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Secular Stagnation: The Long View†

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What does history have to say about the dangers of secular stagnation? History doesn't actually "say" anything, but it points to observations, patterns, and discrepancies between past predictions and outcomes which may be helpful for formulating answers to such questions.

Historical investigation is complicated by competing definitions and hypotheses. Here I define secular stagnation as a downward tendency of the real interest rate, reflecting an excess of desired saving over desired investment, and resulting in a persistent output gap and/or slow rate of economic growth. I distinguish four potential explanations for this phenomenon: a rise in savings rates due to the emergence of emerging markets, a decline in investment due to a dearth of attractive investment opportunities, a decline in the relative price of investment goods, and a decline in the rate of population growth.

Modern discussions of secular stagnation point to the decline in real interest rates since 1980. Thus, two Bank of Canada researchers (Desroches and Francis 2006) highlight the decline in long-term real interest rates in the G7 countries "over the past 25 years." While there are hints that recent movements may in part reflect mean reversion, there is no consideration of the long-term record.

Figure 1 shows nominal and real interest rates for the United States over the last two centuries: the yield on ten year constant maturity government bonds with and without adjustment for realized consumer price inflation, where the adjustment subtracts a seven-year moving average of CPI inflation. (For the portions of the 1830s and 1840s when there was no federal debt, New York State canal bonds are used). For much of the nineteenth century, when the United States was on the gold standard, the nominal interest rate may be more informative, insofar as inflation was a random walk with expectation zero. The figure points to an alternative interpretation, namely that the decline in real interest rates starting in the 1980s is mean reversion after the period of high interest rates and inflation that preceded it.

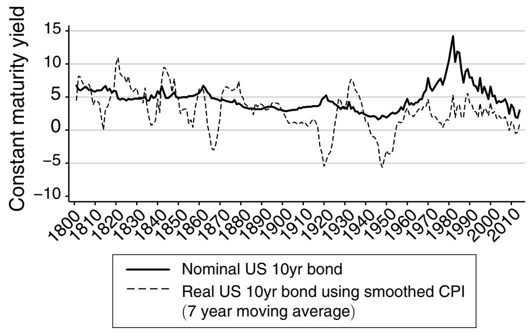

Figure 1. Long-Run US Interest Rates

Turning to explanations, recent discussions highlight high savings rates in emerging-market economies. Compared to advanced economies, emerging markets are financially underdeveloped, forcing households to substitute brute-force accumulation for portfolio diversification. The public sector provides little in the way of a social safety net, encouraging precautionary saving for contingencies and old age security. Central banks rely on reserve accumulation for insurance against financial shocks. In many cases, low old-age dependency ratios make for high levels of life-cycle savings. The implication is that as the share of world GDP accounted for by emerging markets has risen, so too have global savings rates.

Modern analyses focus on the period since the mid-1990s, the first point in time when the vast majority of emerging markets and developing countries increased their output faster than the United States. But it is possible to

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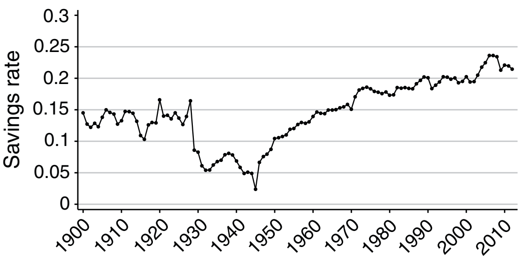

Figure 2. Secular Trend in Global Savings Rates

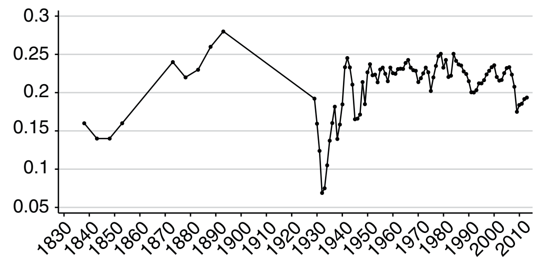

Figure 3. Long-Run US Investment Rate

cast one's net more widely. Historians of the nineteenth-century United States (e.g., Lewis 1983) have pointed to the country's high immigration and low old-age dependency rates as explanations for relatively high savings rates that allowed it to meet its infrastructure needs without relying extensively on foreign capital. This "savings glut" explains how it was that interest rates remained low despite pressure for capital deepening from biased technological change. Revealingly, analysts of other countries such as Hobson (1909) were concerned in this period about the problem of "underconsumption" (read "oversaving"), attributable to the increasing concentration of wealth and income in the hands of the "1 percent."

Figure 2 shows data on global savings rates from the early twentieth century through 2013. The pre-1970 estimates are assembled from national sources. These are a GDP weighted average across countries of domestic investment rates (weighted by 2005 GDP in purchasing power parity terms).[1] While there is some evidence of an upward trend over the long term (interrupted by the two world wars and the Great Depression), one has to look hard to see evidence of a growing savings glut after 1980, as opposed to a temporary bulge in the period of high Chinese savings between the turn of the twenty-first century and the financial crisis.

Estimates of historical investment rates tend to derive from the output of investment-goods industries, and the further back in time one goes the more investment is likely to go through the informal sector or reflect household production and therefore be missed by such methods. For a very few countries like the United States, historians have augmented the output of capital goods sectors with estimates of home manufacturing and the value of farm improvements made with farm materials. Figure 3 shows the estimates of Gallman (1966) spliced to the standard national accounts data since 1925.[2] The United States in the nineteenth century displays the behavior familiar from twenty-first century emerging markets, with investment rates rising from 16 percent in 1834–1843 to 28 percent in 1899–1908. Subsequently, US savings rates headed back down. This is a hint as to what is likely to happen to savings in emerging markets as populations age and capital/labor ratios approach equilibrium levels.

A second popular explanation for the low level of real interest rates is a decline in the relative price of investment goods. The same investment projects can be pursued, it is hypothesized, by committing a smaller share of GDP, and any additional projects that might be rendered attractive by this lower cost of capital are not enough to offset the decline in the investment share. With less investment spending chasing the same savings, the result can be lower real interest rates and a chronic excess of desired saving over desired investment.

IMF (2014) has examined changes in the relative price of investment in the advanced economies since 1980. It documents a downward trend that levels off in the early twenty-first century. In explaining this movement, it points

[1] National savings rates are, of course, the sum of domestic investment and the current account balance, but current accounts in principle sum to zero across countries. Alternatively, the country data can be weighted by current year GDP in purchasing power parity terms. While these show basically the same pattern, data are available only for a subset of countries.

[2] Gallman's (1966) estimates are also adjusted for changes in net claims against foreigners. I eliminate this adjustment, since I am concerned here with savings rates.

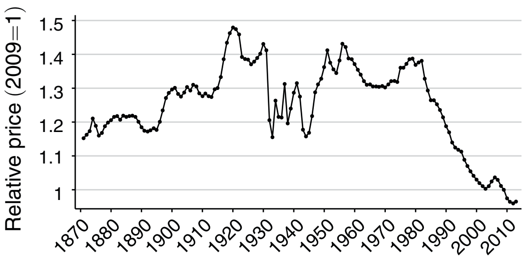

Figure 4. Secular Trend in the US Relative Price of Investment

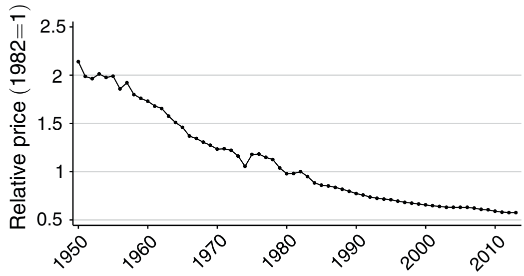

Figure 5. Long-Run Trend in Quality-Adjusted Relative Price of Investment

to the work of Gordon (1990), who emphasizes the role of research and development that is embodied in cheaper, more efficient investment goods. Finally, the IMF asserts that any induced increase in the volume of investment was insufficient to offset the negative impact of this trend on real interest rates.

There is little dispute that research and development activity has grown in the long run or that it has been disproportionately embodied in investment goods. But there is less agreement on when this trend began or how long it is likely to last. Focusing on the United States, Fisher (2006) argues that the real price of equipment, which is closely related to the real price of investment goods, has been falling since the early 1950s, but that its average rate of decline accelerated in the early 1980s, coincident with the downward trend in real interest rates.

Why there should have been this break in the early 1980s is not clear, however, since there is no obvious change in the level or composition of R&D spending between the quarter centuries before and after this date. It may shed additional light on these issues to consider the relative price of investment goods in the long run for countries like the United States for which we have long time series. Figure 4 shows data from Kuznets (1961) and the national income and product accounts after 1929. We see that while the relative price of investment goods rose as well as fell for significant periods, there is a sharp fall in recent decades. One interpretation would situate the break around 1980 (coincident with the timing of the fall in real interest rates). Another would put it around 1950, with an interruption in the 1970s, investment goods being energy intensive and the 1970s being the period of the oil shock. Data for 11 now-advanced countries from Collins and Williamson (2001) show the same thing.

A limitation of the evidence is that such series are not adjusted for product quality improvement. Figure 5 therefore shows Gordon's quality-adjusted series through 1983 extended for two additional decades on the assumption that the same relationship between the adjusted and unadjusted series that holds through 1983 continues to hold thereafter. As expected, this makes the post-World War II decline in the relative price of investment look even more dramatic. Evidently, R&D is not embodied more easily and fully in investment goods than consumption goods in all times and places. Thus, the presumption that consumption goods, and in particular that portion provided by the service sector, are difficult to mechanize and therefore become relatively more expensive over time may not hold as it has in the past. Even if the post-1980 decline in the relative price of investment goods is part of the explanation for the decline in real interest rates, there is no ruling out that it may be reversed in the future.

A third possible explanation for secular stagnation, due originally to Hansen (1938), is that the rate of investment is being dragged down by a low rate of population growth, as first the advanced economies and now emerging markets undergo the demographic transition to slower rates of natural increase. Hansen's logic was that slower population growth meant that capital had less additional labor to work with on the margin, resulting in lower returns and lower investment.

What Hansen did not emphasize was that slower population growth and greater longevity also imply lower savings rates on life-cycle grounds. Goodhart and Erfurth (2014) question on this basis whether slower labor force growth in the advanced economies has contributed to recent decline in real interest rates; they predict that as population growth and savings rates continue to decline, real interest rates will head back up.

The historical data do not show any clear correlation between the growth rates of population and GDP, whether the sample is global or limited to the now-advanced countries. Eichengreen and Fifer (2002) find that increases in old-age dependency ratios have approximately equal negative effects on savings and investment rates and minimal impact on real interest rates and the current account of the balance of payments.

A fourth explanation for low interest rates and the slow growth with which they are evidently associated is a dearth of attractive investment opportunities. This was, of course, another conjecture of Hansen, undermined by subsequent experience. More recently, Gordon (2012) has argued that the returns to innovation in the United States, measured in terms of the impact on GDP growth, have slowed since the 1970s. Gordon associates periods of relatively high investment and growth with key technological clusters: steam and railroads in the early nineteenth century; electricity, chemicals, petroleum, and the internal combustion engine from the late nineteenth century through the mid-twentieth centuries; and computers and related technologies since the 1960s. He argues that the slowdown in US productivity growth starting in the 1970s reflects the relatively limited impact of this third, computer-centered cluster aside from its application to retailing, wholesaling and finance centering in the decade 1995–2005.

There is little disputing the historical record. Productivity and GDP growth were slower before the late nineteenth century than subsequently. Productivity growth again slowed in the United States after the early 1970s, the visible acceleration in 1995–2005 notwithstanding. But different observers will have different views about what this history now implies.

In thinking about the impact of a cluster of innovations on output and productivity growth, I like to distinguish two dimensions of the technology in question, which I refer to as "range of applicability" and "range of adaptation." Range of applicability refers to the number of different sectors or activities to which the key innovations can be productively applied. Thus, the steam engine, the key innovation at the center of the first industrial revolution, had only a limited impact on output and productivity growth because for many years its productive application was limited to the textile industry and railways, which accounted for a relatively small fraction of economic activity (Crafts 2002). The impact of electricity was larger because it proved possible, within decades of its development, to apply the technology to a wide range of manufacturing industries, to the household sector and elsewhere. The "computer revolution" of the second half of the twentieth century again had a relatively limited impact on economy-wide rates of output and productivity growth because its productive application was limited to finance, to wholesale and retail trade, and to the production of computers themselves.

This perspective suggests that the implications for output and productivity growth of the next cluster of innovations will depend importantly on its range of applicability. Optimists point to promising innovations like new tools (quantum computers), materials (graphene), and processes (genetic modification) that would seem to have a broad range of potential applications. They point to the scope for robotics to supplement human brain and muscle power in a wide range of activities. This is not a prediction, but a suggestion to look to the range of applicability of new innovations when thinking about the prospects for output and productivity growth.

Range of adaptation refers to how comprehensively economic activity must be reorganized before positive impacts on output and productivity growth materialize, In addition, the greater the required range of adaptation, the higher the likelihood that growth may slow in the short run as existing technological complementarities are disrupted.

Thus, the steam engine had an immediate positive impact on output and productivity in textiles because until the 1830s its application was largely limited to textiles and a few other activities like pumping water from coal mines that did not require widespread reorganization of economic activity elsewhere in the economy. Similarly it had little tendency to depress productivity growth in the short run because it did little to disrupt existing technological complementarities, such as they were. In contrast, electricity and the internal combustion engine required much more widespread adaptations before their positive impact on productivity could be felt (see Ristuccia and Solomou 2014). Networks of roads and transmission lines had to be built. Urban geography had to be redrawn and a wide range of economic activities had to be relocated. Factory production had to be systematically reorganized. In the meantime existing technological complementarities were disrupted. These facts are invoked to explain why productivity growth in the United States lagged from the 1890s to the 1920s, only by which time much of this adaptation had finally taken place.

Here some observers will point to the fact that productivity growth in the United States has been disappointing in recent years as having positive implications for the future. A wide variety of connected activities and sectors like health care, education, industrial research, and finance are being disrupted by the latest wave of new technologies. Even while expensive investments are being sunk, existing technological complementarities are being disturbed. As a result, productivity growth has tended to disappoint. But once a broad range of adaptations is complete, productivity growth will accelerate. The current slow rate of productivity growth is, in this view, a harbinger of better things to come.

Again, this is not a prediction but a suggestion to look to the range of adaptation required in response to the current wave of innovations when seeking to interpret our slow rate of productivity growth and when pondering our future.

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