

A Demographic View: Do not write off US GDP growth

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Demographically “Whither US GDP Growth over next 5-6 years?”

“Nature of macroeconomics has changed dramatically in the last seven years....concern is now focused on avoiding secular stagnation”, Larry Summers (24 Feb 2014 at the NABE Annual Policy Conference).

We provide a demographic framework based growth analysis assessing the growth debate regarding **where US economic growth is headed over the next 5-6 years?** Many experts are calling for a rebasing of growth expectations citing certain headwinds and structural impediments which will limit economic growth to levels below that observed over the last 4-5 decades. Others believe that the post-credit crisis has resulted in certain temporary cyclical weaknesses.

- We use a demographic factor based supply-side growth framework over 1950-2013 to assess the debate and provide scenario based evidence suggesting that higher growth or similar growth averages to the 1970s-1990s are possible.
- Our **2014-2019 projections** for a **very optimistic scenario** yield average growth of **3.2% p.a.** and that for a **moderately optimistic scenario** yield average growth of **2.9% p.a.** In fact the prospects for US GDP growth **may not be as bleak as many make them out to be** based on historical realizations of demographic components. The IMF projects a GDP growth range of 2.7% p.a. over 2014-2019 whereas the CBO projects 2.5% p.a. over 2014-2024.
- Our demographic focus is on “changing consumers and workers” showing that they affect growth, debt, sectors, pensions and health. Historically unprecedented longevity changes have dramatically transformed consumer and worker behaviours. But economic and social policies have not wholly kept pace with it in terms of policies—fiscal, monetary, health, migration etc.
- Private consumer expenditures are dramatically different in composition today than in 1970s, so are wages and labour income as well as labour productivity. **Living longer is what people focus on easily but “living differently as consumers and workers” is what is affecting GDP growth.**
- Besides the above, the GDP outlook may be even better if policy is brave enough to change and respond to demographic challenges. This will require multiple generations to be flexible and express solidarity for a “Brave New World” of reform based holistic policy solutions.
- Expected inflation of 2% p.a. along with our real GDP projections would yield 4.9-5.2% p.a. nominal GDP growth (2014-19) with implications for the Fed’s monetary policy implementation and its resultant effect on the yield curve.

DISCLOSURE APPENDIX AT THE BACK OF THIS REPORT CONTAINS IMPORTANT DISCLOSURES AND ANALYST CERTIFICATIONS.

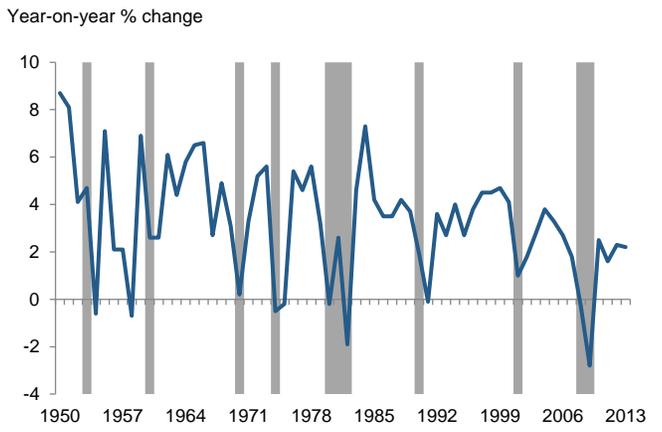
Demographic based analysis of US GDP growth over next 5-6 years:

Over the last couple of years there has been an increase in the number of researchers and analysts who have highlighted a structural break in US growth projections and paradigm relative to the past. The post credit crisis period has seen deviations from both conventional monetary policy and also standard fiscal policy instruments. The weak economic conditions and projections are affected not purely by economic variables and phenomena but also by the lack of political decision making resulting in fiscal gridlocks and a protracted delay in both policy making and policy implementation¹.

Global demographic changes that have not been understood and anticipated in terms of their implications have further resulted in ineffectiveness of policy measures. We believe that **changing consumers and workers**² have led to major structural changes in society with economic implications that have been missed by policy makers, investors and analysts trying to understand these changes wearing “old lenses” and habituated to decision making based on conventional models. **Consumers and workers are not just changing and different but inter-generational changes and intra-generational changes** in a globalized, technological environment have proved the collective economic wisdom and thinking inadequate.

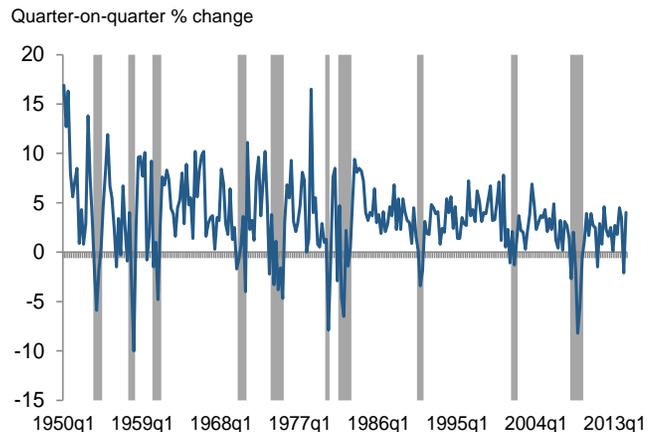
The US real GDP growth experience post 1950 is charted below in Exhibit 1 and Exhibit 2. The point of analysis in this report is not just the past growth pattern but rather whether growth can recover back to its pre-credit crisis levels. Our growth analysis is based on demographic variables that are available over 1950-2013 annually.

Exhibit 1: Real GDP growth based on chained 2009 dollars, US (1950-2013)



Source: BEA, Credit Suisse (Shaded area indicates period of recession)

Exhibit 2: Real GDP growth based on chained 2009 dollars, US (1950 Q1 – 2014 Q2)



Source: BEA, Credit Suisse (Shaded area indicates period of recession)

This report is structured as follows. Section 1 summarises the recent debate regarding the US growth slowdown. Section 2 briefly presents growth projections of the IMF and the CBO. Section 3 presents the demographic-factor based growth approach that we use. Section 4 presents our two GDP growth projection scenarios which are higher than what many others expect. Section 5 concludes. Appendices contain extended literature review and supplementary charts.

¹ Daron Acemoglu's "Modern Economic Growth (2009)" highlights the role of Structural transformations including Demographics, urbanization and migration (chapter 21) and that Institutions and political economy (chapter 22).

² Credit Suisse Demographics Research, "Longer Lives, Changing Life Cycles: Exploring Consumer and Worker Implications" (July 2011)

1. Literature review on growth and productivity

We summarise below a few recent academic papers on US GDP growth prospects and productivity. Additional literature review is also provided in Appendix I.

Robert Gordon (2014)³ projected much slower US economic growth over the next 2-3 decades. His projected future growth is 1.3% per annum for labour productivity in the total economy, 0.9% for output per capita, and 0.4% for real income per capita of the bottom 99% of the income distribution. His GDP projection has triggered a lot of controversy and is based on the US economy facing four headwinds: (i) retirement of baby boom generation and an early exit from the labour force for both youth and prime-age adults (ii) stagnant educational attainment (iii) widened inequality and (iv) increasing level of government debt.

Edward Lazear et al. (2012)⁴ provided a different and more optimistic perspective by arguing that weak economic growth is the reason for heightened joblessness rather than fundamental labour market weaknesses. They claimed that unemployment stems mostly from “cyclic phenomena” that are more pronounced after the last recession. Industries such as construction, manufacturing and retailing that had the biggest losses during the recession have also gained the most jobs since the recovery began.

John Fernald and Charles Jones (2014)⁵ discussed whether the steady rise in living standards will continue in the US over the next 25-50 years. They suggest that studies of semiconductor trends to understand production functions are at best local approximations. They assert that the roughly constant growth of the past century and a half does not mean that the US is on a steady state path and the past could be a poor guide to the future.

2. US economic growth projections (IMF & CBO)

One important question that concerns most of us is whether US economic growth can recover back to its pre-credit crisis levels. Those holding a more optimistic US growth view believe that the economy is still under-utilizing its capacity and that the current headwinds are just cyclical. They assert that the potential growth drivers (infrastructure investment, revolutionary technologies such as shale energy and better education) can all contribute to a higher growth outlook at around 3-3.5%.p.a. However, people who are in the opposing camp think that this current subdued growth can be long-lasting due to structural headwinds like slower labour force growth, stagnating wage levels, consumer and government debt, and a poor education system.

Exhibit 3: Real GDP growth projection, US (2014-2019)

Year- on-year % change	International Monetary Fund	Congressional Budget Office
2014	2.8 (April), 2 (June), 1.7 (July)*	2.7
2015	3.0	3.3
2016	3.0	3.4
2017	2.9	3.0
2018	2.8	2.2 (2018-2024 average)
2019	2.6	

Source: IMF Country Report No. 14/221, CBO, Credit Suisse (*IMF revised US growth forecast twice in June and July and the current growth forecast for 2014 is at 1.7%)

Exhibit 3 displays growth forecasts from the IMF and the CBO. The details of their reasoning are in Appendix I.

³ Gordon, R., "The Demise of U.S. Economic Growth: Restatement, Rebuttal, and Reflection" (2014)

⁴ Lazear, E., and Spletzer, J., "The United States Labour Market Status Quo or a New Normal?" (2012)

⁵ Fernald, J.G. and Jones, C.I., "The Future of U.S. Economic Growth", Prepared for the AEA Annual Meetings session on "What's Natural? Key Macroeconomic Parameters After the Great Recession" (2014)

3. Demographic links to GDP Growth

In this section, we revisit the growth accounting framework from an earlier report “A demographic perspective of economic growth” (April 2009). The model is based on an ECB paper by Maddaloni et al. (2006)⁶ that tries to explain how much of real GDP growth can be explained by changes in the labour force structure. In this approach, real GDP can be decomposed into the following components:

- (i) Working age population growth (population aged 15-64 years)
- (ii) Labour productivity growth (real GDP/ hours worked)
- (iii) Labour utilization growth (hours worked/ working-age population)

Maddaloni et al. state that growth accounting is useful to analyse medium to long-term developments in real GDP and supply side factors. In our opinion, understanding past growth patterns provides guidance for an appreciation of demographic effects on GDP growth.⁷ Based on this approach, we contributed to the lead article “Demography, growth, and inequality – Age invaders”⁸ in The Economist magazine (26 April 2014 edition) by providing **real GDP growth projections of the US, Germany and Japan** from 2014-2018.

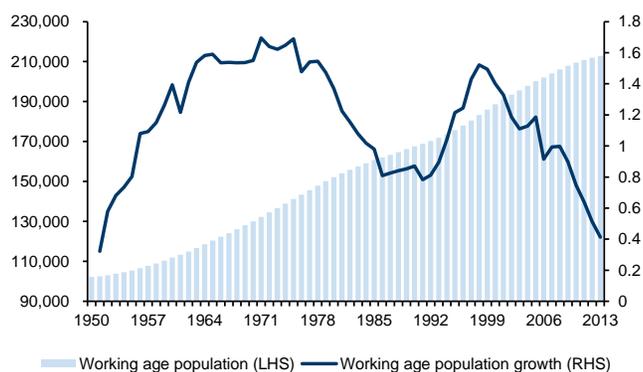
In the section below, we discuss each component by examining its historical level and growth rate and by providing qualitative assessments and economic reasons for why these components may contribute towards higher growth than most expect.

1. Working-age population growth:

This is the first and probably best understood demographic component underlying GDP growth. While the working age definition by most agencies such as UN, ILO, Census Bureau is 15-64 years, we believe that it is a dated definition/concept that needs changing. Exhibit 4 presents both the level and growth in working age population based on the 15-64 year definition. Exhibit 5 presents summary statistics on working age population growth.

Exhibit 4: Working age (age 15-64) population and its growth rate, US (1950-2013)

Working age population in thousands (LHS); growth rate in % p.a. (RHS)



Source: UN, Credit Suisse (Growth rate from 1951-2013)

Exhibit 5: US working age population growth rates by periods and statistical summary over 1951-2013

Average annual growth rate (%)		Statistical summary (1951-2013)	
1951-2013	1.16	Median (%)	1.19
1960-2013	1.22	Maximum (%)	1.69
1970-2013	1.15	Minimum (%)	0.32
1980-2013	1.03	Standard deviation	0.35
1990-2013	1.03	Skewness	-0.35
2000-2013	0.96	Kurtosis	-0.79

Source: UN, Credit Suisse

⁶ Maddaloni, A., A. Musso, P. Rother, M. Ward-Warmedinger and T. Westermann (2006), “Macroeconomic implications of demographic developments in the euro area”, ECB Occasional Paper No. 55

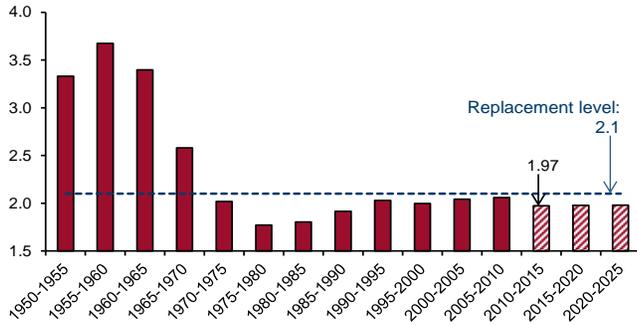
⁷ In the report “From the Demographics Lens: US is definitely not Japan and neither is Germany” (October 2010), we conducted a comparative analysis based on this approach to compare the growth pattern from a demographic perspective between US, Germany and Japan concluding that contrary to popular opinion, the US is not remotely in a Japan-like situation.

⁸ “Demography, growth and inequality – Age invaders”, The Economist, 26 April 2014 edition

This is also the smoothest component of GDP growth and it depends on fertility rates and net migration rates. Exhibit 6 displays US fertility rates from 1950 until 2025 and Exhibit 7 presents US net migration rates over 1950-2025. Fertility rates and net migration rates in 2010-2015 are slightly lower than those in 2000-2005 (but still higher than those in Germany, Japan and Italy). According to the Migration Policy Institute, immigrants accounted for 16.4% of the US total civilian labour force in 2012 and future immigrants will likely become an increasingly more important source of labour.

Exhibit 6: Total fertility rate, US (1950-2025)

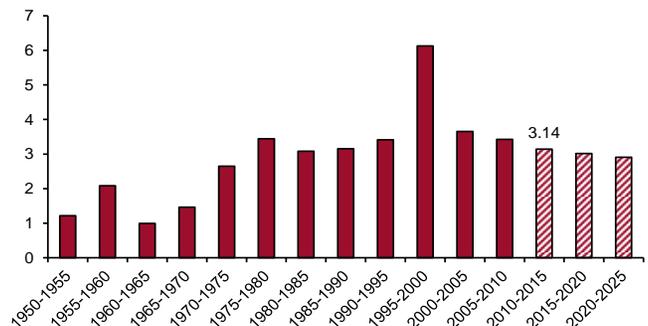
Children per woman



Source: UN, Credit Suisse

Exhibit 7: Net migration rate, US (1950-2025)

Per 1,000 population

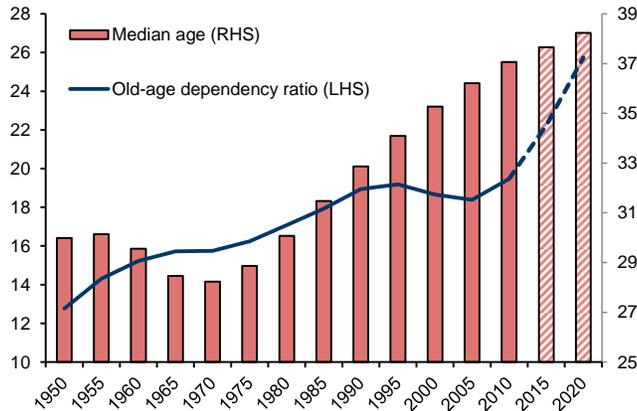


Source: UN, Credit Suisse

There has been concern regarding the slower growth of the US working-age population and its declining labour participation rates since 2000. Some attribute this to the exit of baby boomers from the labour market. This structural demographic change has resulted in a rapid increase in the US aging population. Exhibit 8 shows the dramatic change of median age from 28.2 years (1970), 37.1 years (2010) to 38.2 years (2020) as well as the steep rise in the old-age dependency ratio which correlates with fiscal unsustainability pressures. The old-age dependency ratio's upward trend is projected to accelerate further after 2010.

Exhibit 8: Median age and old-age dependency ratio, US (1950-2020)

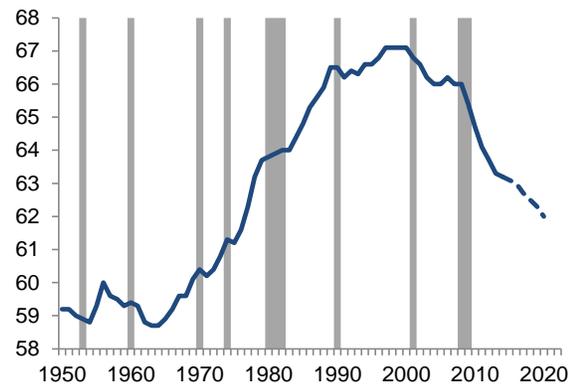
Median age in years (RHS), Old-age dependency ratio is calculated as the ratio of population aged 65+ per 100 population 15-64 (LHS)



Source: UN, Credit Suisse

Exhibit 9: Labour force participation rates, US (1950-2022)

% of aged 16+ population

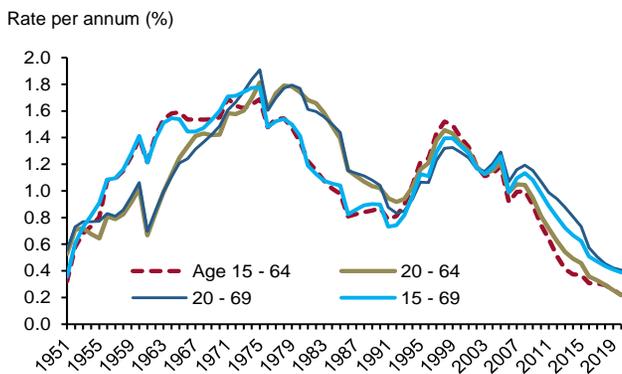


Source: BLS, Credit Suisse (Shaded area indicates period of recession)

The rapidly aging population has partially reflected on the labour participation trend as shown in Exhibit 9. In 2000, the baby boomers were in the prime working age group (age 36-54) with the highest participation rate (67.1%). Since the baby boomers move out of the prime age group, the labour participation rate starts declining and the decline in participation rates is projected to accelerate in the next five years. This should be resisted by policy makers and workers.

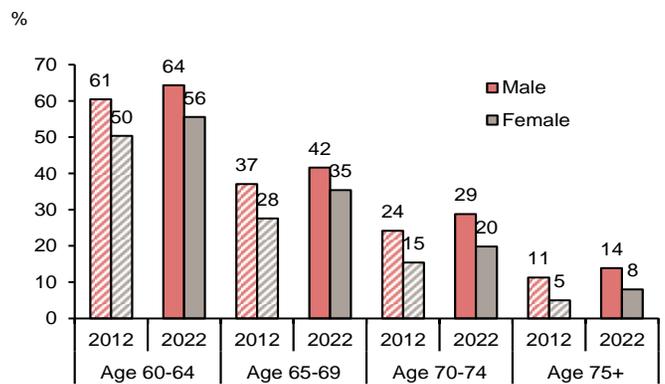
To deal with this declining labour participation rate and to incorporate the changing social trends of longer schooling and life-span, we try to examine different “working age group definitions” which could be a potential source of labour force. While the conventional age definition for working age population is 15-64 years old, we advocate a change on account of delayed labour force entry owing to increased popularity of post-high school education amongst the masses.

Exhibit 10: Working-age population growth, US (1951-2020)



Source: UN, Credit Suisse

Exhibit 11: Male and female labour force participation rates by age group, US (2012 vs. 2022)



Source: BLS, Credit Suisse

Exhibit 10 shows that changing the definition of working age results in significant differences in the annual growth of working age population over 2014-2020. With the status quo definition of 15-64 years the growth rate is 0.3% p.a. whereas with a definition change to 20-69 years the working age population growth increases to 0.56% p.a., for 20-74 years to 0.8% p.a., and for the 20-79 year age group of 0.91% p.a.. In addition, with increased life expectancies, those who have the skills and are productive are working beyond official retirement ages⁹.

While we acknowledge that the assumption is radical and probably a bit unrealistic, all we are calling for is embracing older, skilled, qualified workers as part of the working age population beyond even 70 years of age if longevity stretches for many into the early or late 90s. This change might generate higher growth than many expect for the future. This is needed if conditional life expectancy at 60 years of age heads towards 30 years. This was also articulated by Robert Fogel, University of Chicago, Nobel Laureate in an article in 1998 “Can we Afford Longevity?” In previous Credit Suisse research we pointed this challenge to families, individuals, policy makers and the financial services industry by highlighting multi-dimensional facets of longevity in what we hope was a provoking report “How Increasing Longevity Affects Us All? Market, economic and social implications”.

BLS forecasts (Exhibit 11) a significant increase in the US labor participation rate for older workers aged 60+ over 2012-2022. The projected increase is most evident for female workers in the age group of 65-69. We consider the delayed retirement of older workers a positive sign for future US growth prospects. Another positive trend that provides support

⁹ We had highlighted flexible-enabled retirement as a policy solution towards mitigating the demographics time bomb in our report “The Demographic Manifesto: New People, New Jobs” (2000).

for an increased active worker pool is where the gap between the male and female labour force participation rate is declining.

However the opposite happens when we consider labour force participation of younger cohorts. The challenge to be faced is that participation rates are falling for both the 16-19 year cohort as well as the 20-24 year cohort.

2. Labour productivity growth:

This factor is an important but controversial factor in terms of its future trajectory and its contribution to US growth. The literature review in Section 1 and in Appendix I have discussions centered around the future of labour productivity. Exhibit 12 shows labour productivity in terms of GDP/hour worked and its growth rate over 1950-2013. Labour productivity growth has been declining but has been stabilizing over the last couple of years. Exhibit 13 provides the summary statistics on labour productivity growth rates over different periods. We can infer from Exhibit 13 that the 1950s and 1960s were higher labour productivity growth periods of all the last seven decades.

Exhibit 12: Labour productivity and its growth rate, US (1950-2013)

Labour productivity (LHS) is calculated as real GDP/ total hours worked; growth rate in % p.a. (RHS)



Source: UN, The Conference Board, Credit Suisse (Growth rate from 1951-2013)

Exhibit 13: US labour productivity growth rates by periods and statistical summary over 1951-2013

Average annual growth rate (%)		Statistical summary (1951-2013)	
1951-2013	1.88	Median (%)	1.94
1960-2013	1.77	Maximum (%)	4.09
1970-2013	1.58	Minimum (%)	-1.00
1980-2013	1.59	Standard deviation	1.07
1990-2013	1.70	Skewness	-0.30
2000-2013	1.61	Kurtosis	0.00

Source: UN, The Conference Board, Credit Suisse

We show two different measures of labour productivity in the Appendix II. While Exhibit 22 shows the cyclical fluctuations in labour productivity growth on an aggregate basis, Exhibit 23 displays the absolute level of sectoral productivity in terms of relative productivity across sectors (agriculture, industry and services) over time.

Actually, one of the most damning indictments of productivity and innovation which underlies future growth is by Nobel laureate Edmund Phelps in his 2013 book “*Mass Flourishing: How Grassroots Innovation Created Jobs, Challenge, and Change*”¹⁰. He argues that **not only is innovation and productivity much lower over the last four decades but that it is likely to be lower** and that a combination of public, government and social factors collectively act as impediments to incentivizing productivity. He states that mass flourishing of economies took place due to indigenous innovation and human dynamism associated with it. Lack of human values that inspire indigenous innovation are responsible for the lack of mass flourishing currently and in the future.

Burtless (2013)¹¹ examined the impact of population aging and delayed retirement on workforce productivity. His paper offers evidence that more productive workers stay in the

¹⁰ Phelps, E., “Mass Flourishing: How Grassroots Innovation Created Jobs, Challenge, and Change”, Princeton University Press (July 2013)

¹¹ Burtless, G., “The Impact of Population Aging and Delayed Retirement on Workforce Productivity”, Center for Retirement Research at Boston College (2013)

workforce longer than less productive ones and workers aged between 60-74 years are more productive than the average workers who are younger. He also finds that there is little evidence that the aging workforce is detrimental to productivity.

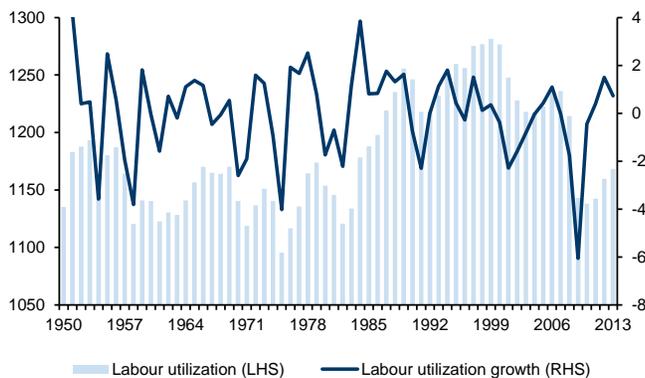
A more upbeat general message on technology's great prospects overall is given by Erik Brynjolfsson and Andrew McAfee (2014)¹² in "The Second Machine Age: Work, Progress and Prosperity in a Time of Brilliant Technologies". They assess the impact of new technologies and innovation on work, progress and prosperity. They show that the biggest thing that "bent the curve of human history" like nothing before was the discovery of the steam engine in late 18th century and the industrial revolution – the **first machine age**. Now we are seeing the **second machine age** with (i) astonishing progress on digital technologies (ii) profoundly beneficial transformations due to digital technology as they will increase the variety and volume of our consumption increasing choice and freedom and (iii) challenges from digitization to those left behind. They spend a lot of time explaining the benefits (bounty) in terms of increased volume, variety and quality and decrease in cost of many offerings brought on by modern technological progress. But associated with that will be the **spread** in term of the unequal distribution of the bounty across people.

3. Labour utilization growth:

This is the third demographic factor that is related to hours worked, participation rate and unemployment rate but mainly to hours worked. Exhibit 14 presents the level as well as growth of labour utilization over 1950-2013. We can see the labour utilization peak at the turn of the millennium and then a recent increase over last few years since 2006. Exhibit 15 displays the summary statistics over different sub-periods and we observe that labour utilization growth has been negative over the last 14 years.

Exhibit 14: Labour utilization and its growth rate, US (1950-2013)

Labour utilization (LHS) is calculated as total hours worked/ working age population; growth rate in % p.s. (RHS)



Source: UN, The Conference Board, Credit Suisse (Growth rate from 1951-2013)

Exhibit 15: US labour utilization growth rates by periods and statistical summary over 1951-2013

	Average annual growth rate (%)	Statistical summary (1951-2013)	
1951-2013	0.05	Median (%)	0.40
1960-2013	0.04	Maximum (%)	4.12
1970-2013	0.00	Minimum (%)	-6.06
1980-2013	-0.01	Standard deviation	1.84
1990-2013	-0.30	Skewness	-0.76
2000-2013	-0.66	Kurtosis	1.32

Source: UN, The Conference Board, Credit Suisse

Labour utilization can be expressed as follows:

$$\text{Labour utilization}^{13} = (\text{average hours worked}) \times (1 - \text{unemployment rate}) \times (\text{participation rate}).$$

There are many ongoing debates over the future participation rate as well as the future unemployment rate. The relationship above across participation rate, (1-unemployment rate)¹⁴ and hours worked per worker combining to explain the labour utilization rate is reflected for decadal sub-periods in Exhibit 16.

¹² The Second Machine Age: Work, Progress and Prosperity in a Time of Brilliant Technologies (2014), Norton Publishing.

¹³ A mathematical derivation is also shown in Exhibit 25 from Appendix II.

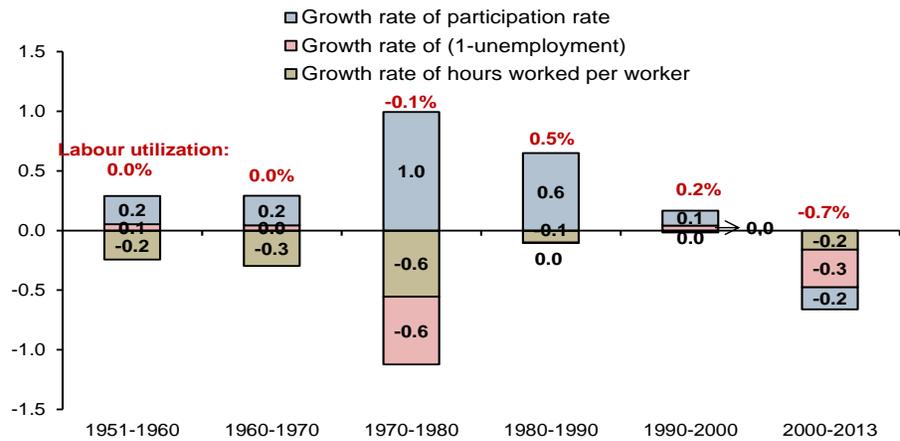
¹⁴ Janet Yellen's speech of May 7, 2014 to the Congress highlighted the links between these factors, economic outlook and determination of monetary policy.

This factor reflects the growth in hours worked. At a micro level the number of hours worked by an individual worker depends on hourly wages, wealth, work-leisure trade-offs and disutility from additional hours worked beyond a limit due to diminishing marginal productivity.

At lower income levels, increases in hours worked generate greater utility based on higher labour income whereas beyond a threshold of income and wealth, the overall hours decision depends on the relative strengths of the income vs. the substitution effect. Post-recession or after being laid off, many workers try to do multiple jobs to trade off job security and multiple sources of income as a diversifier.

Exhibit 16: Growth decomposition of labour utilization

Rate per annum (%)



Source: UN, The Conference Board, Credit Suisse

Exhibit 17 and Exhibit 18 highlight that different demographic component factors have a varying effect on the final real GDP growth. Therefore it is important to assess the combined effect of all the underlying factors.

Exhibit 17: GDP growth decomposition, US (1951-2013)

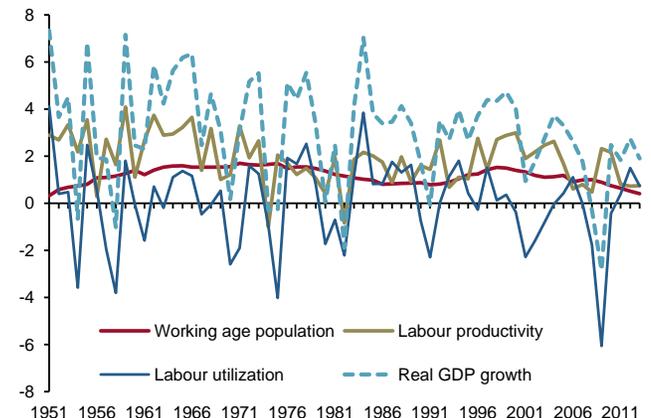
Average annual growth rate (%)



Source: UN, The Conference Board, Credit Suisse

Exhibit 18: GDP growth decomposition, US (1951-2013)

Rate per annum (%)



Source: UN, The Conference Board, Credit Suisse

The underlying demographics of Germany, Italy and Japan are much weaker than that of the US and the better US demographics (Credit Suisse Demographics Report of 3 July 2013 on UN Revisions) supports our argument for higher US relative growth

4. Can US growth be higher¹⁵?

In this section we construct two scenarios which we believe are possible based on the past realizations of underlying demographic factors over 1950-2013. These scenarios yield higher growth than the IMF and CBO forecasts. Our first scenario is our very optimistic scenario. Exhibit 19 presents our first scenario growth projections over 2014-2020. We also break the period down into three sub-periods: 2014, 2015-2018 and 2019-2010.

Scenario 1 (Very optimistic scenario)

- (i) 2014: The inputs to this scenario are based on using the historical growth average values for labour productivity growth and labour utilization growth five years after a recession ends. We took an average of seven such values after recessions. We further adjusted for adverse weather effects and severe contraction due to external effects, government spending and inventory effects. Working age population growth is based on UN projection.
- (ii) 2015-2018: As inputs to these projections we used the 65th percentile values for the labour utilization growth and labour productivity growth over 1951-2013. In addition, the working age population growth was slightly increased based on older people recognizing higher post-retirement lifespans and working beyond normal retirement age. We expect the output gap to be lower as cyclical factors normalize.
- (iii) 2019-2020: We used working age population growth numbers a bit lower than for 2015-2018 assuming no structural policy changes on expanding the definition of working age population. In addition we used a 5-year rolling average for annual hours worked and a 20-year rolling average for labour productivity growth as inputs.

Exhibit 19: US GDP growth projection – Scenario 1

Rate per annum (%)

GDP growth projection, 2014-2020				
	Working age population	Labor productivity	Labour utilization	Real GDP
2014	0.37	1.2	0.3	1.9
2015-2018	0.40	2.4	0.8	3.6
2019-2020	0.35	1.7	0.9	2.9
2014-2019 average	0.39	2.1	0.7	3.2
2014-2020 average	0.38	2.0	0.8	3.1

Source: UN, GGDC, Credit Suisse

Scenario 2 (Moderately optimistic scenario): projections over 2014-2020 (Exhibit 20).

- (i) 2014: The inputs to this scenario are based on using the historical growth average values for labour productivity growth and labour utilization growth five years after a recession ends (average of seven values). We further adjusted for adverse weather effects and severe contraction due to external effects, government spending and inventory effects in the first quarter. Working age population growth is based on UN projection.
- (ii) 2015-2018: We used the 60th percentile values for the labour utilization growth and labour productivity growth over 1951-2013. For working age population growth, we used UN projections under status quo.
- (iii) 2019-2020: For working age population growth, we used UN projections assuming that no imminent policy changes. We also used 5-year rolling average for hours worked and the 20-year rolling average for labour productivity growth as inputs. We adjusted by a multiplicative factor of 0.9 relative to scenario 1.

¹⁵ Than what most analysts and investors especially projection sources like IMF and CBO expect.

Exhibit 20: US GDP growth projection – Scenario 2

Rate per annum (%)

	GDP growth projection, 2014-2020			
	Working age population	Labor productivity	Labour utilization	Real GDP
2014	0.37	1.2	0.3	1.9
2015-2018	0.32	2.2	0.7	3.2
2019-2020	0.24	1.5	0.8	2.5
2014-2019 average	0.31	1.9	0.7	2.9
2014-2020 average	0.30	1.8	0.7	2.8

Source: UN, GGDC, Credit Suisse

We thus generate (i) 3.2% p.a. growth over 2014-2019 in the more optimistic scenario and (ii) 2.9% p.a. growth over 2014-2019 in the moderately optimistic scenario. We note that this is based on some historical realizations of demographic factors. If further structural reform were to support the better demographics of the US, we might even see a return to the growth patterns of the 1950s and 1960s.

5. Conclusion

In this report we provide colour on the recent growth and productivity debate as well as the secular stagnation hypothesis. We review the major voices on this research topic from a demographic vantage point. We present a growth assessment framework based on demographic factors – working age population growth, labour productivity growth and labour utilization growth (influenced by hours worked, participation rate, unemployment rate). We also present the growth outlook views of IMF and CBO. The main contribution is highlighting the fact that the growth outlook need not be as low as many believe.

If holistic policy changes in education, labour, taxes, retirement and health were to be supportive and responsive to unprecedented demographic changes (both inter-generational and intra-generational), then we ought to see even higher average growth numbers. Our very optimistic scenario projects average growth of 3.2% p.a. over 2014-19, whereas our moderately optimistic scenario projects an average growth rate of 2.9 % p.a. over 2014-19, higher than what most official agencies project.

Policy, institutions and voting rights are other additional factors that can either facilitate or impede the total contribution of demographic factors that we considered in our scenarios.

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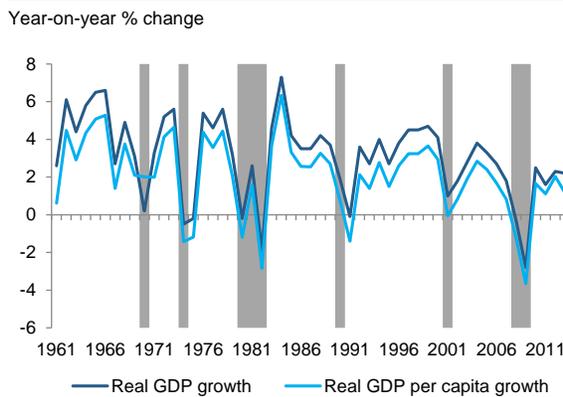
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Appendix I: Literature Review & Projections

This Appendix continues the Literature Review of Section 1 in the paper and provides greater details on GDP projections by IMF, CBO and Conference Board.

Gordon (2010)¹⁶ provided a perspective on long-run growth rates of labour productivity and of multi-factor productivity in the US based on historical trends. The paper suggests that over the next 20 years (2007-2027) growth in real potential GDP to be 2.4% p.a. and labour productivity growth to be 1.7% p.a. respectively. This implies that the growth of real GDP per capita to be 1.5%.p.a. In Exhibit 21, we show the historical growth pattern of real GDP and GDP per capita growth in the US.

Exhibit 21: Real GDP and GDP per capita growth, US (1961-2013)



Source: BEA, WDI, Credit Suisse (Shaded area indicates period of recession)

Feldstein (2010)¹⁷ examined the likely growth of US GDP in the

decade beginning in 2010. He analyzed the two components of the rise in GDP over this 10 year period: (i) the recovery from the substantially depressed level of economic activity at the start of the decade; and (ii) the rise in potential GDP that will result from the expansion of the labor force, the growth of the capital stock, and the increase of multifactor productivity. Based on his analysis, he projected a growth rate of 2.6% p.a. in the US.

Baily et al. (2013)¹⁸ argued that the market is too pessimistic about the prospects of US productivity and overall economic growth. They provided a more optimistic view that technological opportunities remain strong in advanced manufacturing and the energy revolution will spur new investment. Despite weaker productivity growth from sectors such as education, healthcare, infrastructure and government historically, this is not because of a lack of opportunities but because of lacking incentives for change and institutional rigidity.

We also addressed the issue of magnitude and dynamic differences across different countries and their business cycles, comparing the post 2008 crisis to the Great Depression in an earlier CS report "*Demographic dynamics over business cycles and crises: What matters is how different*" (June 2013). We suggested significant divergence in business cycle dynamics warrants differential policies across different countries.

Bloom, Fink and Canning (2011)¹⁹ analysed the implications of population aging for economic growth. They suggest that OECD countries are likely to see modest declines in economic growth. However, increasing female labour force participation and reforms to increase the legal retirement age can help mitigate the adverse economic impacts.

Summers (2014)²⁰ in "*US Economic Prospects: Secular Stagnation, Hysteresis and the Zero Lower Bound*" highlighted that the nature of macroeconomics is now focused on avoiding secular stagnation. He attributes this to long-run effects of short-run developments and inability of monetary policy to achieve goals when interest rates are close to the zero bound.

¹⁶ Gordon, R., "Revisiting U.S. productivity growth over the past century with a view of the future" (2010)

¹⁷ Feldstein, M.S., "U.S. Growth in the Decade Ahead", NBER Working Paper No. 15685, (Jan 2010)

¹⁸ Baily, M., Manyika, J., Gupta, S., "U.S. Productivity Growth: An Optimistic Perspective", Brookings (2013)

¹⁹ Bloom, D., Canning, D., and Fink, G., "Implications of population aging for economic growth" (2011)

²⁰ Summers, L.H., "U.S. Economic Prospects: Secular Stagnation, Hysteresis, and the Zero Lower Bound". Business Economics, Vol.49, No.2, NABE (2014)

Fernald and Jones (2014) stress other important considerations besides local technological advances. They suggest several other key considerations which require careful attention: (i) growth in educational attainment, developed economy R&D intensity and population are likely to be lower in the future pointing towards slower US living standards growth (ii) a counterbalancing factor is the rise of China, India and emerging economies which is likely to create rapid growth in world researchers for several decades (iii) the uncertainty underlying the “idea production function” and the possibility that artificial Intelligence will allow machines to replace workers to some extent could lead to higher future growth and (iv) rise in income inequality, climate change and systematic shift of the economy towards health care.

Reasoning underlying Projections of IMF, CBO and Conference Board

The IMF²¹ thinks that the potential drag to US growth is partly coming from a slower growth in labour supply due to an aging population. A slowdown in productivity also contributes to the slower growth concern. It is uncertain that the slowdown in productivity is long-lasting or temporary given some promising factors such as the newer technological innovations, efficiency gains in infrastructure and productivity effects from ongoing energy boom.

The IMF makes several policy recommendations in order for the US to raise its future growth levels from the current projected levels: raising public spending on infrastructure, job training, research and innovation, provision of childcare assistance, and passing pro-work tax cuts. If the policy changes can be implemented in time, the IMF officials project US growth to reach 3.25% p.a. on average over the next three years and 2.25% p.a. over the medium term.

The CBO expects that increased housing construction and business investment will stimulate output, employment, income and consumer spending during 2014-2017. Furthermore, federal fiscal policy will have less adverse impact on economic growth than it recently has. The CBO projects the US economy to grow at 3% p.a. on average during 2014-2017 and from 2018-2024, the CBO anticipates real GDP to grow at the same rate as potential output at 2.2% p.a. on average. Thus, the CBO anticipates that over the 2014–2024 period, real GDP will increase at an average annual pace of 2.5%. Doug Elmendorf (2014)²² in his NABE presentation highlighted that the output gap between potential and actual GDP would narrow from 4% at end of 2013 to 0.5% at the end of 2017 as per CBO estimates.

- The Conference Board²³ projects the US economy to grow at 2.3% p.a. on average from 2014-2019 and revert to the long-term trend at 1.9% p.a. after 2019, given no changes on the structural factors. The key structural concerns are also listed below.
- It is projected that US consumer spending growth rate may fall below GDP growth rates due to changing spending patterns of young people and baby boomers.
- Broad unemployment including involuntary part-time workers and discouraged workers will remain high due to weak demand and policy uncertainty.
- Productivity: the contribution from information and communication technology which accounted for about two-thirds of the US labor productivity growth has slowed significantly.
- Private investment is discouraged because of unfavourable US corporate tax code and a reduction on fiscal spending on infrastructure and R&D, which hampers further innovation and productivity growth

²¹ IMF Country Report - United States, No.14/221 (Jul 2014)

²² Elmendorf, D.W., "CBO's Outlook for the Economy" - Presentation to the NABE (Feb 2014)

²³ van Ark, B., and Overmeer, W., "Global Economics - Growth Scenarios 2020", The Conference Board (2014)

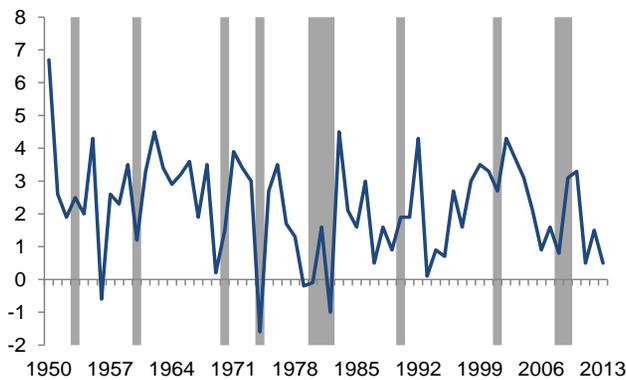
Appendix II: Supplementary charts

This Appendix contains supplementary charts on labour productivity and a decomposition of labour utilization.

In Exhibit 22 and Exhibit 23, we present different measures of labour productivity in the US. Exhibit 22 shows the cyclical fluctuations in labour productivity growth on an aggregate basis. Exhibit 23 displays the sectoral productivity in terms of relative productivity across three sectors – agriculture, industry and services over time. Gross value added per worker in agriculture has always been the lowest. However, since 2000 there has been a rapid rise in agriculture productivity. Productivity in industry overtook Services in 1993.

Exhibit 22: Labour productivity measured as output per hour, US (1950-2013)

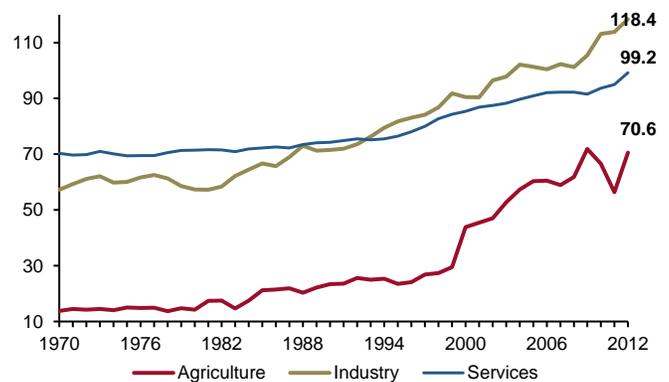
Year-on-year change (%)



Source: BLS, Credit Suisse (Shaded area indicates period of recession)

Exhibit 23: Gross value added per worker*, US (1970-2012)

Thousands of constant 2005 USD



Source: UN, BLS, Credit Suisse (*Calculated as gross value added in each sector in USD / Employment in each sector)

As discussed in section 3, we decompose labour utilization into three labour market components – average hours workers per worker, unemployment and participation rate. We show the mathematical derivation of the decomposition in Exhibit 24.

Exhibit 24: Labour utilization decomposition

$$\begin{aligned}
 \text{Labour Utilization} &\equiv \left(\frac{\text{Hours worked}}{\text{Working age population}} \right) \\
 &\equiv \left(\frac{\text{Hours worked}}{\text{Employment}} \right) \times \left(\frac{\text{Employment}}{\text{Labour force}} \right) \times \left(\frac{\text{Labour force}}{\text{Working age population}} \right) \\
 &\equiv \left(\text{Average hours worked} \right) \times \left(1 - \text{Unemployment rate} \right) \times \left(\text{Participation rate} \right)
 \end{aligned}$$

Source: Maddaloni (2006), Credit Suisse

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