Economic Analysis

Employment: trends, outlook and challenges

Filip Blazheski / Kan Chen / Nathaniel Karp / Boyd Nash-Stacey / Marcial Nava

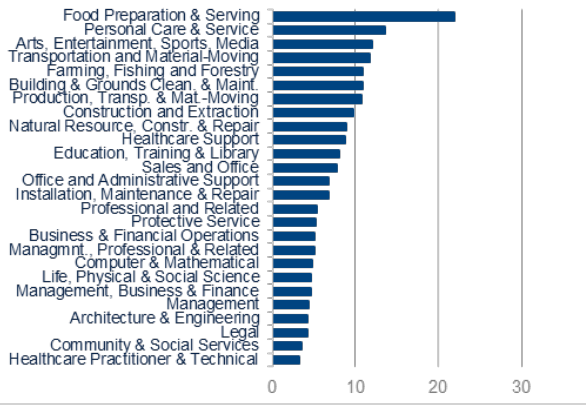
September 25, 2020

Beyond the pandemic

The Covid-19 pandemic generated an unprecedented shock to the labor market that at its peak contributed to the loss of 25 million jobs, forcing 24 million people to claim unemployment benefits and 8 million to leave the labor force temporarily. The service-oriented nature of the pandemic has acutely impacted minorities, young people, women and people with low education levels. For example, individuals with less than a high school diploma currently have an unemployment rate of 12.6%, 7pp higher than prior to the pandemic, whereas for workers with at least a college degree the unemployment rate is only 5.3%, just 3pp higher than the pre-pandemic levels. Similarly, women's unemployment rates rose 2.5pp more than their male counterparts and has remained higher. Alarmingly, the pace of decline in the unemployment rate for Blacks and Asians is half the rate of Whites, suggesting that minorities continue to face more widespread and prolonged labor market dislocations during economic crises.

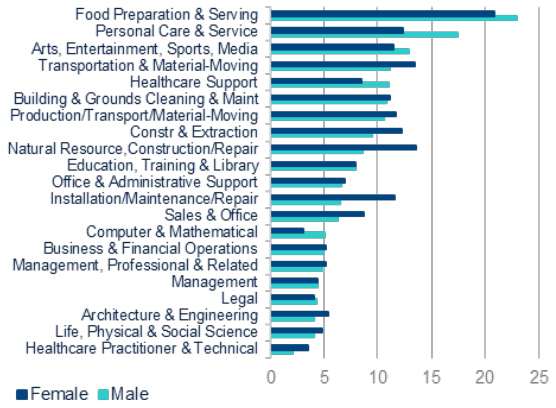
Looking through the occupation lens, there are also widely disparate outcomes. For example, 1 in 5 food preparation and restaurant workers remains unemployed. While a 20% unemployment rate for occupations in food preparation and restaurant workers is dire, this is down from a peak rate of 41.8%, which is also likely an underestimate of the true unemployment rate given the mismeasurement issues present in the surveys in early months of the crisis. This suggests that many of the workers who are unable to easily transition in the labor market will struggle to find opportunities in other industries. Also suffering from the inability to effectively implement socially distant policies and the behavioral impact from the pandemic, arts, entertainment and sports media professionals and personal care workers continue to have persistently higher unemployment rates that are between 3x and 4x those prevailing before the pandemic, respectively.

Figure 1. **UNEMPLOYMENT RATES BY OCCUPATION** (%)



Source: BBVA Research & BLS

Figure 2. **MALE AND FEMALE UNEMPLOYMENT RATES BY OCCUPATION** (%)



Source: BBVA Research & BLS

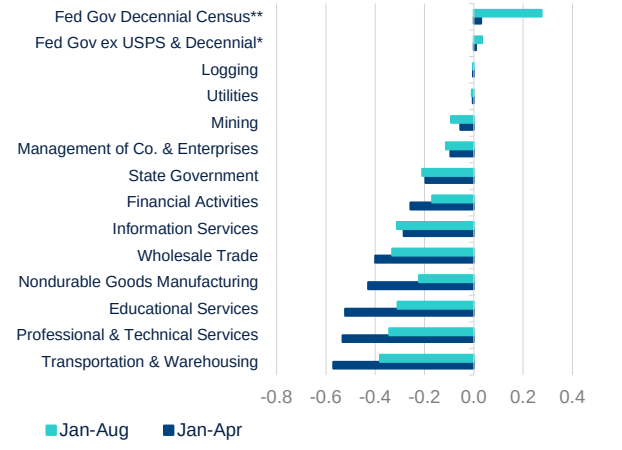
Conversely, healthcare professional and associated technical professions, which had the lowest unemployment prior to the crisis, saw unemployment rates rise sevenfold reaching 7% at the peak of the crisis. Currently, however, their unemployment rates, while still elevated relative to the pre-crisis, are close to 3%. In an economy where the skills premium continues to increase, it is not surprising that skilled professions such as lawyers, engineers, social and physical sciences, and managers experienced significantly less labor market volatility and a quicker return to pre-crisis levels. Individuals in these occupations also benefited from greater opportunities to continue working remotely. Another bright spot in the labor market, underpinned by the surge in housing demand brought about by the crisis and ability to properly social distance, is the construction sector. In fact, the unemployment rate in August was lower than the pre-crisis average, the only group for which the current unemployment rate is below the pre-crisis average.

While men and women in high-skilled occupations have seen a relatively better recovery than lower-skilled occupations such as restaurant workers, estheticians, hairdressers and individuals whose occupations are related to live entertainment, there appears to be a persistent gender gap in terms of the post-pandemic recovery. For example, prior to the pandemic, female healthcare workers and technicians had an unemployment rate around 2.1% while male healthcare workers had an unemployment rate around 1.5% Now, however, that number has disproportionately risen to nearly 3.5% for females as opposed to 2% for males. While female workers in sales and office related occupations have seen a stronger recovery in their unemployment rates, female social workers, personal care workers, attorney's, support workers in the healthcare sector and food preparation have not experienced similar reductions in unemployment relative to their male counterparts. Abundant labor supply, discriminatory preferences, caregiver demands, and disproportionate and persistent impact of the pandemic on "pink collar" jobs likely explain this gap.

Meanwhile, the pandemic's negative shock on the labor force participation rate was amplified for the low-skilled workers. By August 2020, the labor force participation rate for high school graduates was 54.9%, or 3.4pp lower than in February. In contrast, the participation rate for workers with a college degree or higher recovered to 72.8% - only 0.2pp lower than its pre-pandemic level of 73.0% in February. If these trends continue, the labor force participation rate is unlikely to return to its post-2016 upward trend.

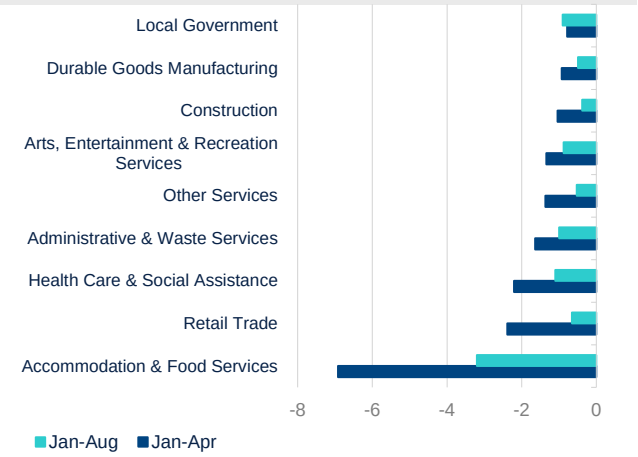
Although the pandemic affected virtually every aspect of economic activity, the impact on employment varies across industries. From peak to trough (January to April), there was a 14% decline in total nonfarm payroll, equivalent to nearly 22 million jobs. The worst effects of the Covid-19 pandemic happened in industries deemed "non-essential." These industries are labor intensive and depend on physical proximity; some of the most affected -in percentage terms- were arts, entertainment & recreation (-53%), accommodation & food services (-48%), and other services (-23%) like repair & maintenance, and personal & laundry services. In contrast, some of the least affected industries were those considered "essential" or those where tasks could be performed outside the workplace like utilities (-0.8%), financial activities (-2.9%), professional & technical services (-5.5%), wholesale trade (-6.7%), and healthcare & social assistance (-10.7%).

Figure 3. **CUMULATIVE CHANGE IN NONFARM PAYROLL 2020** (MILLIONS)



* Decennial Census Temp & Intermittent
** Decennial Census Temp & Intermittent Workers (NSA,Thous)
Source: BBVA Research & BLS

Figure 4. **CUMULATIVE CHANGE IN NONFARM PAYROLL 2020** (MILLIONS)



Source: BBVA Research & BLS

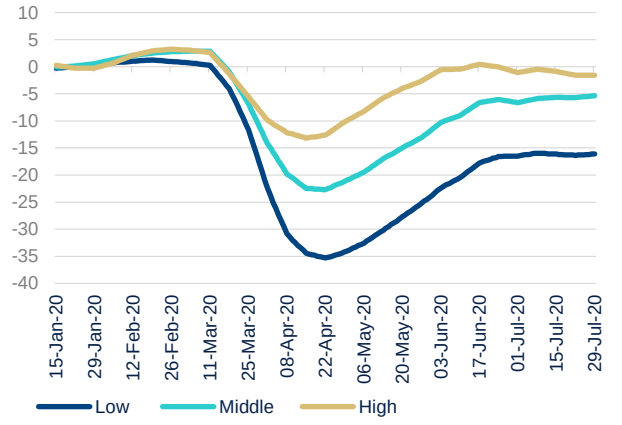
As economic activity resumed, the recovery started for most of the sectors, but with different dynamics. By August, almost 48.4% (~10.6 million jobs) of total non-farm payroll losses had been recovered. By sector, other services, construction, retail trade, healthcare & social assistance, accommodation & food services had recovered more than 50% of the jobs lost in the first two months of the pandemic. The remaining sectors had recovered less than 50% of the job losses or continued to experience losses. Nevertheless, employment in the private sector remained below January's levels. In the public sector, excluding the postal service and temporary Census workers, the federal government increased its payroll by about 34K workers between January and August. On the contrary, state and local governments continued to shed jobs after April, as tax revenues shrank and governments had to cut expenses in order to balance their budgets. State and local governments employ one out of four essential workers in the country, more than hospitals, grocery stores or warehouses. (Kane and Tomer, 2020).[1]

For most industries, but especially those that require physical interaction between clients and employees or for those that cannot benefit from telework, the recovery of employment will significantly depend on the availability of a vaccine and how confident people are in resuming their normal lives. Since both events will take time, we will see subpar employment creation in the following months. Moreover, recessions and economic crises tend to shed light on structural challenges and inequities, as was the case during the Global Financial Crisis. In fact, one of the recent improvements to the Federal Reserve's monetary policy strategy was to codify the objective of striving for maximum employment as "broad-based and inclusive", mainly in response to the inequitable and lagged recovery in the labor market for low-income individuals and minorities.

1: Joseph W. Kane and Adie Tomer. (2020) "State and local governments employ the highest share of essential workers. Congress is failing to protect them." The Avenue. Rethinking Metropolitan America. Brookings. August 3.

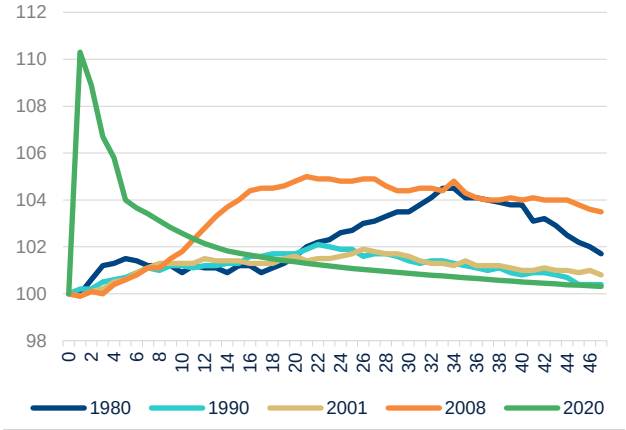
Moreover, real-time data from Opportunity Insights shows that employment for low-wage workers (less than $27,000) and middle-wage workers ($27,000-$60,000) is 16.1% and 5.3% below the pre-pandemic levels, respectively, highlighting the concentrated effects of the pandemic on low-income and low-skilled workers, which are more likely to be minorities, women and younger people. However, after surpassing pre-pandemic levels, high-income employment has drifted downwards and is now 1.6% below the employment levels in January, possibly signaling that the second and third round effects from the persistent weakness in lower income occupations and fading fiscal support are spilling over into higher-paying, higher-skilled, white-collar professionals, presaging a slowing of the recovery.

Figure 5. **EMPLOYMENT BY WAGE COHORTS**
(INDEX, JAN-2020=0)



Source: BBVA Research & Opportunity Insights

Figure 6. **UNEMPLOYMENT RATES CYCLES**
(RECESSION START=100, change in PP)



Source: BBVA Research & BLS

That said, with a majority of the lockdown measures now having been lifted or relaxed, and with more individuals voluntarily distancing and embracing personal protective equipment, labor market conditions have markedly improved. In fact, there are around 14M more people working now than in April, with nontrivial gains in the most acutely affected sectors such as leisure and hospitality, health care and retail. Moreover, the unemployment rate after reaching a peak of 14.7% has fallen 6.3pp to 8.4%, while weekly initial unemployment insurance claims have fallen from 6.9M at the end of March to 0.9K in mid-September.

While real-time labor market data, hard and soft readings from the goods producing and services sectors, and rising uncertainty suggest that momentum is slowing, our baseline continues to assume modest improvements in labor market conditions going forward. Specifically, we expect 2.1M additional net nonfarm payroll jobs to be added in the remainder of 2020, which will push the unemployment rate down to 7.2% by year-end.

With respect to 2021, assuming there is a viable vaccine we expect labor force participation to rise to around 62.9% by the end of the year. That said, we also expect the overall pace of nonfarm payroll growth to decelerate as capacity shortfalls in the most acutely impacted industries fades. In 2021 and 2022, non-farm payroll is expected to increase by a monthly average of 364K and 240K, respectively. With rising participation and solid, albeit decelerating job creation, our baseline assumes slower, but nonetheless steady improvements in the unemployment rate, averaging 6.2% in 2021 and 5.4% in 2022.

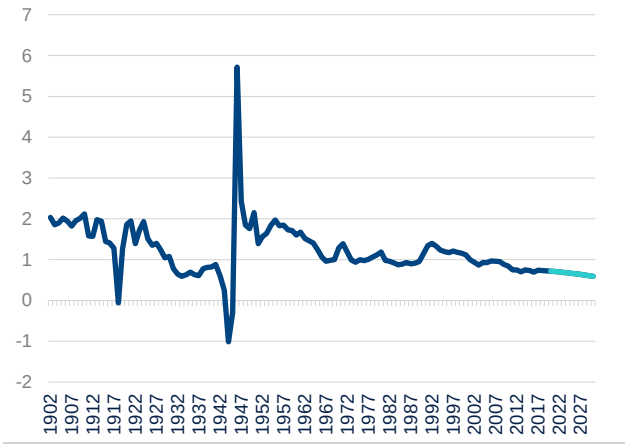
The road to maximum employment

In the long-run, the labor market will be shaped by structural forces, whose effects will transcend Covid-19. Standard economic theory assumes that employment is determined by the interaction of supply and demand, and the impact of government intervention and institutions. In the next sections, we focus on the major supply- and demand-side factors that will shape the future of employment; in particular, demographic changes -supply side- and technology, sustainability and globalization -demand side.

Population and labor force. On the supply side, the main factors impacting the labor market and consequently employment are population growth and to a lesser degree labor force participation. Since the mid-1990s, annual population growth has consistently slowed down and, according to the Census Bureau, it will continue doing so. In fact, between 2020 and 2030, population growth will average less than 0.7% per year, significantly below the 1.2% annual average in the last 118 years. The only time population growth has been so low was in the years following the Great Depression up to the end of WWII. Slower population and labor force growth reflects three major trends: lower fertility rates, the aging of the population and a slowdown in net migration.

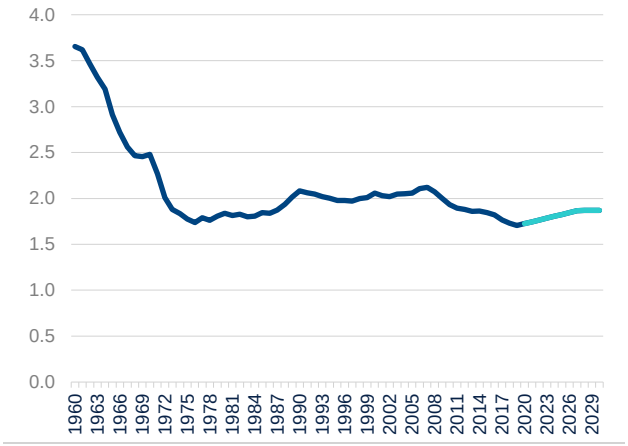
Fertility rate. According to the NCHS, in 2019, the total fertility rate stood at 1.7.[2] This was the fourth consecutive decline and marked the lowest rate since at least 1960. The decline in the fertility rate (Gone Baby Gone) reflects greater returns to education, better labor market opportunities for women, higher urbanization, changes in the origin of immigrants and the integration of second- and third-generation descendants. A lower fertility rate implies slower growth of the labor force. Population estimates from the Census assume that the fertility rate will edge up modestly to around 1.9 in future years, which is still below the replacement rate of 2.1.

Figure 7. **POPULATION GROWTH** (%)



Source: BBVA Research & Census

Figure 8. **FERTILITY RATE** (PER 1M)



Source: BBVA Research, The World Bank, NCHS & Census

2: The estimated number of births over a woman's lifetime or childbearing period which is defined as ages 10-49.

Aging. The labor force is also expected to slow down in tandem with an aging population. According to our estimates, we expect the labor force to increase by 9M between 2020 and 2030. This implies an average annual growth rate of 0.5%, which is lower than the historical average of 1.4%. On the one hand, people that leave the primary working age range (ages 25–54) tend to work less. On the other hand, a larger share of older workers implies a bigger downward impact on the labor force once they retire. Since 2000, 94% of the increase in the labor force occurred among people 55 years and older while their share of the labor force increased from 13% in 2000 to 23% in 2019. Considering the high relative share of the baby-boom cohort, these trends will continue for at least another 10 years.

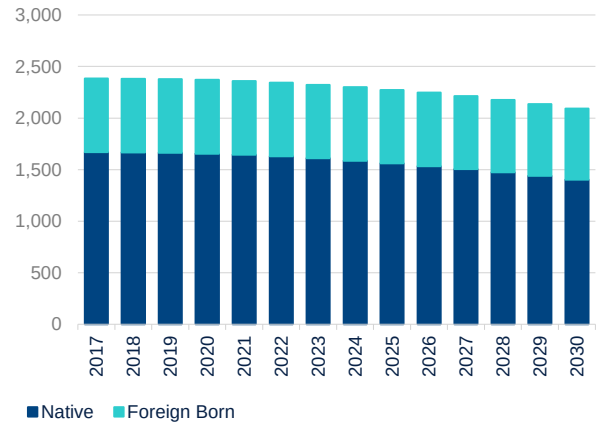
Migration. According to the Census, in 2018, there were 44.7M immigrants living in the U.S. and their number is expected to reach almost 54M by 2030, equivalent to an average annual increase of 700K. Meanwhile, the BLS estimates that in 2019, 17.4% of the civilian labor force were foreign-born, an increase of 1.8pp since 2009. Although the growth rate of the foreign-born population is also expected to slow down, it will average 1.4% per year between 2020 and 2030, equivalent to 2.7 times that of the native-born population. This implies that 31.5% of the increase in total population in the next 10 years will come from the foreign-born, suggesting that their share of the labor force will also become greater over time. Most studies conclude that immigration has a net positive impact on the economy and can help ease fiscal pressures.

Participation. Labor supply will also moderate as a result of a lower participation rate. Data from the BLS shows that participation declined 4.4pp between 2000 and 2015 to 62.7%. Thereafter, the overall participation rate bounced back to its historical average of 63.1% in 2019. However, secular trends suggest that, over the long run, participation is likely to moderate somewhat. The drop in participation during the 2000's mainly reflected a decline of 18pp and 7pp among younger workers aged 16-19 and 20-24, respectively. Although participation stopped falling further in recent years, the inverse correlation between higher school attendance and participation suggests modest gains ahead among younger workers since they are more likely to reach higher educational attainment levels.

Among prime-age workers (25 to 54 years old), the participation rate is expected to remain fairly stable for men and to edge up for women. The latter reflects, among other things, a higher opportunity cost from staying out of the labor force as a result of smaller wage differentials between men and women and prospects of higher real wages due to higher levels of education attainment particularly among minority females.

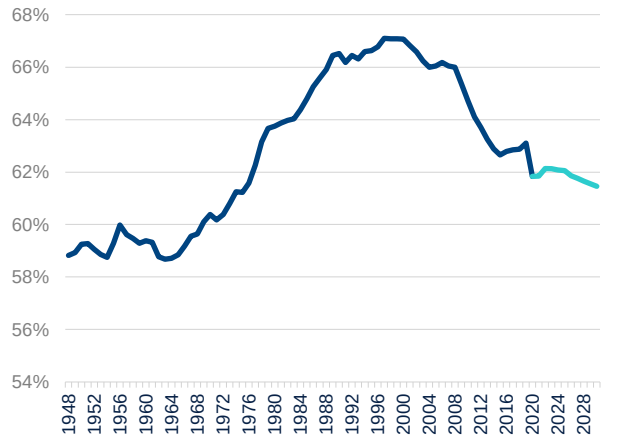
For the population aged 55 and older, the upward trend in recent years is expected to continue, supported by lack of sufficient retirement savings, an increasing share of jobs in the services sector, greater willingness to hire and retain more experienced workers, and high demand for employer-sponsored health insurance. However, the combination of declining participation rates among older cohorts (80% for 50-54; 65% for 55-64; 34% for 65-69; 20% for 70 and older) and the aging of the population translates into an overall lower participation rate. Therefore, our estimates assume that the participation rate will average above 62% between 2020 and 2030. This would be around 5pp below the peak at the end of the 1990s but only slightly below the historical average of 63%.

Figure 9. **CONTRIBUTION TO POPULATION GROWTH** (M)



Source: BBVA Research & Census

Figure 10. **LABOR FORCE PARTICIPATION RATE** (%)



Source: BBVA Research & BLS

On the demand side, the pandemic may have accelerated some structural trends and slowed others. For example, the prospects of another pandemic may have accelerated innovations that reduce human interaction and protect workers at high risk of being infected. Lockdowns around the world have temporarily lowered carbon emissions to the atmosphere, while stimulus packages oriented to clean investments could accelerate the transition to a green economy, which in turn could result in a permanent reduction in CO2 emissions. However, with the economic crisis, non-Covid R&D spending may decline, which could delay advancements in other areas.

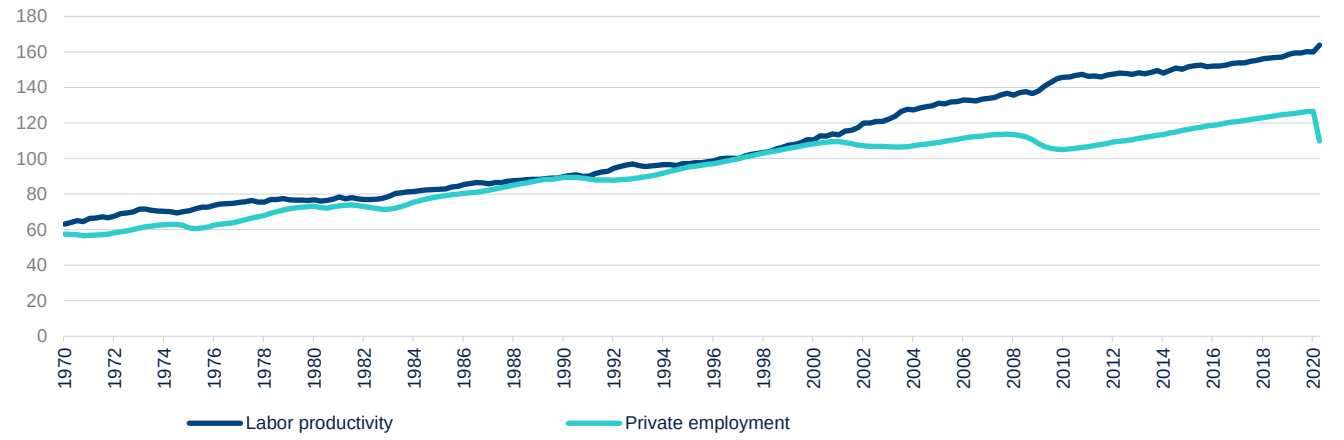
Therefore, the growth of employment will also be determined by the type of jobs that are created by employers and the occupations and skills needed to fill these jobs. This in turn will be highly influenced by technological advancements, climate change and globalization. For some, the scope and depth of the technological changes that will occur in the next decade will result in massive job losses. For others, it will create vast opportunities and create millions of new jobs. Likewise, sustainability and globalization are also perceived as potential drivers of job creation and job destruction. According to our analysis the net impact of these trends remains positive, and could help offset some of the downward pressures emanating from the supply-side; however, uncertainty remains elevated.

Technology. Technology has enabled contingent work (self-employment or gig work). People in this category work independently for one or multiple clients, which could be companies or individuals. Retirees working part time, programmers, handymen, ride-hailing drivers and social media influencers are just some examples of occupations that have harnessed the benefits of information technologies to reach customers directly and build an individual reputation. The expansion of gig work has raised some questions about the future of salaried work and the ability of labor laws to protect contingent workers. Often, self-employed workers lack medical, disability insurance or retirement accounts. Labor laws need to catch up with these new forms of employment.

From the industrial revolution to late into the twentieth-century, technological change aimed primarily at increasing the productivity of routinely tasks. Throughout this period, innovations like electricity and computers destroyed and created

jobs, but the net effect was positive as suggested by trends in labor productivity and private employment.[3] However, in the last decade, the rapid decline in the cost of computation coupled with developments in Artificial Intelligence (AI) and Big Data have disrupted cognitive non-repetitive tasks for the first time in history. The emergence of AI and Big Data coincides with a decoupling of labor productivity and private employment growth. Frey and Osborne (2017) examined the relationship between the likelihood of computerization for 702 occupations in the USA. To do this, they classified occupations as high, medium and low-risk based on their likelihood of computerization and predicted that around 47% of total U.S. employment is in the high-risk category. The occupations that are less susceptible to automation involve perception and manipulation tasks, creative intelligence tasks, and social intelligence tasks.[4] Meanwhile, today's technological change is skill-biased, resulting in an increasing wage gap between high and unskilled workers. In the past, people were able to offset the impact of disruptive technologies through education, but as the pace of technological change accelerates and the cost of higher education increases, it has become more difficult to catch up with technological progress.

Figure 11. **LABOR FORCE PRODUCTIVITY AND PRIVATE EMPLOYMENT** (INDEX 1997=100)



Source: BBVA Research, BLS & BEA

Sustainability. On the one hand, many workers, particularly those in construction, agriculture and other outdoor activities will be negatively impacted by heat waves and other forms of extreme weather. From an economic point of view, this could result in significant productivity losses. Studies suggest that productivity in outdoor jobs starts to decay after 77F.[5] The International Labor Organization (ILO) estimates that heat stress will lead to a 2% decline in hours worked by 2030. However, the ILO also predicts that, under the right policies, the transition to a "green" economy could result in net job creation of 24 million around the globe.[6]

3: Erik Brynjolfsson and Andrew McAfee (2016). "The Biggest Winners, Stars and SuperStars" in *The Second Machine Age.* First edition. Norton. New York. pp.147-162.
4: Carl Benedikt Frey and Michael Osborne (2013). "The Future of Employment: How Susceptible are Jobs to Computerisation?" Working Paper. Oxford Martin School. University of Oxford. September 17
5: Joseph Romm (2016). "How does global warming affect human productivity?" in *Climate Change. What Everyone Needs to Know*. Oxford University Press. pp.107-112.
6: International Labour Office (2018). "World Employment Social Outlook 2018. Greening with jobs." ILO.

Thus, the fight against climate change could become a fifth industrial revolution, but this time triggered by investments in renewable energy, alternative-fuel vehicles, energy efficiency, recycling, repair, and remanufacture, etc. This could lead to a new type of "green collar" worker, boosting job creation in construction, heating, ventilation, air-conditioning and refrigeration systems as well as energy and environmental management and smart controls, and industrial-machinery manufacturing. According to Brown and Ahmadi (2019), a $25 carbon tax could create around 1.4M jobs per year between 2020 and 2030 in the U.S.[7] The transition to a clean economy also has the potential to help people escape poverty and alleviate chronically high unemployment. Nonetheless, some pundits also claim that the transition to a green economy could result in elevated costs on society, forestall economic growth and destroy millions of jobs, particularly in fossil-based energy sectors such as petroleum, natural gas, coal and woody biomass, electric power generation, transmission, distribution and storage, and motor-vehicle-related industries.

Other industries. The combination of new technologies, aging of population and consumer behavior will trigger both significant increases in employment across some industries and sharp declines in others, as well as create new demand for jobs that do not currently exist. Increasing life expectancy and aging of the population is boosting the demand for jobs in health care and social assistance and personal care services. The number of people aged 65 and older has increased from 35M in 2000 to 56M in 2020 and is expected to reach more than 73M by 2030. This cohort has seen a relative increase in its share of total population from 12.4% in 2000 to 16.9% in 2020, and is expected to reach almost 21% by 2030.

Employment in the agriculture and construction sectors is also expected to see solid gains. Meanwhile, the ongoing transition to e-commerce and increasing automation will boost employment in the information, transportation and warehousing industries but will lower it in the retail and manufacturing sectors. From an occupational perspective, the largest gains are expected in healthcare-related occupations, as well as computer and mathematical jobs, construction and food preparation activities. In contrast, sales, clerical and administrative support occupations are likely to see declining numbers.

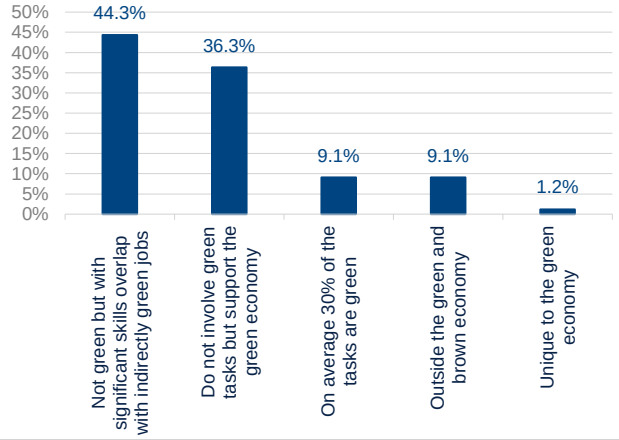
Emerging industries such as personal wearables, urban logistics, space travel, connected living, cannabis and mobile robotics could have a significant impact on job growth as demand for these products and services becomes widespread. Likewise, the increasing digitization of the economy implies greater demand for cybersecurity jobs, data analytics and cloud computing as more companies turn to the opportunities provided by these innovations. The combination of greater computing power, AI and machine learning could lower production costs and boost innovation in ways that would have taken decades in the past, particularly in life sciences. However, these trends could also result in lower employment in some sub-sectors within mining, information, manufacturing, leisure and hospitality, finance and professional and business services.

In this environment, what will the new jobs look like? According to the Cognizant Center for the Future of Work, in the not so distant future, career websites will be filled with positions such as genomic portfolio director, personal memory curator, quantum machine learning analyst, walker/talker, social media addiction therapist, carbon farmers, algae farmers, man-machine team manager, avatar designers, etc. These jobs will be possible because just as technology solves problems, it also creates new ones for which human creativity is still needed. This, and the heterogeneity of the

7: Brown, M. A. and M. Ahmadi (2019). Would a Green New Deal Add or Kill Jobs? Scientific American. December.

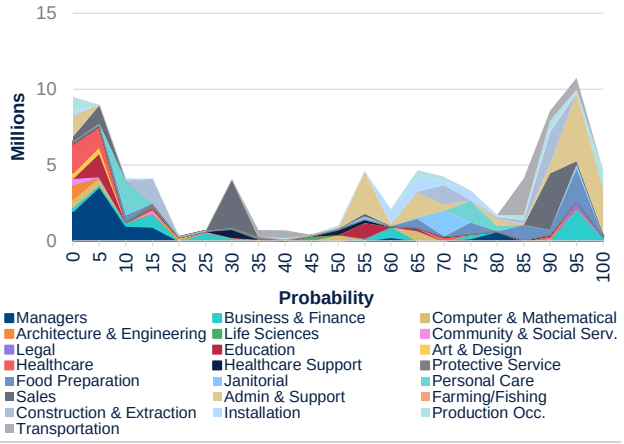
job spectrum guarantees that technology can change the way some things are done, but it cannot change the way all things are done simultaneously.[8]

Figure 12. **SHARE OF THE U.S. WORKFORCE THAT COULD BE CONSIDERED "GREEN"**



Source: Alex Bowen, Karlygash Kuralbayeva, and Eileen L.Tipoe (2018). "Characterizing green employment: The impacts of 'greening' on workforce composition." Energy Economics. Vol. 72. Pages 263-275

Figure 13. **JOBS AT RISK OF AUTOMATION**



Source: Frey and Osborne (2013) & USTPO

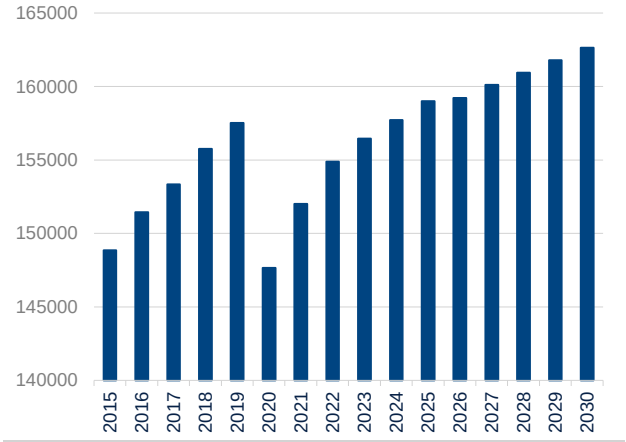
Globalization. Global developments will also have an impact on employment demand. The ongoing expansion of the middle class in emerging markets will continue driving up the demand for U.S. exports, particularly in mining, chemicals, petroleum, metals, agriculture, plastics and capital goods. Meanwhile the shift toward more protectionist policies could have positive effects on domestic jobs, particularly in the manufacturing sector. Recent studies that analyzed the effects of increasing import substitution and offshoring over the last 20 years found large negative effects on employment and real wages, particularly for blue-collar workers in the manufacturing sector. This also impacted non-exposed industries due to the negative effects on aggregate demand.[9]

The U.S. is going through a period of protectionism illustrated by recent trade wars and more restrictive bilateral agreements. Moreover, Covid-19 increased awareness of the importance of reshoring industries deemed "important for national security" like medical device manufacturing. In the short-run, this could have a positive effect on manufacturing jobs as some industries could relocate back to the U.S. due to higher tariffs, taxes and other protectionist measures, or for national security reasons. However, the transition could take time while the impact on employment could be limited by higher prices of goods and services that result in lower demand. Moreover, while some sectors could benefit from increasing protectionism, others are likely to see less benefits, particularly if new technologies result in higher rates of robotization and automation.

8: Center for the Future of Work (2017). "Jobs of the future. A guide to getting -and staying- employed over the next 10 years."
9: Autor, D.H., D. Dorn & G.H. Hanson (2016). "The China Shock: Learning from Labor-Market Adjustment to Large Changes in Trade." Annual Review of Economics. Vol. 8:205-240

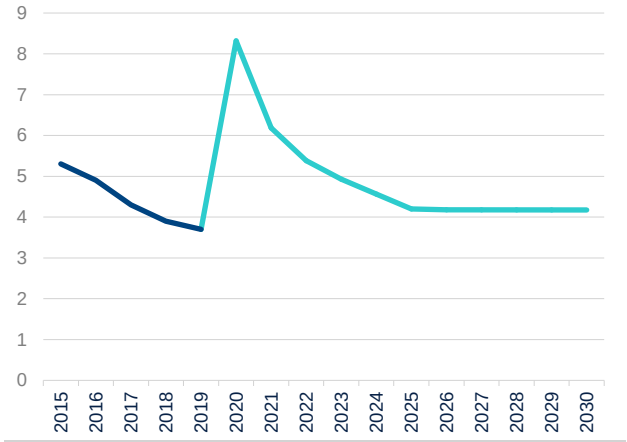
Based on the supply- and demand-side trends, we expect employment to increase by 15M, equivalent to an annual average growth rate of 1%. This is around 0.6pp lower than the historical average of 1.6%, and implies monthly job creations of around 190K in the next five years and around 70K between 2026 and 2030. Based on our estimates for potential output, labor force growth and the participation rate, the unemployment rate will continue to trend down and converge with its long-run equilibrium of 4.2% by 2025, which is similar to the 2016-2019 average but 1.6pp lower than the historical average.

Figure 14. **EMPLOYMENT** (M)



Source: BBVA Research & BLS

Figure 15. **UNEMPLOYMENT RATE** (%)



Source: BBVA Research & BLS

Challenges

Implications. Although technological change has always generated fears and anxiety, and adversely affected some occupations, the adoption of new technologies has also supported creation of new jobs and opportunities. Thus, technological advancement has more to do with the transformation of the job market rather than the destruction of employment. That said, while the current environment is to some extent similar to previous periods of rapid technological change, there are important differences since the benefits are increasingly biased towards knowledge and the automation of tasks. The resulting dynamics in the labor market could create significant challenges for society and institutions.

First, the current educational system might not be able to meet the robust increase in demand for knowledge workers and those in need to quickly learn new skills during their professional life. If this happens, companies will have to compensate for the shortcomings by hiring more employees abroad or risk losing their competitive edge. Hiring employees outside of the U.S. is becoming increasingly feasible with the proliferation of new technologies and the wider acceptance of work-from-home in the wake of the Covid-19 crisis. Second, if increasing automation and job dislocation results in higher structural unemployment, or if the existing workforce cannot quickly adapt to the requirements of the new job profiles, the result will be alienation, dissatisfaction, polarization and social tensions. The recent social and political turmoil is arguably a taste of what could happen in the absence of an effective policy response.

Depending on how labor supply and demand evolve, they could have a significant impact on wages and lead to further divergence in earnings. For example, talent shortages would bid up the wages for those individuals that have the required skills, widening the gap between routine and non-routine jobs. Likewise robotization would further drive low-skilled workers out of manufacturing and into a service sector where slower productivity gains lead to lower wages, thereby intensifying the hollowing out of the middle class.

Policy response. The shock of the Covid-19 pandemic along with the impact of the information revolution raise the question if there needs to be a policy response to the skills and opportunity gaps. The former implies broadening educational attainment and improving the quality of education, digital literacy and the ability for continuous learning. This will boost productivity and economic growth. The latter requires modernizing and improving the social safety net to help curb down income inequality.

Policies aimed at improving education and subsidizing training will be successful if they boost productivity and opportunities for workers, particularly in disadvantaged communities. In the past, when employment demand shifted from agriculture to manufacturing and services, reading, writing and critical thinking became highly important to obtain training and perform on-the-job tasks. The response was the introduction of the modern educational system. With the new industrial revolution in full swing, a reorganization of the educational system is required to improve digital literacy, critical reasoning and the ability to both quickly learn new skills and adjust to a rapidly changing environment. In addition, longitudinal studies show that high-quality early learning has a positive and significant impact on educational attainment, professional success and lifetime income.[10]

Since technological progress accelerates in a non-linear way, many individuals will still lag behind. Therefore, other policies that provide a living wage and meaningful work may still be required. For the most part, these options aim to transfer income from the winners to the losers of automation. These include universal basic income, a citizen's dividend, guaranteed minimum income, income tax credits, negative income taxes, a more progressive income tax system and taxing robots. Other options include baby bonds, which aim to build enough savings after birth and until the person becomes a young adult to cover the costs of college or buying a house, as well as a job guarantee program whereby the government temporarily hires displaced workers during periods of high unemployment while they get a chance to gain new skills.

The scope and direction of the policy response will depend on the political balance of power, the pace of the recovery and the demands of the electorate. Democrats support expanding paid sick leave, increasing spending on education, implementing universal early childhood education, expanding trade adjustment assistance, raising the federal minimum wage and improving union participation. Meanwhile, Republicans support school choice, increasing investment in aerospace and healthcare research, supporting technology startups, deregulating labor markets, cutting taxes, lowering the cost of housing and boosting access to financial markets. Both parties would also like to incentivize reshoring and increase employment in manufacturing, which has declined significantly since the 1990s. Regardless of who wins the election, the policy responses have to be implemented in a way that do not drive down innovation and education, as this will result in lower productivity and a net welfare loss. In other words, policymakers need to collaborate and be open-minded, allowing for the design and testing of different alternatives to both tackle the challenges and maximize the benefits of the fourth industrial revolution.

10: Sylva, K. et al. (2010). Early Childhood Matters. Evidence from the Effective Pre-school and Primary Education Project. Routledge.

Disclaimer