



VAULT

A Demographic Decline

One of the most important and yet widely ignored factors in economic growth is demographics.

The French philosopher Auguste Comte, knew what he was talking about when he said: “demography is destiny”. I’m going to show you why this is, what really drove the last 100 years of exceptional global economic growth, and then lay out why the next 100 years is going to look nothing like the last.

We’re then going to talk about how this is already significantly impacting the global economy and markets; from shifting consumer preferences for goods and services to financial assets. And then we’ll finish with a little known tax law that’s going to result in a growing wave of equity supply over the next 10-years.

Let’s start with the basic equation for economic growth.

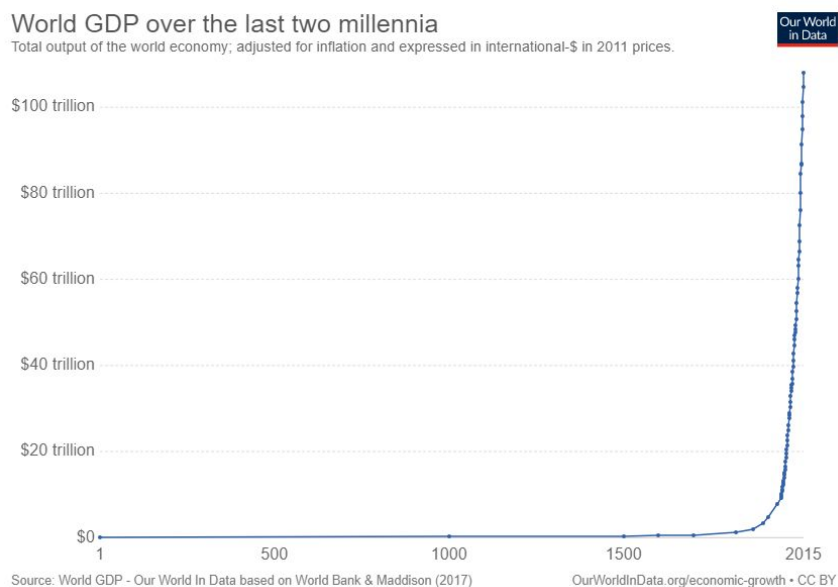
$$\text{Number of Workers} \times \text{Total Productivity}$$

That’s it.

Over the very long run, it’s just these two factors that drive all economic growth.

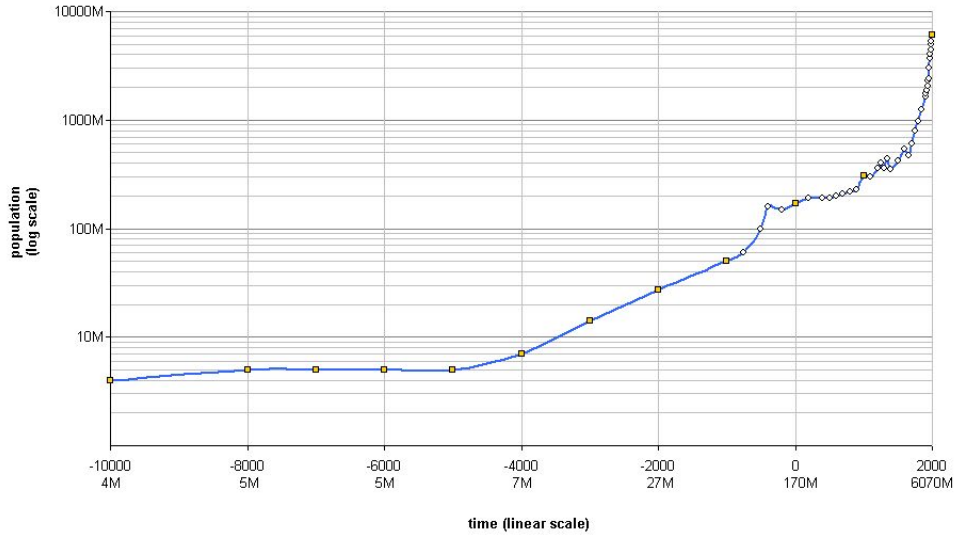
The more workers there are the more creators, makers, service providers there are in an economy. That means more laborers creating value and conversely creating demand. Productivity is essentially the steady build-up of knowledge (advancements in our technology and know-how) that drives efficiency gains over time. Combine the two and you have all the ingredients that make up economic growth.

Now take a look at this (ignore the obvious chart crimes being committed for now). The chart shows world GDP over the last two millennia. I’ve seen many point to this parabolic rise as proof that our recent technological advances are driving an explosion in economic growth, one that’s likely to continue. They take Moore’s Law, apply it across the board, and extrapolate into the future.



But now let me show you another chart.

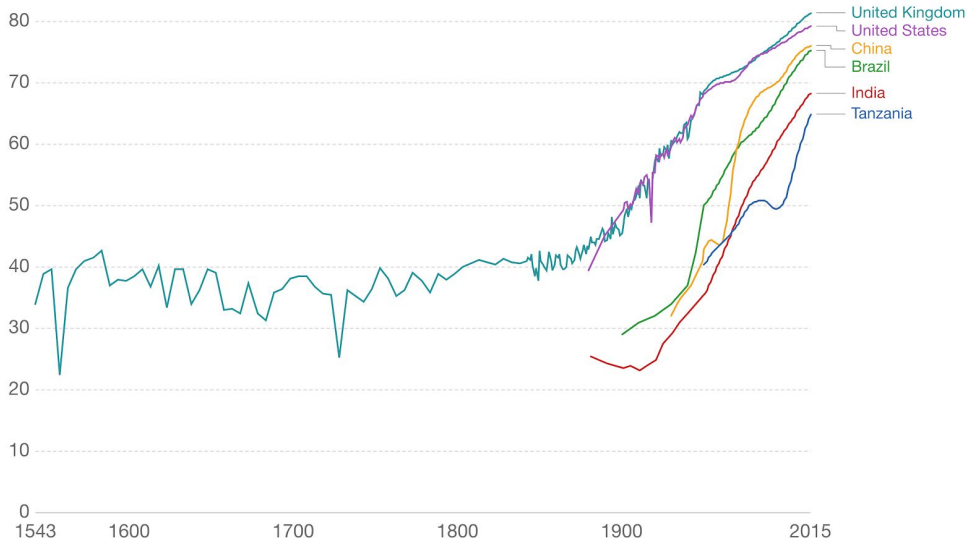
This one is of a log scale of the world's population over the last 12,000 years. Notice how something interesting happens around 150-years ago that causes the population to hockey-stick upwards and begin to rise exponentially?



Well, this population “explosion” was driven by two developments (1) The discovery of “Germ Theory” in the late 19th century, which literally led to doctors learning the importance of washing their hands before surgery and (2) the advent of antibiotics in 1928. These two developments drastically lowered the mortality rate which led to global life expectancy quickly doubling for the first time in human history.

Life expectancy

Shown is period life expectancy at birth. This corresponds to an estimate of the average number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life



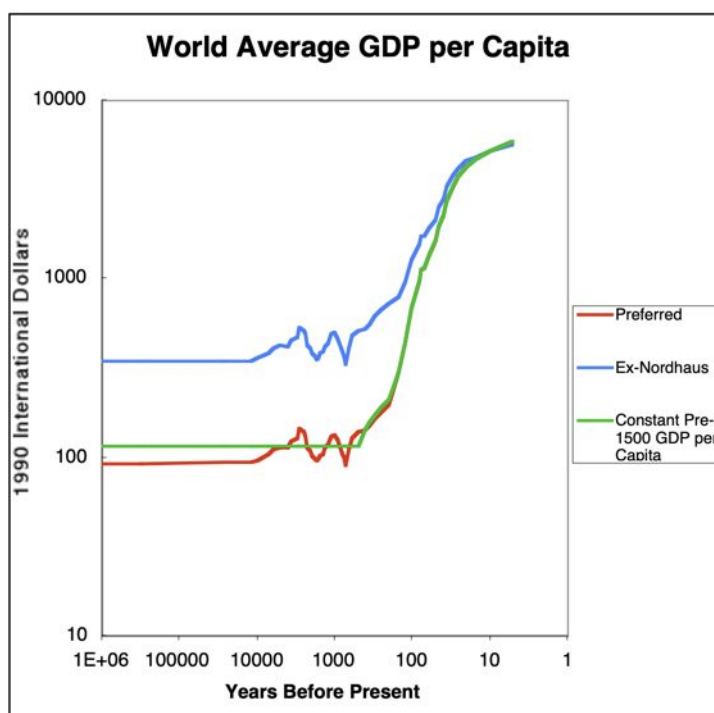
Source: Clio-Infra estimates until 1949; UN Population Division from 1950 to 2015

OurWorldInData.org/life-expectancy • CC BY

Longer lifespans meant more people having more babies. This kicked off the exponential growth in the world's population that began roughly 150-years ago.

This is exactly around the time that global GDP turned parabolic.

So now take a look at this chart which shows world GDP per capita since the start of human civilization. Unlike the first GDP chart which commits the chart crime of graphing exponential growth on a linear scale. This one is logarithmic and you can more clearly see how economic growth progressed before pivoting straight around the turn of the 20th century and finally tapering off over the last 15-years (more on that in a bit).



This isn't surprising.

We know that demographics are one of the two critical ingredients for economic growth. In 1900 the global labor force (working population age = 15-64) was somewhere in the neighborhood of a billion people. **By 2000, that number had quintupled to 5 billion people.** The explosion in the world's labor force is the primary driver behind why the 20th century saw the most rapid economic growth in human history.

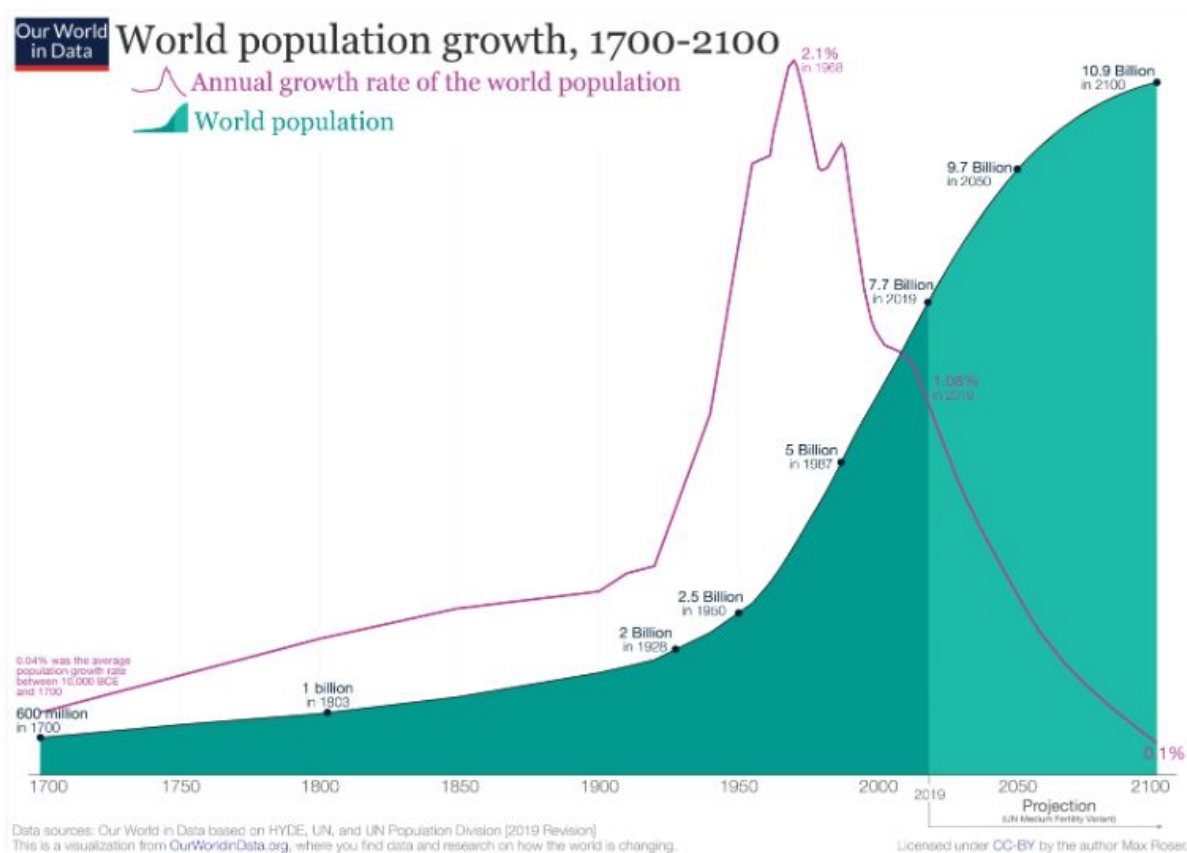
Since we're investors and we don't make money from trading off economic growth that happened in the past, **we have to look to the future and ask ourselves are we likely to repeat this historical outlier of economic growth?**

And the short answer to that question is a fat resounding... NO.

Why?

Because the once in human history demographic impulse that was spawned by a sudden drop in the mortality rate has already rolled over and is now falling about as fast as it climbed on the way up. This means that the force that was such an incredibly powerful economic tailwind for the last 100-years is now all that... but in reverse.

The chart below shows what's taking place. The annual population growth rate peaked at 2.1% in 1968. It's now at 1%. The UN projects it will hit zero — in other words, the global population will peak — in the next 80-years. Also, the UN has consistently *underestimated* the slowdown in global population trends, so there's a good chance growth this forecast is too optimistic.



It's important to note that when looking at growth, it's the rate of change and not the absolute number that matters. Yes, the global population will continue to expand for the next 50-100 years. But it will do so at a much slower pace and the demographic makeup of that growth is increasingly comprised of old people living longer rather than new kids being born.

We are already close to 'peak child' which is a term coined by Hans Rosling to mark the first moment in human history at which the number of children in the world stops increasing.

Remember how I pointed out that **in the previous 100-years we saw a quintupling — that's a 500% rise — in the world's labor force? Well, over the next 100-years it's going to climb by a meager 20%.**

There are a number of other one-time demographic/Total Factor Productivity impulses that have rolled over as well and will no longer be positively contributing to economic growth.

They're a bit wonky so we won't go too much into them here but things like the "Mankiw Extension" which is basically the huge improvement in child education over the last 150-years along with an improved matching function of labor in bringing more women into the workforce ([see research by Cesare Marchetti](#)).

All the juice has been squeezed from these positive trends and now we're seeing their benefits to the growth rate fade...

When you understand all this, which I now hope you do, the confusion over all the "Secular Stagnation" talk that everybody is struggling with, suddenly isn't all that confusing. It actually makes perfect sense. Of course, the global economy is trapped in a low growth, low inflation environment. The only factors in the economic equation say that **MUST** be the case.

Check out these key findings from a presentation given recently at the Berkeley [Forum on Aging and the Global Economy](#) (emphasis by me).

Expansion of the working age population has been a powerful engine of the global economy in recent decades, with the resulting demographic "tailwinds" accounting for 48% of annual economic growth from 1990-2015.

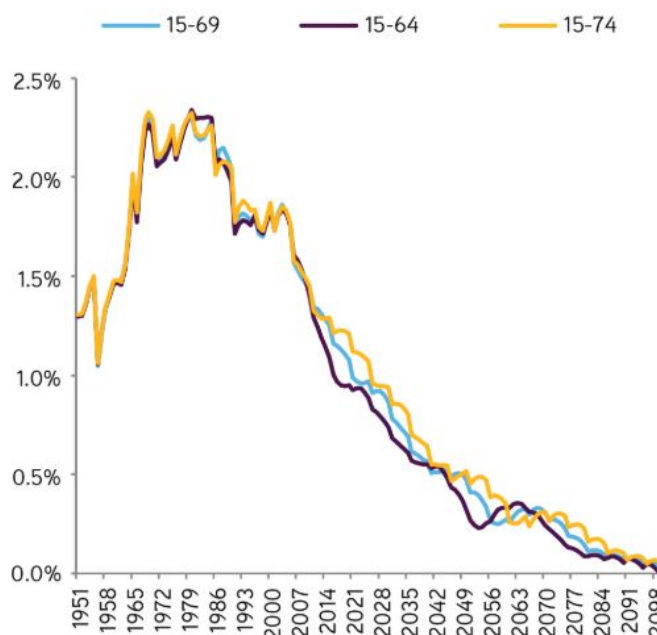
These tailwinds will slow, however, as the global population ages 20-64 will grow less than half as fast from 2015-2040 as compared to the prior 25 years, while the age 65+ population will grow five times faster than the working age population.

We predict that slowing population growth and rapid aging of the population in the United States and other leading economies around the globe will cause global demographic tailwinds to be only 31% as strong in the 2015-2040 period as compared to 1990-2015. Tailwinds that added 1.3% per year to global economic growth during 1990-2015 will drop to only 0.4% per year from 2015-2040.

...We find that in 2040 the global economy is projected to be 20% smaller than if we had ignored the upcoming changes in the rate of population growth and aging between 1990-2015... The most dramatic difference is in China: we project a Chinese economy in 2040 that will be 41% smaller than under naive backward-looking projections that ignore the effects of China's slowing population growth and rapid aging.

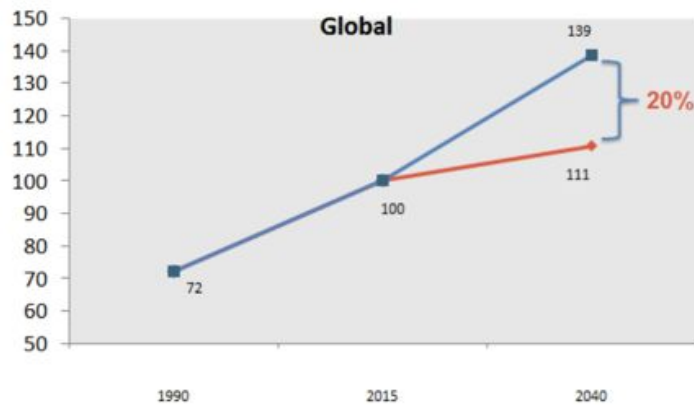
Working Age Population Growth Rates Are Declining, Which Has Implications for Economic Growth

Global Working Age Population Growth Scenarios, Y/y%



Note: The above analysis depicts the growth rate of the global working age population under three definitions: 15-69, 15-64 and 15-74. In all cases, growth in the size of the global working age population will continue to slow in coming decades. Data as at June 23, 2017. Source: United Nations, Haver Analytics.

Figure 5: Difference in Size of Economy under Historical and Projected Population Trends (2015=100)



China is so screwed and they don't even know it yet...

Take a look at various global GDP forecasts and they project economic growth to hold steady at around 3.5%+ over the next decade.

These forecasts are not factoring in at all this massive secular shift that's occurring in our labor force demographics. Barring all other factors such as deleveraging and deglobalization, **this demographic turning point alone will lower the average real global GDP growth rate by close to 2% a year — 2%** doesn't seem like a big deal, but compound that out over just three decades and you get... actually, see for yourself ([link](#)).

Aggregate demand is shifting structurally lower. This means real global GDP growth of sub 2% is going to be a part of our new economic reality going forward.

For a system that is predicated on rapid and ongoing economic growth (ie, you NEED the growth to pay off the debt), this change is going to have long-lasting and wide-ranging repercussions... Ones will require a total reorg'ing of how we think about and conduct our economies (chart via KKR).

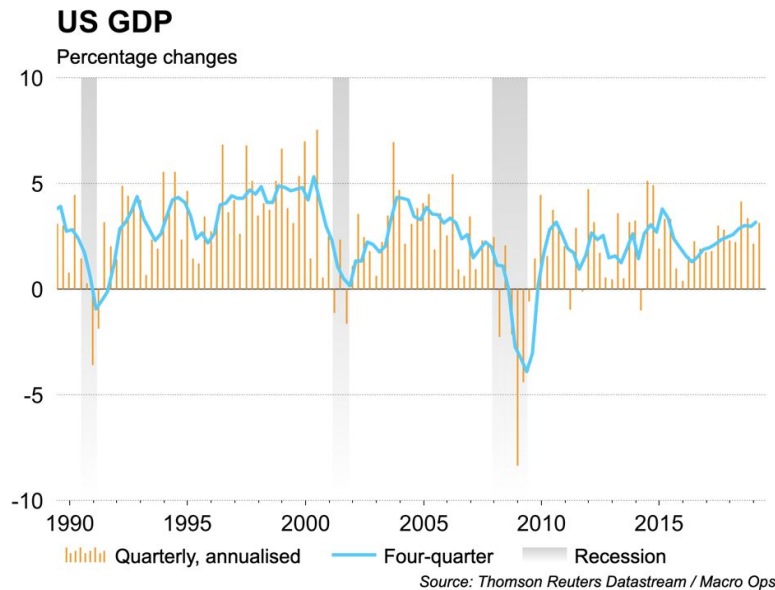
EXHIBIT 7

Holding Productivity Constant, Demographics Alone Will Pressure GDP Growth to Slow



Data as at June 23, 2017. Source: United Nations, Haver Analytics.

This growth has been so stubbornly low. Look at the tiny bump we saw in GDP following a trillion dollar tax cut and a \$300mn boost in fiscal spending in 17/18¹. Growth jumped a whopping 1.5% and is already rolling over — I project GDP growth to fall even further to around 1.5% within the next 12-months and stay there until the next recession or round of US/China fiscal stimulus.



And again, this is only going to accelerate as more boomers retire and drop out of the labor force. Studies have shown that **retirees consume 35% less than those in their working years.**

Consumption not only decreases but their preferences change dramatically as well. No longer are they in the market for things, especially the big-ticket items that make for a dynamic economy such as bigger houses and new cars. Instead, most of their consumption goes to services. Things like healthcare.

This is a persistent structural deflationary force. **If you think 2% nominal yields on the 10-year are crazy then just wait... Barring an introduction of new major fiscal/monetary policy experiments (which is increasingly possible), we're following right in Japan's footsteps. The zero bound is acting as an irresistible attractive force for the entire yield curve.**

This report was written in early 2019