdown in business entry in high tech? There are many interesting possibilities here, including some of the distortions and misallocation issues in the 1990s that the author perhaps dismisses too readily. Perhaps, as some have opined, in the post-2000 period too many of the best and the brightest were heading to Wall Street to create financial derivatives rather than the Silicon Valley to create innovations in the high-tech sectors.

This alternative perspective also raises questions about the housing bubble not playing a role. While the decline in productivity did precede the Great Recession, it may be that the Great Recession added insult to injury. Fort et al. (2013) found that entrants and young businesses were hit especially hard in the Great Recession—and especially in the states where housing prices fell the most. Moreover, Foster, Grim, and Haltiwanger (2014) found that the Great Recession not only exhibited a slowdown in reallocation, but also the reallocation that did occur was less productivity enhancing.

So, an alternative hypothesis is that the post-2000 period is one of misallocation toward the financial sector with an accompanying bubble in financial assets as well as housing. Such misallocation may have led to less innovation in high tech. The subsequent financial crisis and the bursting of the housing bubble added insult to injury as entrants and young businesses were hit especially hard. Since such businesses are important for job growth, innovation, and productivity, this has contributed to the anemic recovery in terms of both job and productivity growth. This alternative story is highly speculative, but I do not think it has been ruled out by the evidence in this paper.

To sum up, this paper presents rich and interesting facts about productivity growth before, during, and after the Great Recession. It is apparent that the slowdown in productivity growth preceded the Great Recession. It is also apparent that IT had something to do with this
slowdown. There has been a noticeable slowdown in IT-producing industries and a slowdown in industries that historically had a high share of IT-intensive occupations. Why this happened is an open question. These interesting facts alone do not provide sufficient evidence to rule out factors that are related to the causes and consequences of the Great Recession as being important determinants of the productivity slowdown.

**Endnotes**

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1. The discussion here on the patterns of dynamism and business entry draws heavily on Decker et al. (2014a, 2014b).

2. See the discussion in Foster, Haltiwanger, and Krizan (2006) about the changing structure of retail trade.

**References**


