

BLUEPRINT FOR THINKING ABOUT THE FUTURE

Are you tired of thinking about the economy in terms of interest rates, bond yields, exchange rates, quantitative easing, central bank action, fiscal or monetary stimulus, credit growth, inflation, deflation, infrastructure spending, consumption, investment, etc?

The financial media and research is full of these discussions and commentaries but truth be told, has any of it been helpful in thinking about long term trends?

In this essay, I shall outline a different way to think about the economy, one that is, in my opinion, more useful for taking long term views.

WHAT IS AN ECONOMY?

This is an interesting question because I believe most people who talk about all those things in the first paragraph will actually struggle to answer.

The way I see it, an economy can be described in one word – TRANSACTIONS. The following illustrates this point.

Kim, Yamada and Chen are subsistence farmers living in SomewhereLand. They catch their own fish, rear their own chickens and grow their own vegetables. There are no trade transactions between them and the GDP of SomewhereLand is therefore zero.

One day, they decide to specialise. Kim will only rear chickens. Yamada only catches fish and Chen only grows vegetables. They trade with one another to buy what they don't produce. With these transactions, SomewhereLand now has a functioning economy.

Let's parachute Ronald into this. Ronald has no productive skills. But he's a great clown and knows how to give everyone a rip-roaring time. After a hard day's work, Kim, Yamada and Chen all need some entertainment and Ronald, provides this in exchange for some fish, chicken and vegetables. The economy has now grown further.

When Kim's child grows up, the Kim family splits into 2 specialties – rearing chickens for meat and eggs. Likewise, Yamada's family eventually splits into catching fish and crustaceans. The Chen family now has vegetables and fruits as separate specialties.

This is the very essence of economic growth. More players, with ever more specialised skillsets, all increasingly transacting with one another.

WHAT MAKES AN ECONOMY GROW?

If an economy is all about transactions between its constituents, obviously to grow the economy you must increase the number &/or value of those transactions.

The simplest way is to increase the number of people. More people lead to more transactions.

The more difficult but far more potent way is to increase the level of specialisation.

The most active portion is the working age population aged 15-64. Below 15, they are mostly children who are not producing units of the economy. Above 64, they are mostly retirees – a category that is largely not producing units of the economy and not big consumption factors either. Hence, what matters to the trend of transactions is the working age population.

As for specialisation, the key is education. The more highly educated the population, the probability of deeper levels of specialisation. Just as the Kim family divided into chickens-for-meat and chickens-for-eggs, so too will transactions increase in a population with ever deeper levels of specialisation.

When you reduce an economy to these two elements – working age population and education – you immediately see that all those things that people usually talk about are simply the grease to help these two basic elements work.

We thus come to the shocking conclusion that all the financial press talks about is the grease. It almost never talks about the engine pistons themselves – working age population and specialisation.

MORE ON SPECIALISATION

Working age population is easy to understand and measure. Specialisation is more subjective.

We can obviously measure the percentage of the population that reaches tertiary education. However, this is only part of the picture.

Beyond this, there is another piece of the puzzle - the absolute number of young people entering the workforce. Compared to their elders, young people are more creative, take more risks and are more willing to try new things. New specialisations are far more likely to be invented by young people than the old.

So, the dynamism of an economy won't just be about how educated the young people are but whether their numbers are increasing or decreasing.

If the number of young people is falling, better education can mitigate this problem to a certain extent. However, if the number of young people falls too fast, even better education may not be enough to preserve the overall dynamism of the population.

THE TEMPLATE

There are 3 trends to consider if you want to assess the long-term dynamism of an economy.

- working age population
- number of young people (my yardstick of choice is the number of 20-year olds)
- number that reach college level education

This of course assumes that other hygiene factors are already present e.g. infrastructure, regulation, justice, intellectual property protection, transparency, etc. If a country succeeds in mass availability of college education, this bundle of hygiene factors will mobilize this resource to produce the ever-increasing specialization that drives transactions and therefore, growth.

With this template, we can now proceed to look at selected countries.

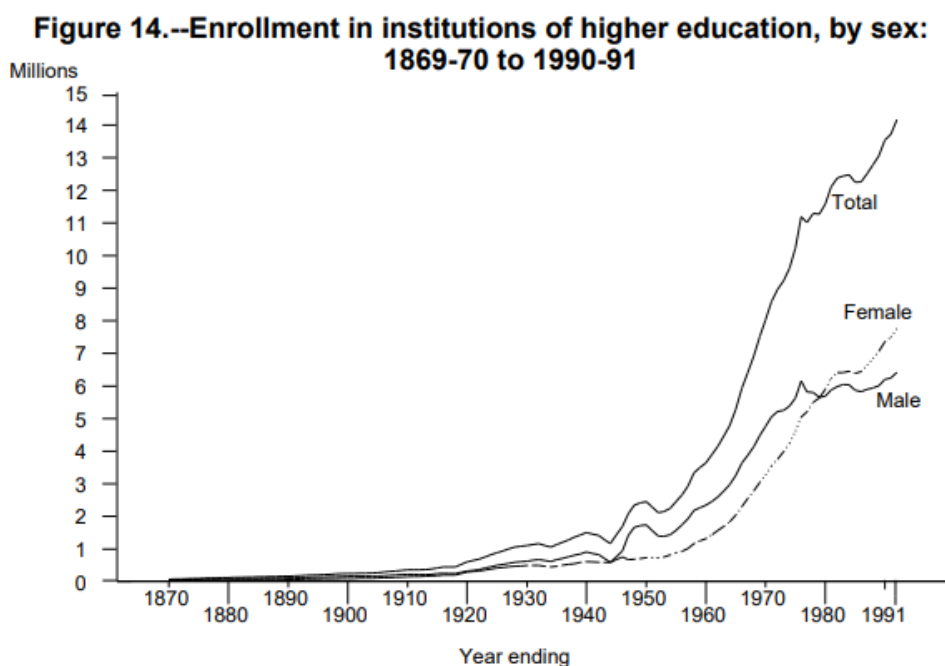
COLLEGE EDUCATION IMPACT ON USA

What is generally not well recognized is the fact that mass tertiary education in the USA is a post-WW2 phenomenon. Before the war, fewer than 1.5 million Americans were enrolled in institutions of higher education. In 1940, a mere 186,5000 Americans graduated with bachelor's degrees.

In 1950, college enrolment was still below 15% - even for the most privileged social class, white males – and only 432,000 earned their bachelor's degrees that year.

By 1975, college enrolment had more than doubled past 30%. If all forms of post high school education are included, tertiary education enrolment would be over 50%. 923,000 were awarded bachelor's degrees – the figure of around 1 million per year stands until this day.

You can see the massive spike from the end of WW2 to 1980 in the next chart.



Source: U.S. Department of Commerce, Bureau of the Census, *Historical Statistics of the United States, Colonial Times to 1970*; and U.S. Department of Education, National Center for Education Statistics, *Digest of Education Statistics*, various issues.

As college level education was embraced by the masses instead of a narrow elite, there was an explosion of innovation and technological advancement. Today, 88% of Americans receive some form of tertiary education. The idea that the US is undisputed world leader in the advancement of human knowledge has its roots in this great investment in human capital since the 1950s.

COLLEGE EDUCATION IMPACT ON CHINA

The image of the super-bright, ultra-hardworking Chinese college student is so ingrained in most people's minds that it's hard to comprehend how new even the idea of a Chinese college student is.

China's Cultural Revolution completely destroyed the education system such that the number of students enrolled in post-secondary education went from 674,400 in 1967 to 47,800 in 1976.

Just think about it. China's population was 931 million in 1976, one quarter of humanity. And amongst this multitude, fewer than 50,000 were studying in college.

A period of rebuilding happened after the Cultural Revolution. By 1986, tertiary education enrolment rate had risen to 3% - corresponding to just 3 million people. Even as recently as 2000, fewer than 8% were enrolled in tertiary education – that year only about 1 million graduated with bachelor's degrees.

But starting from the 1990s, the Chinese government had begun a massive investment in the nation's education system, especially for post-secondary institutions. From 2000 to 2010, the number of higher education institutions in China increased by 120%.

By 2007, nearly 7 million were graduating from college. Today, over 8 million do and the numbers are still rising. Total tertiary institution enrolment was is now over 38 million compared with fewer than 33 million in 2012.

There is still much room for even higher levels of human capital development. China's tertiary enrolment rate is still only 51%. There is every possibility that it can reach the 70-80% levels seen in the US.

But even at 51%, graduating numbers is 2.5x that of the US. When it rises further, we will see it at triple or even quadruple.

The transformation to the Chinese economy will be on a scale that is beyond imagination. Having already produced more than 100 million bachelor's degree holders in the past 12 years, it will produce another 100 million within the next decade.

This enormous human capital is already reaping rewards. Chinese publications of academic papers and patent applications are already fast catching up with the US and in some arenas, overtaken it already.

And they are still young. The oldest graduate from the past 12 years is only around mid-30s. His or her most productive years still lie ahead. Meanwhile, another 100 million are in the pipeline!

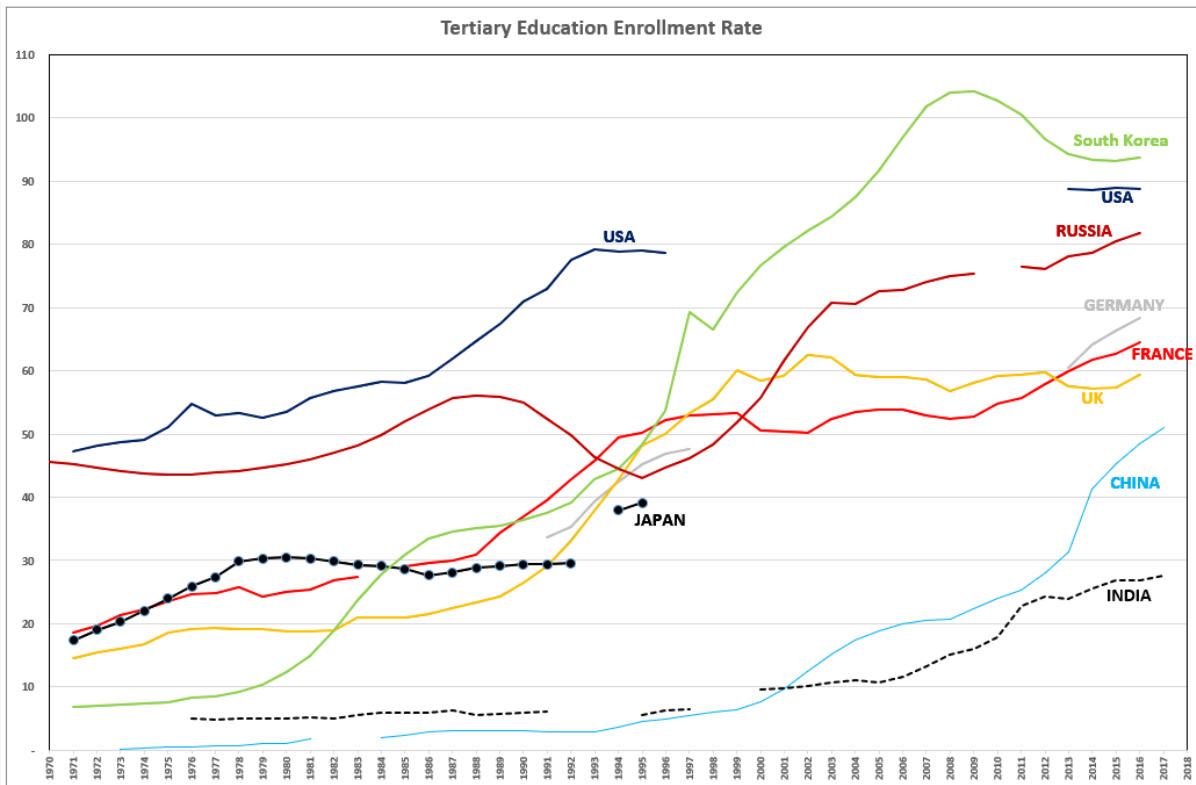
ZOOMING OUT BEYOND USA AND CHINA

UNESCO maintains statistics of tertiary education enrolment rate of different countries. It isn't complete but there is enough to help us understand what made some countries arrive at where they are now.

From the next chart, a clear story unfolds about various countries. Korea's tertiary education enrolment rate exceeded that of the US starting from the mid-1990s. This explains why it punches well above its weight in global economic matters.

Russia too has a high enrolment rate but as we know, the other hygiene factors aren't sufficient and the country's ability to harness this brainpower is sub-optimal.

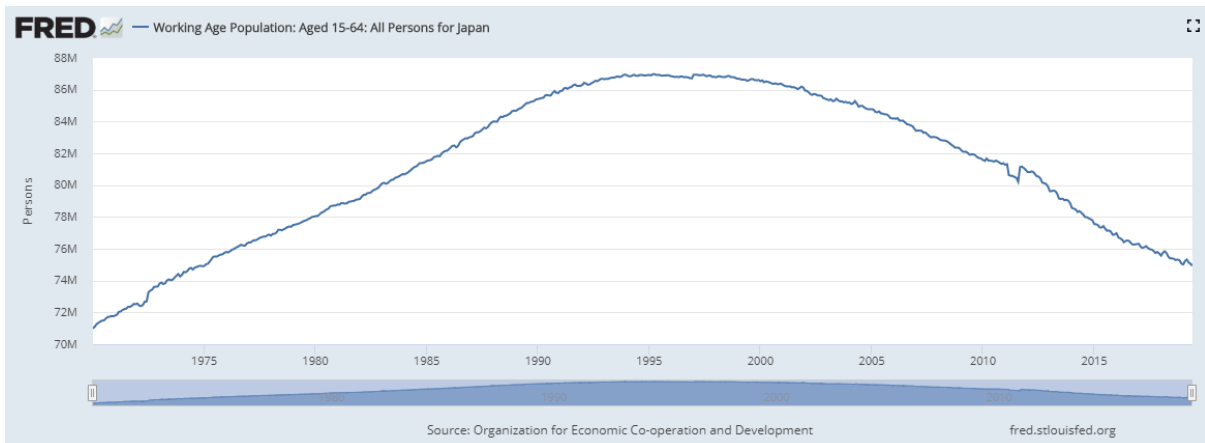
At under 30%, India still has a long way to go. The slope of its curve suggests that it is still not getting its act together on education when the population is considered as a whole.



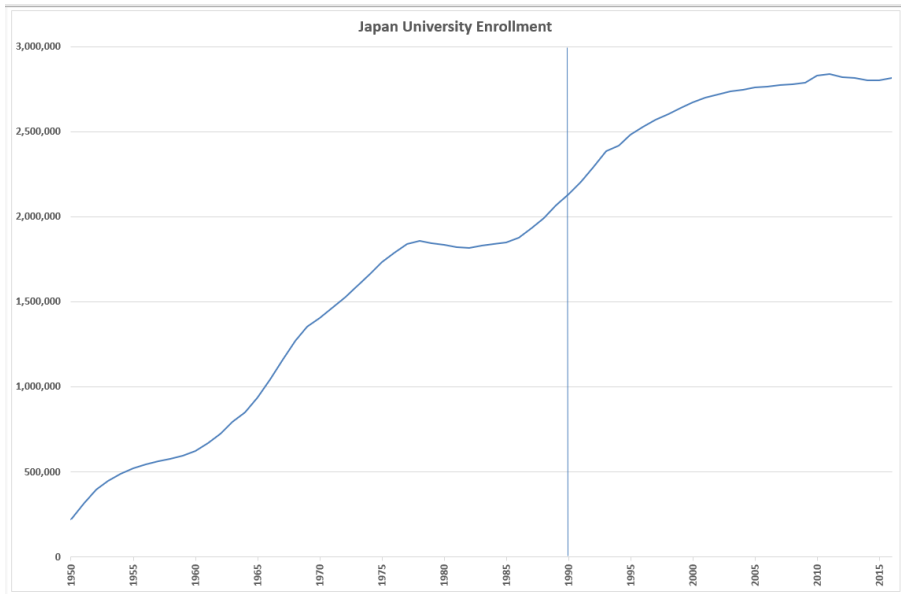
APPLYING THE TEMPLATE : JAPAN

The most recent baby peak in Japan was 1973. Over the subsequent 20 years, the number of babies born dropped by 43%. This means that from 1993 to 2013, the number of 20-year-old Japanese fell by 43%. In parallel, Japanese working age population peaked in 1995 (15-64 as defined and compiled by Federal Reserve Bank of St Louis) at around 87 million and fell 11% to 77.5 million in 2015.

It now becomes clear the demographic driver for Japan’s long period of stagnation.



However, Japanese enrolment in universities played a big role in mitigating the demographic decline. The chart below shows the massive rise in university enrolment after WW2 – an 8-fold increase from 1950 to the late 1980s. During the lost decade of 1990s and 2000s, even as the working age population and number of 20-year olds fell, the enrolment numbers continued to rise providing human capital factor that helped to mitigate the other two negative factors.

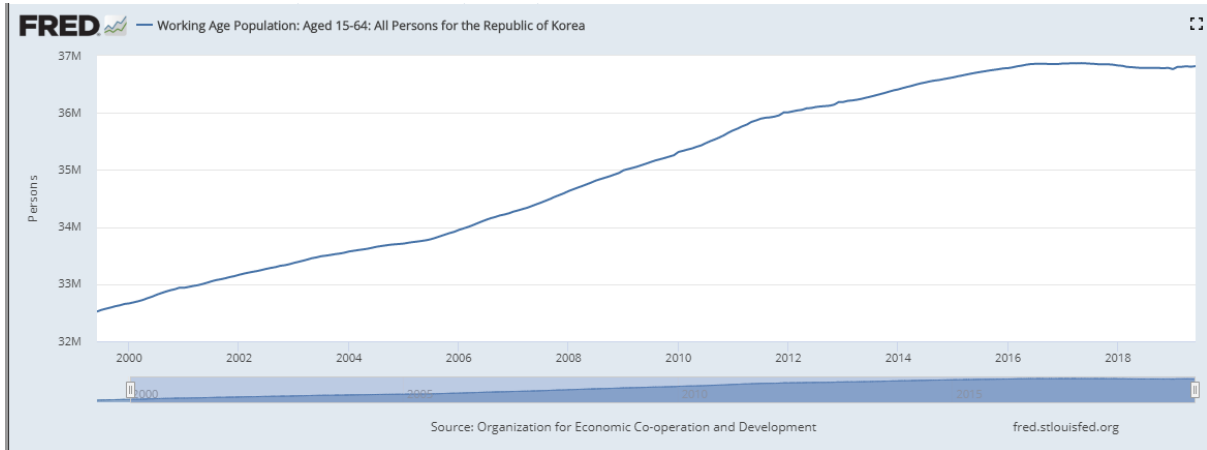


However, the future doesn't look good. Over the next 20 years, the number of 20-year olds will drop by another 24%. The working age population will continue shrinking - compared 2017, the Health, Labour and Welfare Ministry expects a fall of 7% to 2025 and a further 14% fall to 2040. With so few babies being born, college enrolment numbers will certainly begin falling as well.

All 3 "pistons" are weakening over the next 20 years.

APPLYING THE TEMPLATE : SOUTH KOREA

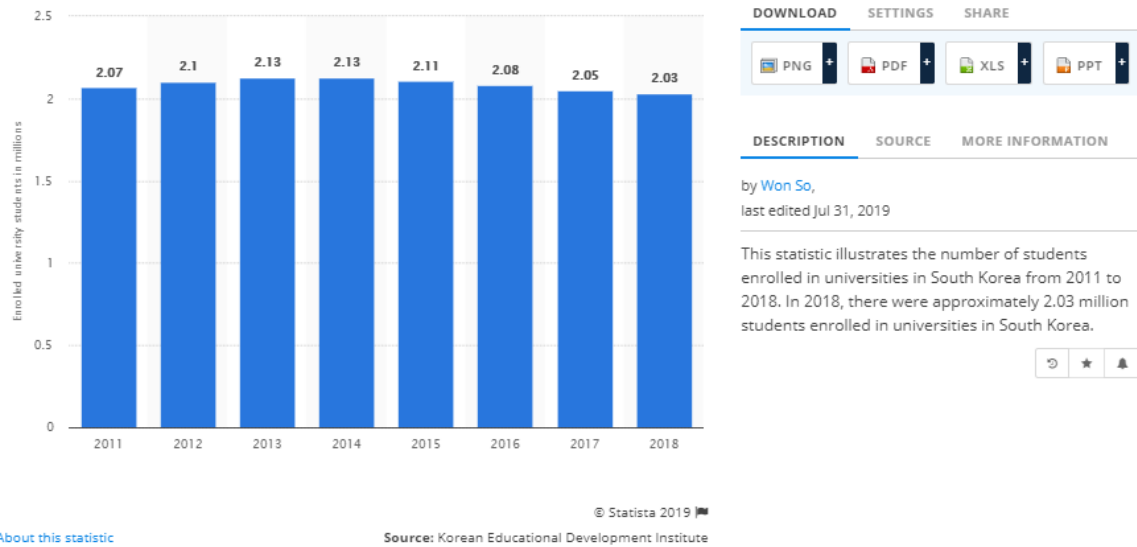
The next country to feel the force of declining demographics will be South Korea where working age population peaked in 2017. The chart looks remarkably like Japan's prior to 1995!



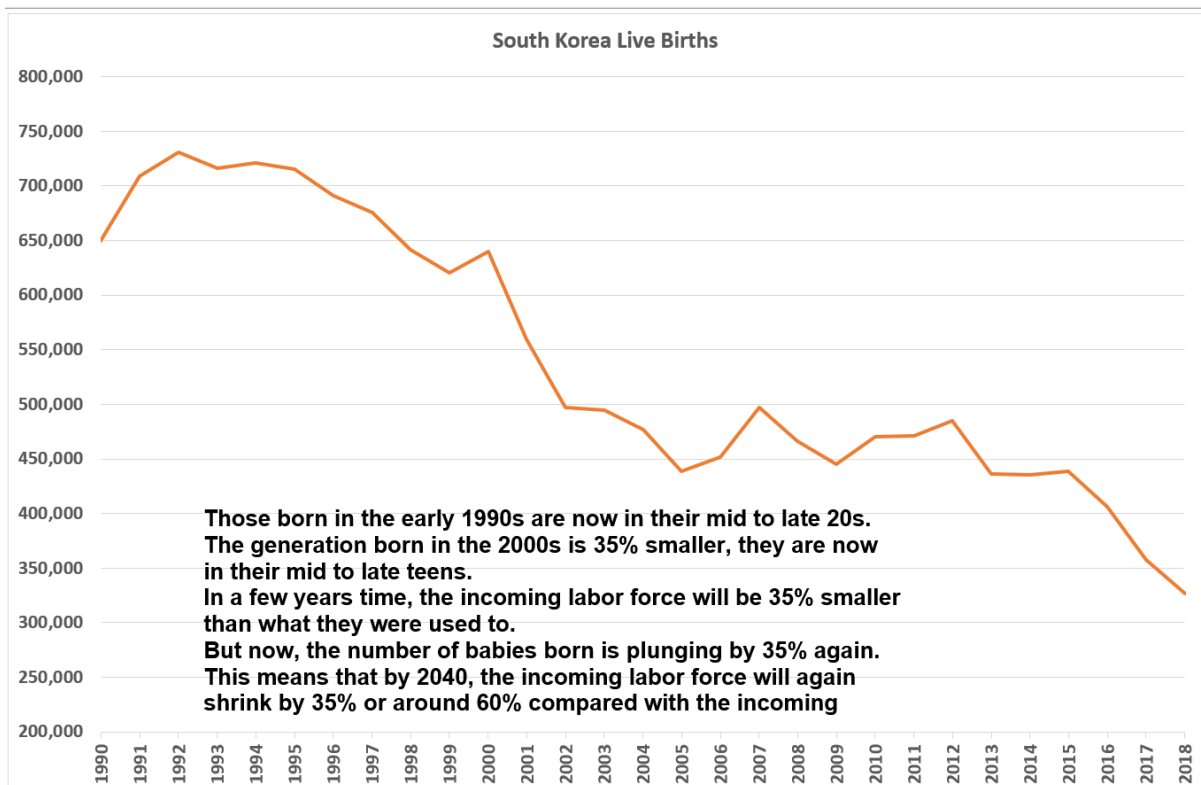
South Korean live births peaked in 1992, which means the number of 20-year olds peaked in 2012. By 2022, 20-year olds will fall by 32%. By 2037, 50%.

This demographic cliff will be compounded by falling numbers of enrolled students (both undergraduate and postgraduate) in South Korean universities, where the numbers peaked in 2013 at 2.13 million and has been falling since. It is down to 2.03 million as of 2018.

Number of enrolled students in universities in South Korea from 2011 to 2018 (in millions)



With tertiary enrolment rate of over 90% already, there is no possibility of offsetting the declining cohort sizes with higher rates of college enrolment rates. Koreans in tertiary education currently were born in the second half of the 1990s. From the chart below, it is clear that over the next 6-7 years, there will be a >25% fall in students enrolled in Korean universities.

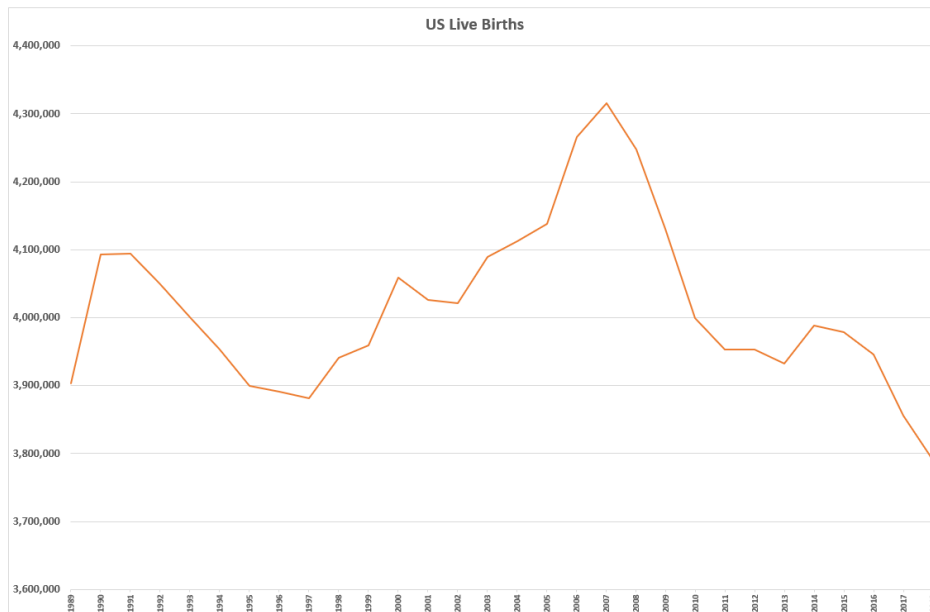


Far from the super dynamic economy it has been for the last 30 years, South Korea is headed for a period of unprecedented decline. With working age population falling as well as a collapse in the number of 20-year olds and tertiary education enrolment, all the basic “pistons” of the economic engine are failing catastrophically at the same time.

APPLYING THE TEMPLATE : USA

The data that I have examined suggests that the domestic US working age population could have already peaked in 2018. But this is mitigated by immigration as we shall see later.

In terms of live births, the peak was 2007. Since then, the number of babies has fallen 12%. Assuming there isn't any precipitous drop in live births over the next decade, the peak in 20-year olds will occur in 2027, followed by a decade of moderate decline.

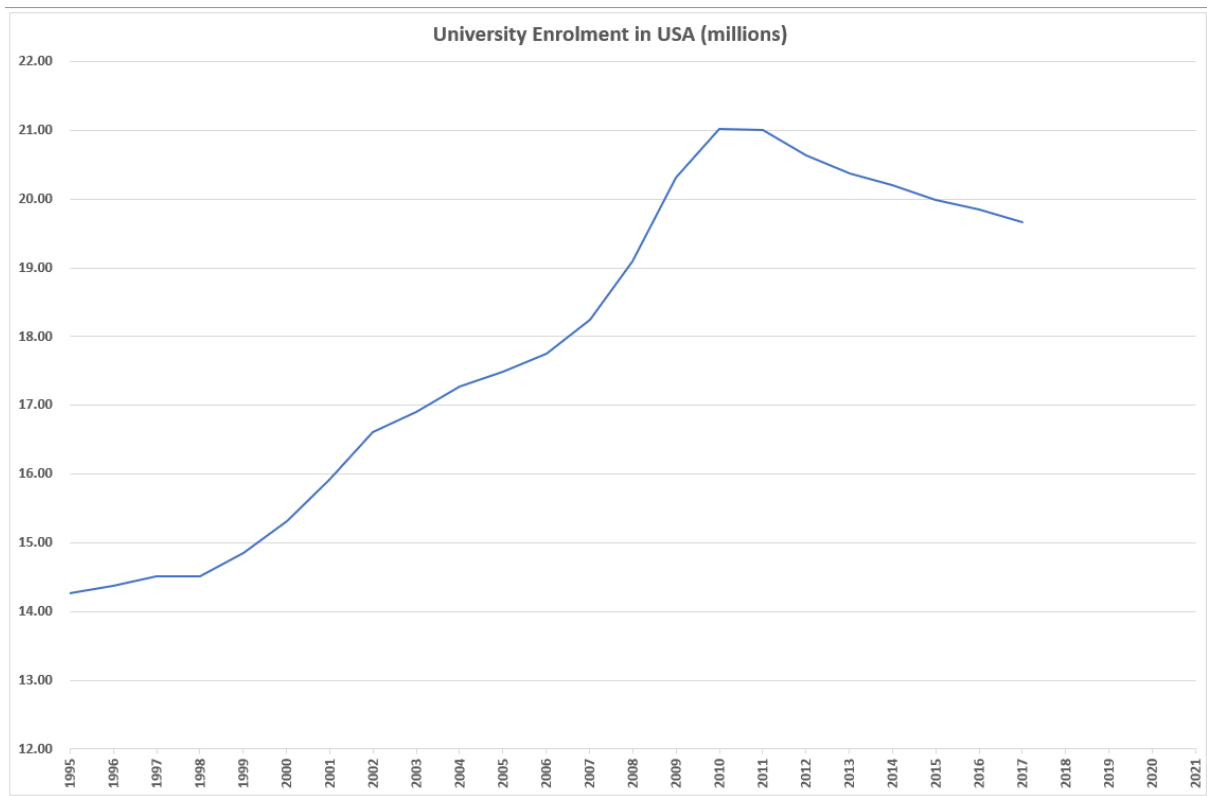


What this says is American demographic forces will tend to be plateauing but dual blow of declining working age population and collapsing numbers of 20-year olds will be more gradual.

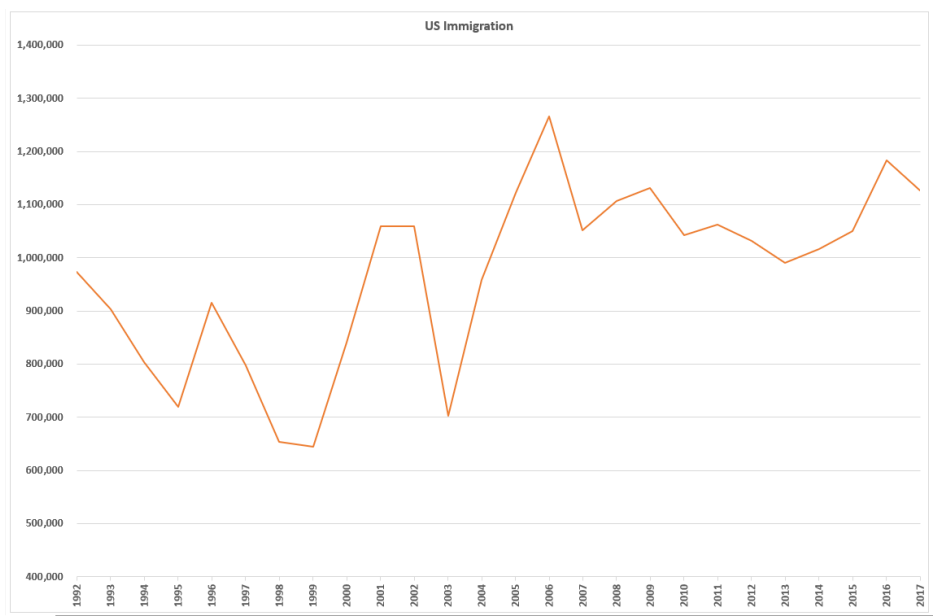
On the other hand, total US college enrolment peaked in 2010 at 21.02m and has been falling every year since. In 2017, it was down to 19.77m. Up until 2010, this figure had been rising – 2000 (15.31m), 1990 (13.81m), 1980 (12.1m). **If one excludes foreign students, the decline is from 20.30m in 2010 to 18.76m in 2017, a fall of 7.6% in just 7 years.**

If one considers only **full-time college enrolment**, the fall is even worse. Excluding foreign students, the numbers have **fallen by more than 10%** to just 11.25m in 2017 from a peak of 12.52m in 2010.

In other worse, for nearly a decade now, young Americans are becoming steadily LESS well-educated. When your society's investment in human capital declines, it can only be bad news.

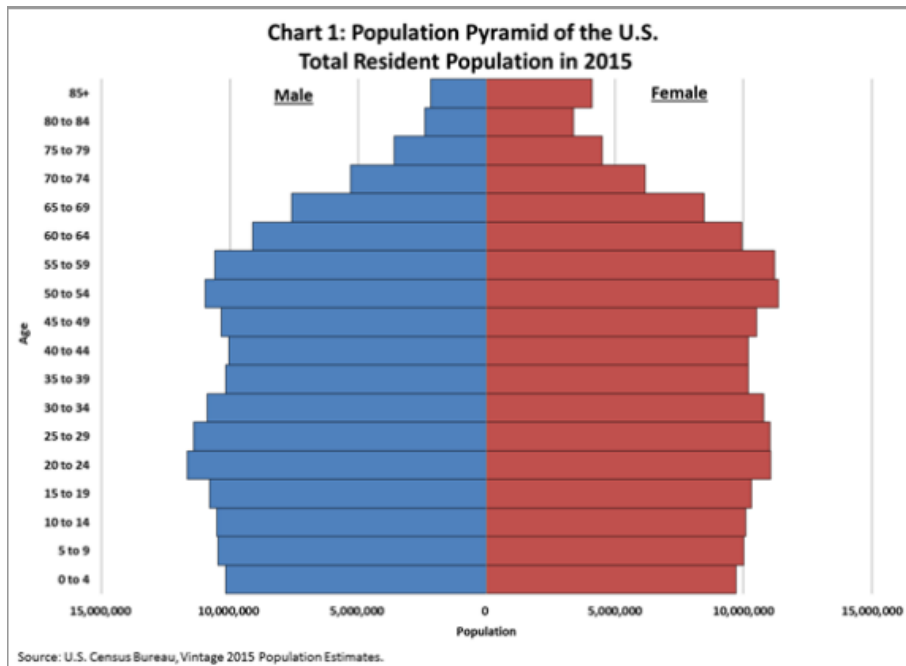


It is often argued that the USA accepts large numbers of immigrants and this will mitigate the negative demographic forces. From the chart below, it can be seen that during the Obama years, the rate of immigration was about 1.0-1.1 million per year. But since Trump took over, it has started to fall. Although I could not find 2018 data, it would come as no surprise to anyone that immigration has fallen further and will continue falling.

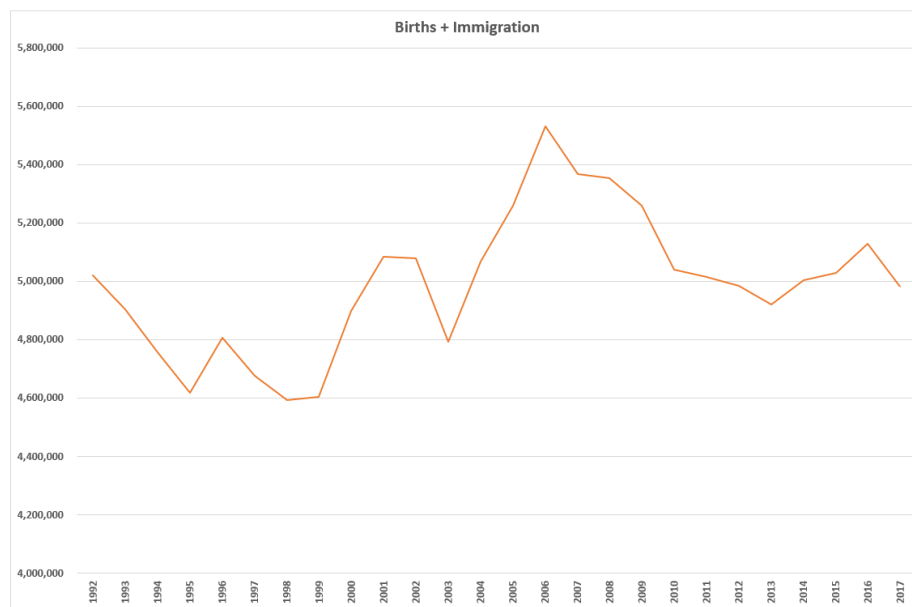


Immigration at current levels will more than mitigate the declining labour force problem. From the population pyramid below, over the next 10 years, the layers marked 50-54 and 55-59 will be aging out of the workforce – on average, each cohort is about 4.4 million in size. But incoming cohorts will be about 4.0 million. With immigration of 1 million, assuming all are working age, there will be a net

gain to labour force of 0.6m every year. This represents a gain to the working age population of about 0.3%, a usual feature for a developed country but not a dramatic positive.



The simplest perspective can be obtained by studying the sum of births and immigration, as seen on the next chart. If we think of this as an economic force, we can surmise that from 1998 to 2006, this was an accelerating force. But since then, it is a decelerating one and with the combination of falling births and a less immigrant friendly administration, the deceleration will worsen.



In summary, the outlook for US dynamism is entirely dependent on the level of immigration. Working age population will fall without adequate immigration. The number of 20-year olds will fall as well as the incoming workforce will be less and less well educated unless padded with college educated immigrants. The future of the US as a leader of economic dynamism has never been more dependent on foreigners at a time when the socio-political sentiment has never been more inward looking and protectionist.

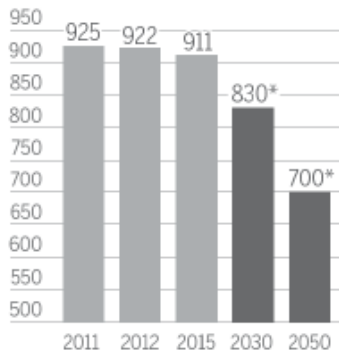
APPLYING THE TEMPLATE : CHINA

China's working age population already peaked in 2011. Over the next 10 years, it will fall by about 6% and then, another 16% over the subsequent 20 years.

Working-age population

Number of Chinese
16 to 59 years old

(Unit: million)



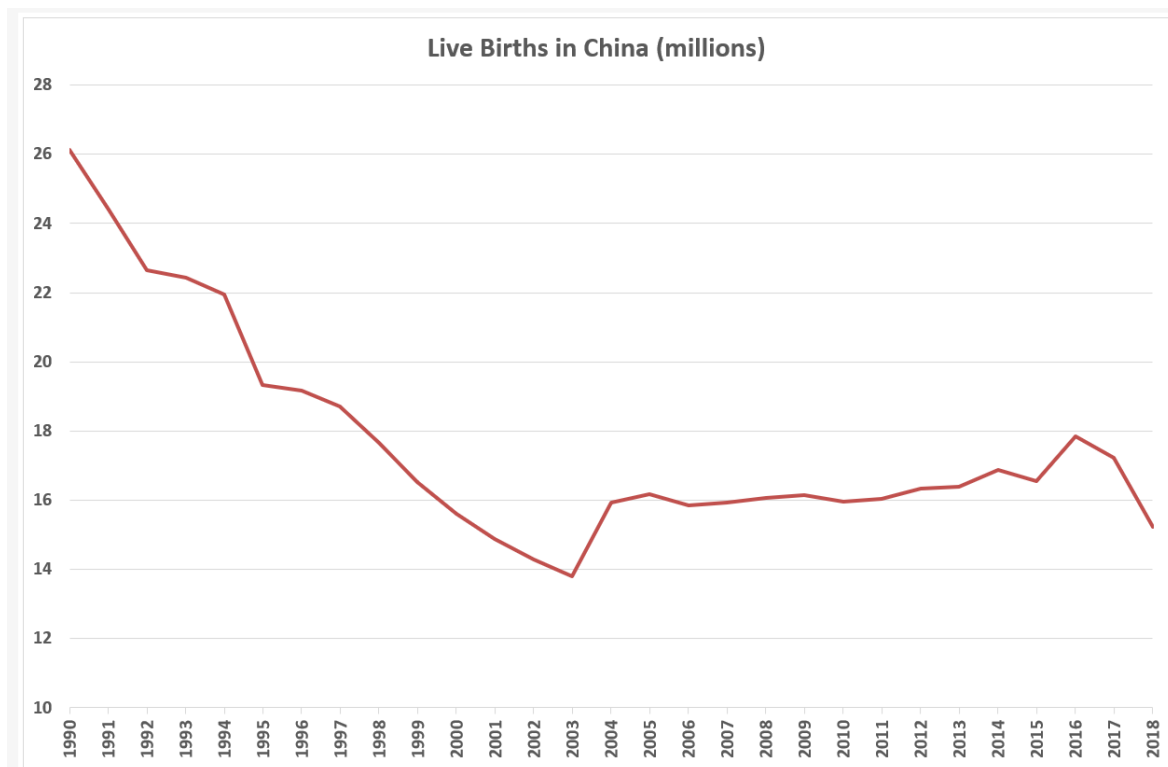
*Estimate

Note: Data for 2013 and 2014
not available

Source: National Bureau of Statistics and
Ministry of Human Resources and Social
Security

CHINA DAILY

The last peak in live births occurred in 1990. Over the next 10 years, it fell by 40%. This means the number of 20-year olds will fall by 40% from 2010 to 2020. But since 2000, the number of live births has stabilised at around the 15-16 million number.



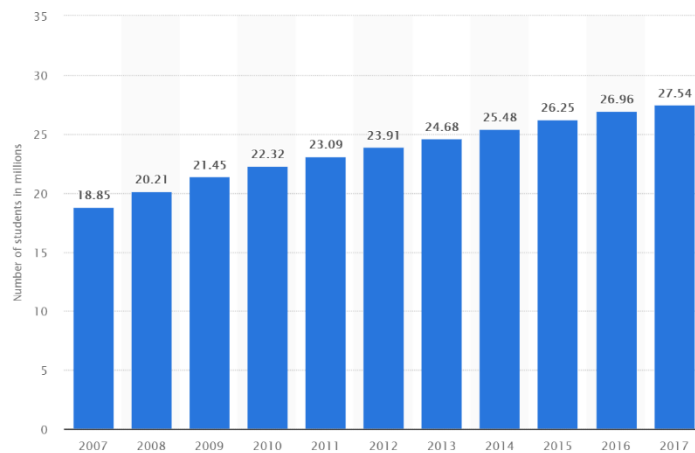
This means that China has ALREADY experienced the drop in 20-year olds and going forward, for the next 20 years, there won't be any dramatic fluctuation in the number of young people entering the workforce.

At the same time, China is beginning to reap the benefits of concerted investment in higher education by the state. This is described earlier under “COLLEGE EDUCATION IMPACT ON CHINA”.

Society > Education & Science > Number of students at universities in China up to 2017

PREMIUM +

Number of students at universities in China between 2007 and 2017 (in millions)



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DESCRIPTION SOURCE MORE INFORMATION

by Shu Han,
last edited Feb 5, 2019

The statistic shows the number of students at universities in China between 2007 and 2017. In 2017, the number of students at universities in China amounted to around 28 million, which increased from 27 million in the previous year.



China's economy is only just beginning to enjoy the fruits of this enormous investment in human capital. It will go a long way to mitigate the headwind from demographics.

To summarise China's prospects, 1 piston is weakening, 1 piston is stable, and 1 piston is strengthening.

Or another way to look at it, China's economic vigour as driven by the size of its labour force is already a spent force, its economic dynamism as driven by a tertiary educated workforce has only just begun.