

United States

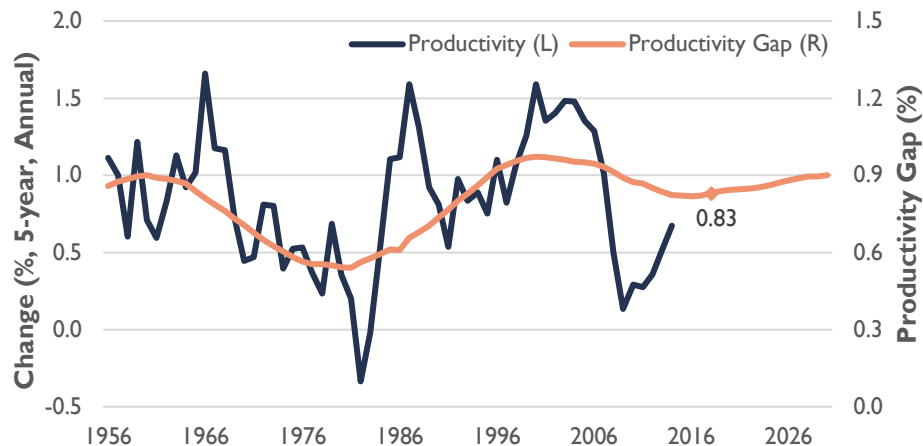
The Productivity Gap



- Growth rates will accelerate modestly as the Producers have an increasing impact on productivity.
- Inflation may remain constrained as productivity moderates increasing demand.
- Interest rates levels will not approach the prior cycle highs as lower population growth lowers the natural growth rate, and thus the expected interest rate.
- Equity markets will benefit from increased productivity of the workforce, particularly those that deliver domestic services.
- The US will enjoy relative terms of trade advantages versus Europe and Japan and would be US dollar bullish.

The story of growth is productivity. Doing more with less. Before one can do more with less, one must learn. Thus, with experience comes productivity, particularly in a service-based economy. It is not a surprise that the proportion of experienced people in the workforce, particularly the 35-50-year cohort, provides a good description of productivity growth. If this is the case, then stories of secular decline are premature.

Exhibit I. US Total Factor Productivity and the Productivity Gap



Source: Penn World Table, Department of Health Services, Federal Reserve Economic Database, CRM calculations

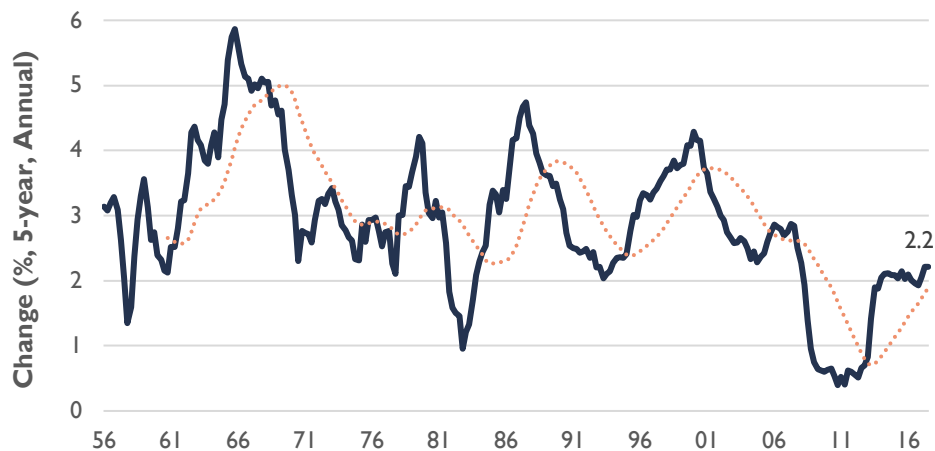
These implications come with the time-worn caveats of economics: the past is not prelude, and everything else is held constant. Notwithstanding these caveats, demographic trends are unalterable forces that are only put asunder during a time of war. Barring that ominous outcome, it seems the most probable course for the US is modestly accelerating productivity.

Growing Pains

The growth rate for the US has declined and is evident in the data (Exhibit 2). Annual growth in GDP for the US averaged 1.5% since the end of 2006, less than half of the 3.3% average for the 50 years preceding this period. Indeed, a decline in birth rate, an indirect component of GDP growth, should slow the growth, which is an outcome that Japan knows well. Even though population growth is not necessarily a determinant of slower growth (Pritchett, 1996), the fear for the US is that the aging workforce will contribute less to growth, while technology will not provide the boost of the past. Future growth does appear destined to slow when viewed through this lens.

Exhibit 2. US Real GDP Growth

US growth slowed over the last two decades...



Source: Federal Reserve Economic Database

... while Chinese growth accelerated.

In contrast, China is enjoying significant GDP growth while it's population growth rate slows. The significant difference is productivity in China, whose GDP per capita is one third the level of the US. Indeed, China has room to increase productivity to the level of the US and will continue to move their workers up the productivity spectrum towards the plateau that the US achieved. This process does not, however, explain *slower US growth*.

Labor versus Capital

The story of growth is the battle between capital and labor...

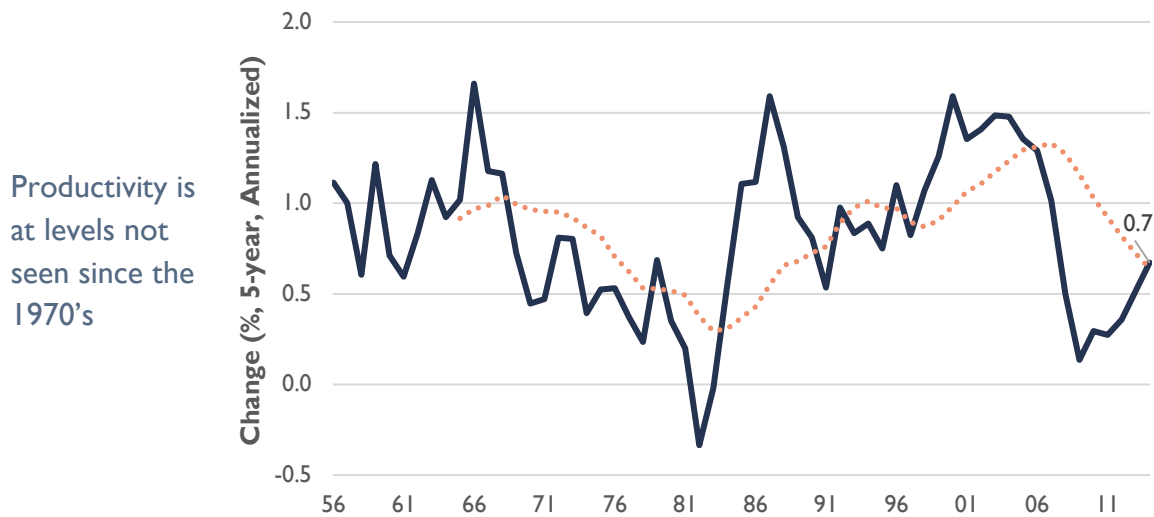
Labor and capital struggled perpetually since the dawn of humanity. A club, sword, or the barrel of a gun usually settled these battles. Those who needed (or wanted) more capital, tried to take it through the application of their labor in various militaristic means. From serfdom to the industrial revolution, the battle became less a direct application of force to a more nuanced form of subjugation via the trading of labor for wages. Through this exchange, a person could indeed enrich themselves with more work or increased productivity. As time is a finite resource, the incentive for the worker is to become more productive so that they might enjoy more time to dispose of the hard-won income. This conflict provides the color for the past 200 years of productivity growth in the developed world.

As most of the Western World foraged headlong into the industrial and the information revolutions, the rest of the world wallowed in self-inflicted seclusion from the benefits to world trade and industrialization as they explored varying forms of government. No starker contrast can be made than the free-wheeling capitalism of the United States to that of the isolationist Communism of post-war China. One led the economic world for decades, while the other slept.

...and who receives the rewards of higher productivity.

The US enjoyed a post-World War II boost in growth that peaked in the mid-1960's. This growth boost was followed by a relatively benign period of slower growth in the 1970's, while periods of higher growth appeared in the later 1980's and 1990's. Higher productivity accompanied these periods of higher growth (Exhibit 3). The challenge for the US is that it has reached a period of slower population growth *and* slower productivity growth. Even with a bounce back in the rate from a recession-induced low, the rate is still only at a level not seen since the 1970's, a period of materially below-trend productivity growth. There are not any inherent reasons why productivity should slow in a large economy that is knowledge-based. In fact, knowledge may expand marginal productivity thus reinforcing a countries position (Romer, 1986).

Exhibit 3. US Total Factor Productivity



Source: Penn World Table, Federal Reserve Economic Database

The Productivity Problem

The problem is that productivity is self-limiting. After a certain level of development, productivity gains slow, and more modest growth expectations arrive. Increased productivity comes from the application of new manufacturing techniques, improved global trade, and the efficient management of information. The US enjoyed the benefits of all three, while China has only recently started to reap the benefits of the first two. The world now encompasses a global supply chain that is managed in real time and deploys capital most efficiently, irrespective of the final market.

...and slowed at the same time that population growth slowed.

The challenge is what happens when an advanced economy reaches its natural limits (e.g. the US), and then a new economy is introduced with significantly more labor, but inferior productivity (e.g. China)? Adam Smith long ago provided the insight into the benefits of trade that still stands: produce the good where it is more efficient, and thus an economy can “import” productivity growth from abroad. The secular change that is occurring in the world today is a combination of the relentless application of technology to a supremely efficient global manufacturing process and an open global trade system that now encompasses materially more labor from the inclusion of China.

The watershed moment for global trade was the entry of China into the World Trade Organization in 2001. The event changed world trade. With a dramatically lower cost of labor and access to an efficient global transportation system, the global productivity gains are self-evident. The US, the world's

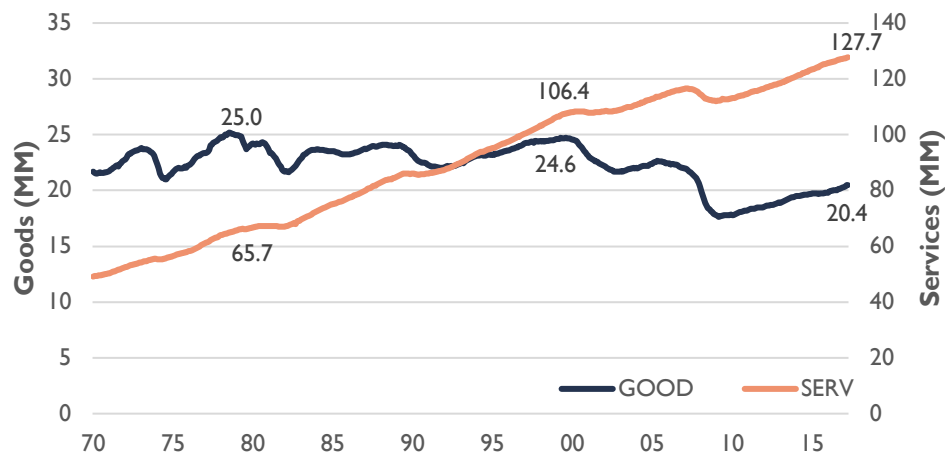
China entered the WTO in 2001...

economic leader, availed itself to the new source of cheap labor, but at a cost. While the gains to trade are well documented (Feenstra, 2016, pp. 25-50), the implication on labor policy is not as well understood.

The US provides a clear case of the impact of free trade in goods and capital: a free market will seek the lowest cost of production in tradable goods. Since 2001, the Service sector has continued its ascent in the US, but the Goods-producing sector has yielded to economic forces and reduced the number employed by over 4 million people (Exhibit 4). This loss of jobs has not reduced the value of production: goods production *increased by \$1.6 trillion* during the same period. Do more with less, indeed.

Exhibit 4. US Employment by Goods and Service Sectors

...and then US jobs in the Goods sector fell by 4 million.



Source: Federal Reserve Economic Database

Herein is the paradox of productivity: capital is insensitive to the social contract. An unconstrained global capital market and a domestically constrained labor market ensures that labor bears the sacrifice. The bifurcation is abundantly clear: if the good or service is tradable it will be produced most efficiently anywhere in the world, while services that involve geographic proximity or regulatory constraints are, for the most part, insensitive. Thus, US consumers may revel in the decreasing prices of tradable goods, but find their employ exported to more capital friendly environs.

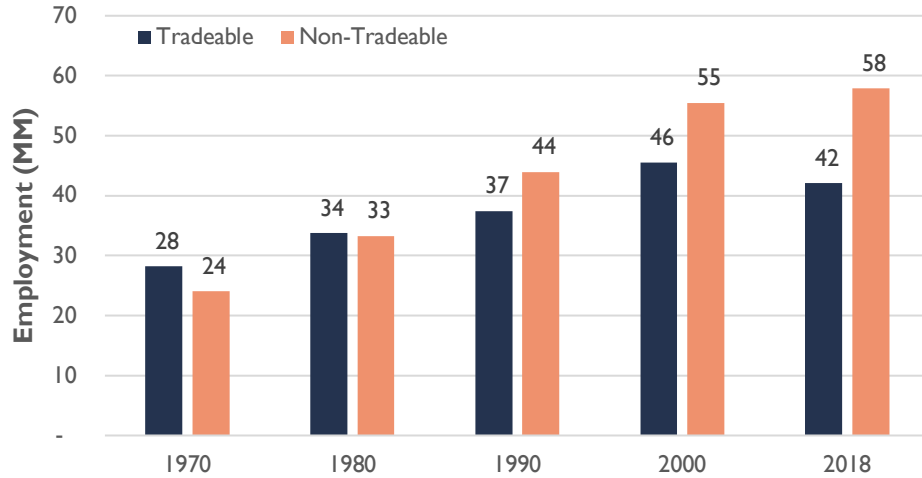
Changing Jobs

In the last 18 years, the tradable goods sector lost 4 million jobs while the non-tradable goods sector has similar gain (Exhibit 5). Tradable goods and services include the manufacturing of products and services that involve information technology, finance, and professional services. Conversely, non-tradable goods

are location or regulation centered, and includes infrastructure, education and health service, hospitality, leisure, and wholesale trade.¹

Exhibit 5. US Employment by Tradable and Non-Tradable Sectors

Most of the jobs lost are in the 'tradable' goods sectors.

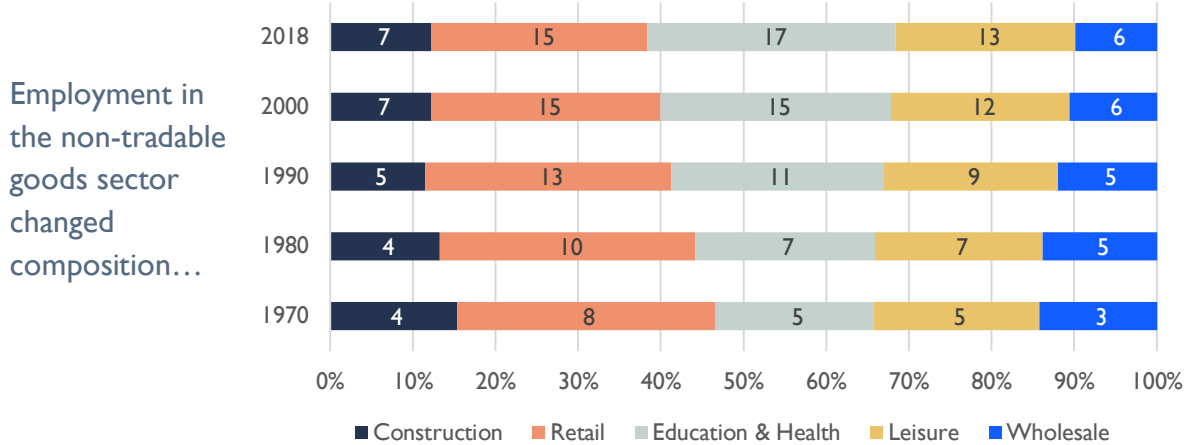


Source: Federal Reserve Economic Database

The composition of non-tradable employment migrated over the last two decades, even as each type of job gained in number. Education, Health Services, and Leisure enjoyed significant gains on a relative basis, while construction and wholesale trade decreased (Exhibit 6). This outcome reflects the changing demographic profile that requires more health services, as well as the inclination of the wealthy to avail themselves to more leisurely activities. Interestingly, retail and construction employment has not enjoyed growth since 2000, an outcome that reflects the changes in technology and consumer behavior.

¹ Government employment is excluded to make the comparison clearer. Government employment as a proportion of the workforce declined over the period.

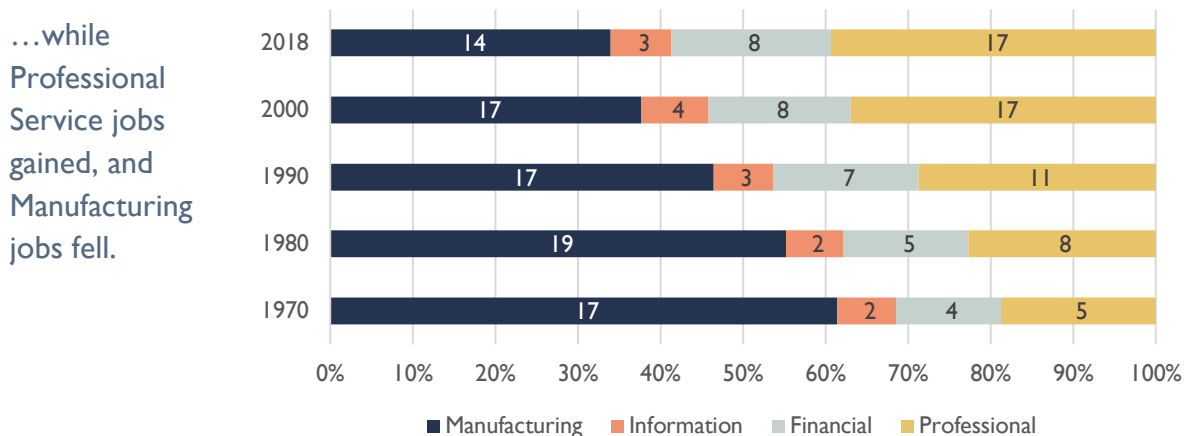
Exhibit 6. US Employment in Non-Tradable Goods & Services



Source: Federal Reserve Economic Database

In the tradable goods & services sector, the change of composition is stark: professional service has increased its share while the other three industries have decreased in percentage. In particular, Information Technology and Financial Services have reduced their relative proportion in the tradable goods services. This outcome is the result of the two forces mentioned: increasing technology enables information management companies to do more with less and rising global trade via the implementation of global real-time communication networks, allows the location of the service anywhere in the world. The result is that services that are highly dependent on information management can be placed anywhere, while professional services because of the degree of labor friction caused by regulation and licensing are more resistant to global transition.

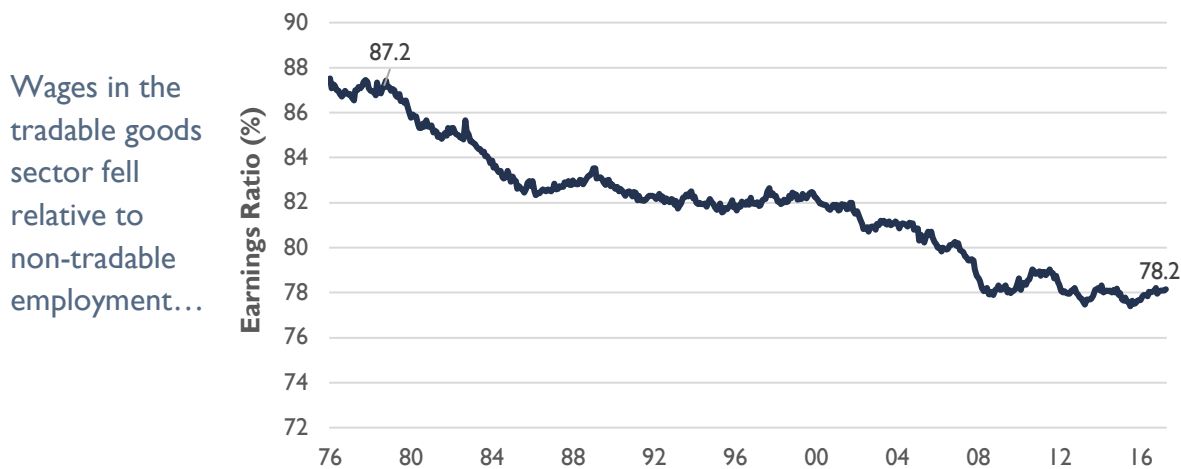
Exhibit 7. US Employment in Tradable Goods & Services



Source: Federal Reserve Economic Database

The result of the changing employment composition presages the bifurcation that is occurring in the US economy: one side is the high-value-added service sector, and the other the low-value service sector serving the needs of the other. Whereas manufacturing jobs once were stable, high paying jobs with low education requirements, the excess labor in this sector are transitioning into high-touch, low-value service. The more depressed wages for this employment is evident in Exhibit 8. While the aristocracy may no longer have an in-house maid, butler, and chauffeur, they are increasingly receiving service similar in the application when they dine, dry clean, taxi, and relax: someone is serving them.

Exhibit 8. US Average Hourly Earnings (Tradable/Non-Tradable)



Source: Federal Reserve Economic Database

...and has little prospects of reversing with labor-force participation low.

The implications for this secular transition are readily apparent. Global firms increasingly rely on the dual engines of trade and technology to deliver returns to capital at the expense of increasing labor redundancy in the domestic US market. The result of this both virtuous and virulent cycle is that labor gains will be significant for those that are non-tradable but will increasingly become under pressure for the tradable goods sector. The implication is muted for overall inflation, as the primary driver of inflation, wage demands, is non-existent (Exhibit 9). Reinforcing this outcome is the prime-age labor force participation rate, which remains 2% or 3 million people below the prior peak.

Exhibit 9. US CPI and Average Hourly Earnings



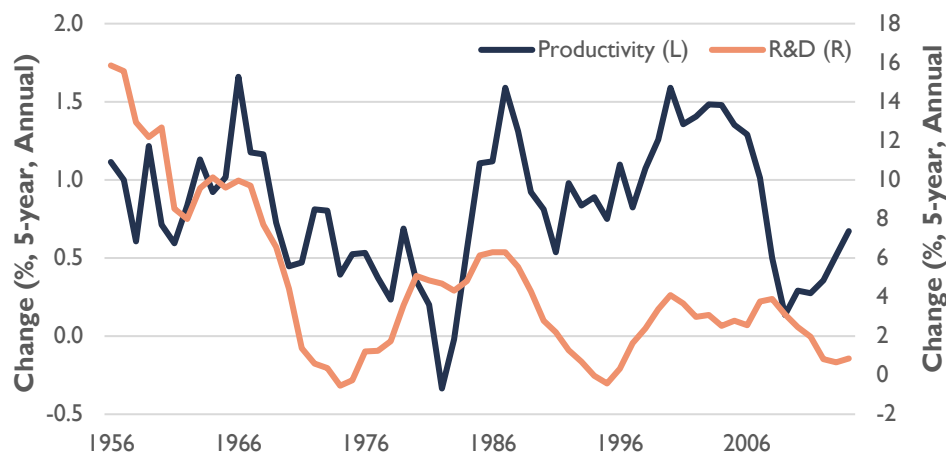
Constrained labor wages have kept inflation in check...

Source: Federal Reserve Economic Database

The Productivity Paradox

The United States has not lacked for deployment of capital, particularly in research & development, which is a proxy for investment in productivity-enhancing technology. The rate of growth in research & development has fluctuated around a 3% annual growth rate for most of the last 50 years (Exhibit 10). Of note, there is no clear relationship between productivity and research & development. The peak and troughs in the growth rate of research & development are asynchronous with the growth rate of productivity. At times it leads productivity, while at other times it lags.

Exhibit 10. US Productivity and Research & Development

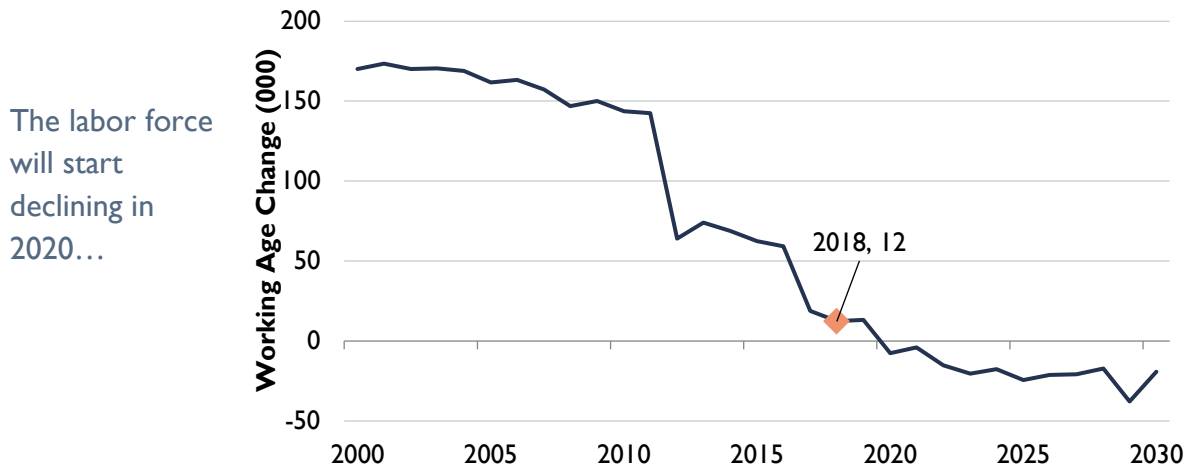


...while productivity is slow despite investing in research and development.

Source: Penn World Table, Federal Reserve Economic Database

This problem with productivity is that it is a critical element for future growth prospects in the US, especially when the population growth rate is at an all-time low level of 0.7% versus an average over the last 67 years of 1.05%.² This is particularly worrisome when projecting the future labor force growth (Exhibit 11), which is expected to turn *negative* in 2020.

Exhibit 11. United States Workforce Growth



Source: US Department of Health Services, CRM (adjusted for mortality and immigration)

Demographics provide another insight, this time into productivity. As every parent knows full well, the young are confident of their ability to do any task, even those that require years of experience. As every child knows, irrespective of their age, every parent is hopelessly behind the times in technology. Dividing the workforce into three age cohorts to reflect this framework results in age groups of 20 and 35; 36 and 50, and 51 and 65. Broadly, this reflects people with lower productivity who are still learning their craft (the “Learners”); people who have a combination of experience and technological adaptability (the “Producers”), and those with stable productivity that are settled in their ways (the “Maintainers”).

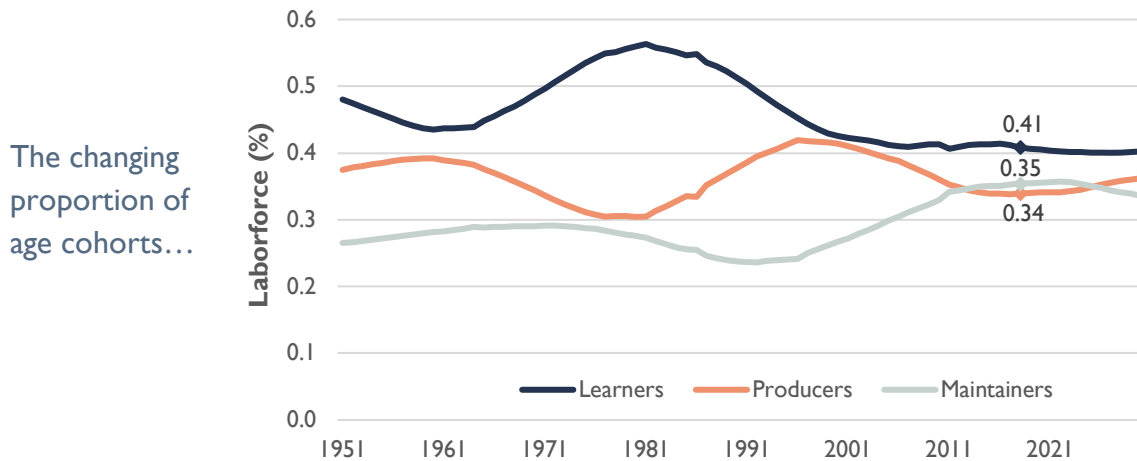
...but ‘The Producers’ may offset the decline.

In this framework (see: Feyrer, 2007 for a global analysis.), productivity is affected by the proportion of each of these groups relative to the whole. For example, too many Learners with insufficient experience would drag on productivity, while productivity would increase as the Producers gain dominance. The Maintainers are not expected to impact productivity materially. A visual inspection of the trends shows how each cohort has varied over the last 67 years (Exhibit 12). The Learners dominated the 1970’s, while

² Population growth rate is used rather than birth rate because it accounts for mortality and immigration patterns. For reference, the parallel birth rate numbers are 1.24% and 1.58%. Source: Federal Reserve Economic Database.

the Producers dominated the 1990's. The current balance is towards the Learners and the Maintainers, a net result that should reflect lower productivity.

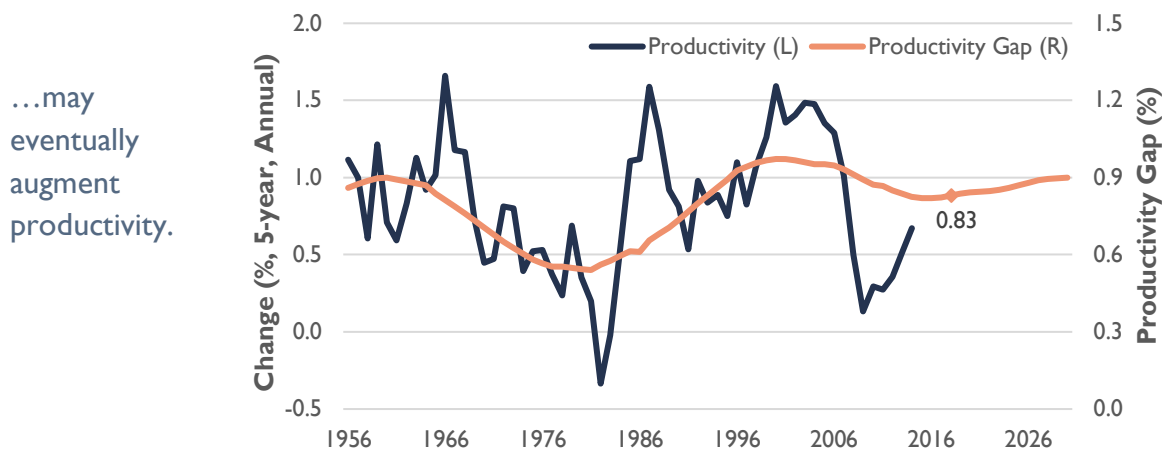
Exhibit 12. United States Labor Force by Age Cohort



Source: US Department of Health Services, CRM

The relevant age cohorts are the Learners and the Producers, since the impact of the Maintainers is considered neutral. Thus, understanding the relative proportion of each age cohort in the workforce can help to understand the impact on productivity, and hence future growth. A “Productivity Gap” is created with the ratio of the proportion of Learners to Producers. The relevance of age cohorts to productivity is vividly displayed in Exhibit 13. As Learners dominate the workforce productivity slows, while an increasing prominence of Producers leads to higher productivity.

Exhibit 13. United States Productivity and Productivity Gap



Source: Penn World Table, Department of Health Services, Federal Reserve Economic Database, CRM calculations

The Productivity Gap is currently in a unique territory, where the Maintainers are dominating the Producers. The challenge is whether the neutral impact of productivity of the Maintainers persists. If not, the expected boost of the Producers will not appear. While you may not be able to teach an old dog new tricks, the Greatest Generation may have the final say in the matter.

Conclusion

Growth will accelerate modestly...

The story of growth is productivity. Doing more with less. Before one can do more with less, one must learn. Thus, with experience, comes productivity, particularly in a service-based economy. It is not a surprise that the proportion of experienced people in the workforce, particularly the 35-50-year cohort, provides a good description of productivity growth. Armed with this insight from demographics and productivity, the implications for the future seem straightforward.

...while constraining inflation and interest rates...

- Growth rates will accelerate modestly as the Producers have an increasing impact on productivity.
- Inflation is constrained as productivity moderates increasing demand.
- Interest rates levels will not approach the prior cycle highs as lower population growth lowers the natural growth rate, and thus the expected interest rate.

...and supporting equities.

- Equity markets will benefit from increased productivity of the workforce, particularly those that deliver domestic services.
- The US will enjoy a relative terms of trade advantage versus Europe and Japan would be US dollar bullish.

These implications come with the time-worn caveats of economics: the past is not prelude, and everything else is held constant. Notwithstanding these caveats, demographic trends are an unalterable force that is only put asunder during a time of war. Barring that ominous outcome, it seems the most probable course for the US is modestly accelerating productivity.

Many caveats, but this time is probably *not* different.

While this time is probably not different from the past regarding the degree of technology saturation and its impact on productivity, the safer bet is upwards, not downwards. As any seven-year-old will show you, elementary programming of a robot is not complicated, nor is placing special effects on YouTube's videos. The first will save you time, while the second will entertain you during your newly found free time. The remaining challenge for society is ensuring that all have access to the technology, which is a story for another time.

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