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ECONOMIC ANALYSIS

# The case of missing wage growth

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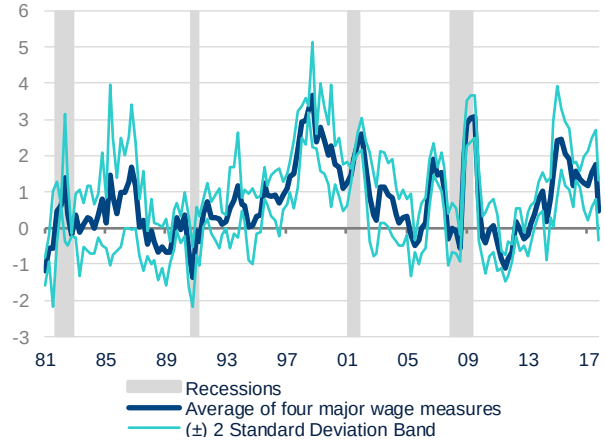
**The flows to and from full-time employment occurred disproportionately for low-skilled workers during the Great Recession, thereby elevating median real wage growth. Conversely, the secular shift in demographics – namely the retirement of baby-boomers - contributed negatively to median real wage growth in the post-Great Recession recovery. The General Purpose Technology advancements, Information Communication Technology and digitization, are the common factors behind three major trickle-down structural contributors to stagnant real wage growth – low productivity growth, the decline in labor income share, and the rise in wage growth distribution inequality. Policies geared towards investment in human capital are necessary to unravel the use of technological advancement to promote widespread prosperity.**

The muted growth in wages has been central to the ongoing discussions on the health of the U.S. economy, labor automation, offshoring, and aging. The weakness in wage growth that accompanied the post-Great Recession recovery has called into question the usefulness of mainstream economic models in explaining the phenomenon and has warranted examination of the structural challenges that face the U.S. economy.

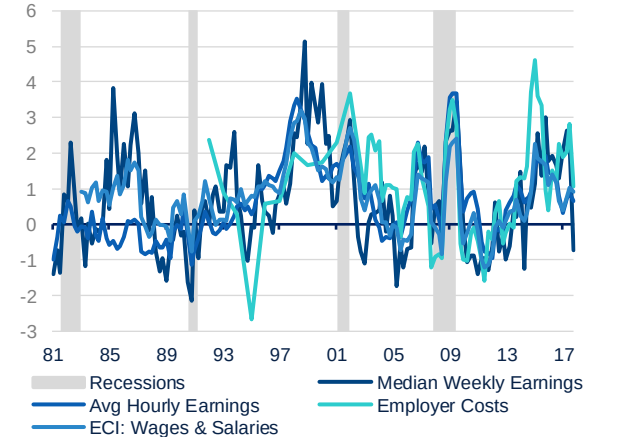
> *"Generally in a strong labor market where many firms are having difficulty finding qualified workers, we would expect just through normal demand and supply channels to see some upward pressure on wage growth over time…It remains at a low level, but we would expect in the context of an ongoing strong labor market to see some upward pressure…" Federal Reserve Chair Yellen, Press Conference, December 14, 2017*

**Figure 1.** Real Wage Growth
(%, year-over-year change)




Source: BEA, BLS, & BBVA Research

**Figure 2.** Real Wage Growth
(%, year-over-year change)




Source: BEA, BLS & BBVA Research

In line with standard economic theory, wage growth is expected to exhibit pro-cyclical changes – to slow during recessions due to the labor slack and loss of jobs and to pick-up during expansions due to tighter labor markets and a decline in the unemployment rate - over the short-term. In addition, the societal expectation of each generation having an improved living standard compared to the previous generation necessitates increases in real wage growth over time.

Nevertheless, aggregate measures of wage growth have at times exhibited counter-cyclical behavior and over the long-run appear to be stagnant. For example, in the ninth year of post-Great Recession growth, the 2017 fourth quarter economic report showed that total nonfarm workers' compensation adjusted for inflation grew 1.1% over four quarters. At the same time, 2017 fourth quarter nonfarm payroll gains averaged an increase of 221K jobs per month and the unemployment rate remained steady at 4.1%. By contrast, in the first quarter of 2009 during the Great Recession, as the unemployment rate was on the rise at 8.3% and the nonfarm payroll loss averaged at 764K jobs per month, the same measure of employment compensation reported 3.2% real growth. Moreover, the annual average growth rate for median real earnings from 2010-2017 was 0.4%, which is the same rate as that of the 1980s and is 50 percentage points lower than the rates seen in the 1990s and 2000s.

## Employment flows, aging, and pro-cyclical wage growth

Empirical analysis determined that while individual wage growth exhibits pro-cyclical fluctuations, there is no single pattern of cyclicality in aggregate real wage growth throughout US history. In fact, real wage growth moved counter-cyclical relative to the unemployment rate from the late-1980s to the mid-1990s and during the Great Recession, while the relationship appeared to be acyclical in the late-1990s.

Research into the aggregate real measures of employment compensation has explored the changes in the composition of earners in the survey and concluded that the composition effect is behind the observed counter-cyclical periods in aggregate wage growth. When wage growth series such as median weekly earnings growth is divided into two parts 1) changes in composition associated with the earnings of the workforce that shifts employment status, and 2) wage growth associated with the earnings of the workforce that stays employed full-time, then the data show that the wage growth effect is indeed pro-cyclical.

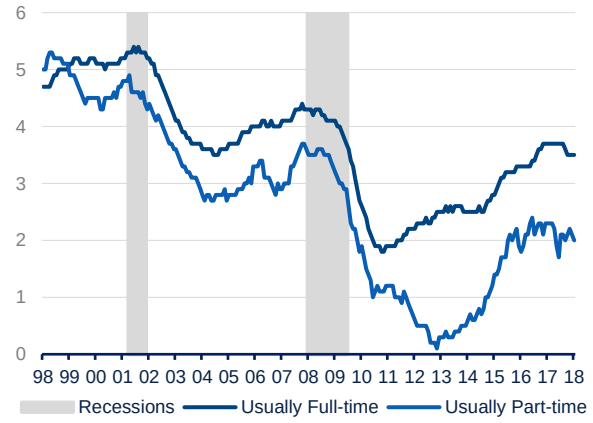
**The composition effect** reflects the change in the composition of the workforce, such as flows to and from part-time jobs, unemployment, and people leaving the labor force entirely. During recessions, the flow of workers out of the full-time workforce into the part-time, unemployed, or out of the labor force categories occurs disproportionately for low-skilled and therefore low-paid earners. Thus, the composition effect created an "upskilling" effect and biases wage growth upwards during recessionary phases. The offsetting weight of the composition effect was strongest during the Great Recession in comparison to past recessions.

Additionally, the vast majority of the negative impact on median earnings growth from the composition effect has been due to the elevated share of the workforce moving to- and from- part-time employment and to- and from- the labor force, rather than to-and-from unemployment. The unemployment margin accounted only for the 3.8% of wage growth variance.

By contrast, the flows to and from part-time work and to and from the labor force accounted for 5.7% of real wage growth variance.[1]

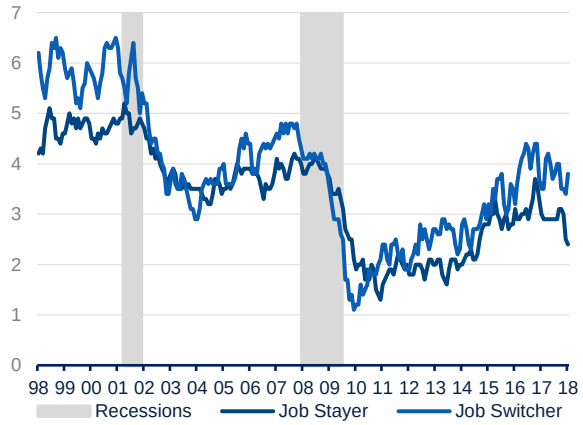
**The wage growth effect** among the full-time employed, in the tight labor market, is due to wage upgrades of job-switchers rather than job-stayers whose wage variation is low throughout the cycle. The job-switchers account for nearly half of the variation in median earnings growth during economic expansions.[2]

**Figure 3.** Median Wage Growth by Employment Type (%, 12 month moving average)



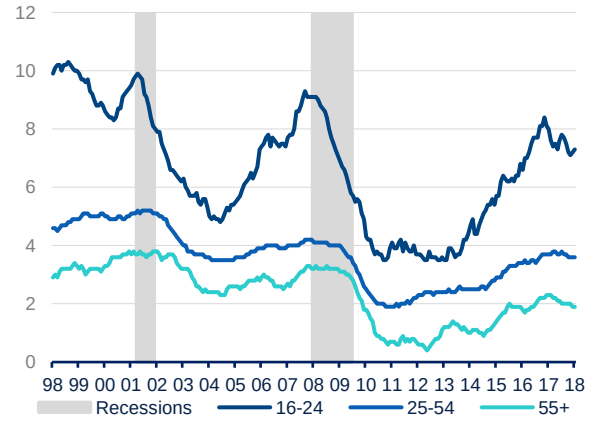

Source: CPS Survey, BLS, FRB Atlanta & BBVA Research

**Figure 4.** Median Wage Growth by Job Continuity (%, 12 month moving average)



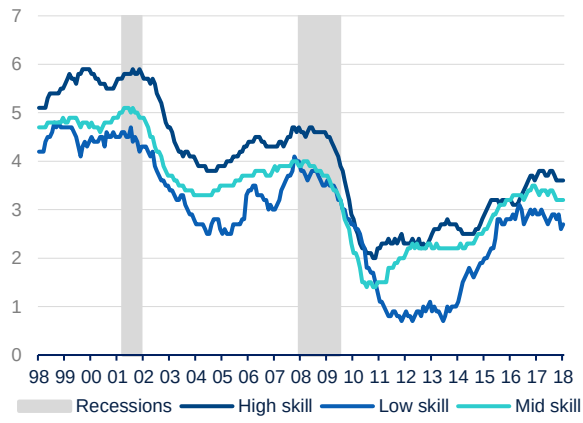

Source: CPS Survey, BLS, FRB Atlanta & BBVA Research

**Figure 5.** Median Wage Growth by Age (%, 12 month moving average)




Source: CPS Survey, BLS, FRB Atlanta & BBVA Research

**Figure 6.** Median Wage Growth by Occupation (%, 12 month moving average)




Source: CPS Survey, BLS, FRB Atlanta & BBVA Research

1: Daly and Hobijn (2016)
2: Daly, Hobijn and Wiles (2012)

Overall, the secular shift in demographics, namely the retirement of baby-boomers, has contributed negatively to median real earnings growth. Thus, the flows to and from full-time employment have remained elevated since the Great Recession and so did the drag on median earnings. Decomposition of median earnings reveals that as the baby-boomers began retiring, the share of exits from the above median earnings levels increased. However, 79.3% of the entrants who went from being out of the labor force to being in the full-time workforce acquired jobs with a below median wage. The share of below median earners exiting from full-time work to being out of the labor force is estimated at 66%.[3]

## The road to a higher living standard

A rise in worker productivity should ensure improvement in living standards by means of sustainable real wage growth. However, the assumption that labor productivity growth – an increase in output produced per labor hour – directly translates into real wage growth and subsequently a higher living standard is not necessarily true. In order to maintain the direct link between productivity, wage growth, and the quality of life, a few things are required. First, workers should continue to collect the same share of produced output as in previous years. Second, there should be an equitable distribution of wage gains. However, upward pressures on real wages have been limited and wage growth has been stagnant due to low productivity growth, a decline in labor income share, and a rise in income growth inequality.

U.S. productivity growth has switched into a lower gear since 2004 averaging 1.9% per year from 2005 to 2009 and has reached historic lows with an average rate of 0.7% per year since the Great Recession. By contrast, productivity growth from 1996 to 2004 averaged at 3.1%. In addition, the labor income share declined from 63.2% in 2000 to its historic low of 56.6% in 2017, and the ratio between the ninth and the first deciles of the weekly wage distribution increased by 13%.

The rise of Information and Communication Technology (ICT) and digitization emerges as a common factor behind three major trickle-down structural components of stagnant real wage growth. ICT and digitization meet all of the check marks that classify them as General Purpose Technology (GPT). Studies illustrate that GPTs are accompanied by an initial period of low productivity, followed by an increase in the premium for high-skilled labor and a reallocation of the stock of human and physical capital.[4] GPT is characterized by the following three features: 1) pervasiveness – it should spread to most sectors; 2) improvement – it should become better over time and continue lowering costs for its users; and 3) innovation spawning — it should make it easier to invent and produce new products.

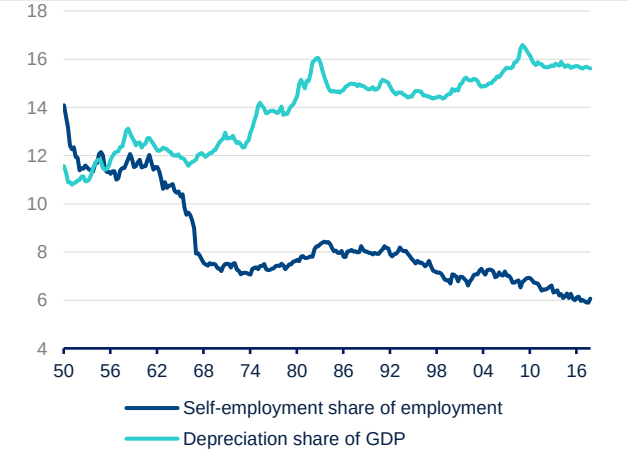
**Productivity:** Studies find that the slow-down in productivity during the adoption period of GPT is due to reasons such as adjustment costs, learning delays, the speed of technology diffusion, lags between the technological frontier and implementations due to the high costs involved, and the introduction of complimentary products.[5] The 2004 switch to a lower productivity regime in the U.S. economy coincides with the economy-wide adoption of ICT and a spike in young ICT firm entrants.

3: Daly, Hobijn and Pyle (2016)
4: Jovanovic and Rousseau (2005)
5: Jovanovic and Rousseau (2005)

**Labor income share:** GPT leads to reallocation of an economy's stock of human and physical capital. In the specific case of ICT and digitization, these phenomena have led to the creation of a new type of capital – digital capital. Additionally, ICT and digitization have led to a rise of "superstar firms" which have low labor shares and high profitability.[6] Studies on the previous episodes of GPT – the adoption of electricity and of information technology - have illustrated that the penetration of GPT is accompanied by the entry of young firms, the exit of slow adopters, and mergers. The pressure to adopt effectively new technologies benefits new and younger firms with younger leadership. In line with studies, the growth of new firms is fast and every stage of the firms' lifetime is shorter.[7]

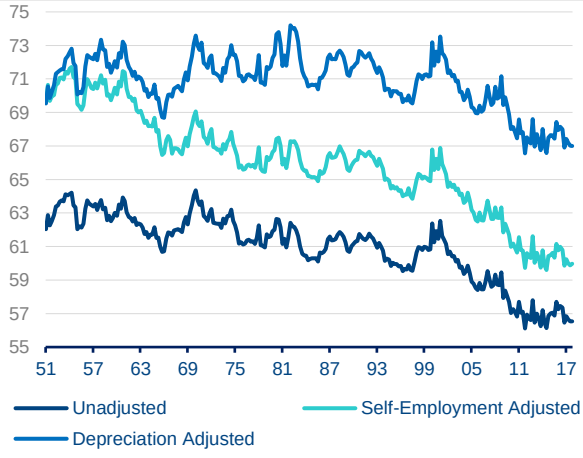
Both ICT and digitization have resulted in a steep decline in the use of investment products thereby lowering the user cost of capital. This has led firms to substitute labor with capital and hence has resulted in a lower labor income share. In contrast to the effect of past GPTs, ICT and digitization have fundamentally changed the concept of mobility and thus have contributed immensely to the globalization of the labor market and offshoring of jobs. The higher capital intensity and accessibility of offshoring have lowered labor's bargaining power and weakened labor institutions' power, further reducing the labor income share.[8] At the same time, the vital characteristics of pervasiveness have also resulted in reallocation between human, physical and digital capital within industries rather than the reallocation of capital to other sectors. The International Monetary Fund's study finds that globally with the exception of China, 90% of changes in labor income shares are due to changes that occur within an industry.[9]

**Figure 7.** Structural Shifts
(%)




Source: BEA, BLS, & BBVA Research

**Figure 8.** Labor Income Share and Adjustments
(%)




Source: BEA, BLS & BBVA Research

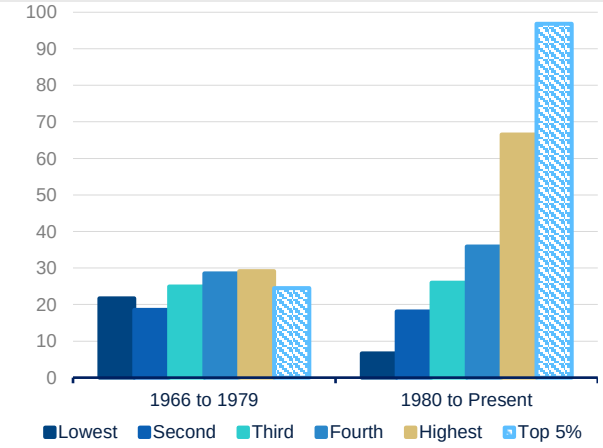
Additionally, the decline in the labor income share could also be partly due to a measurement issue such as the statistical treatment of self-employed income and capital depreciation. Since the statistic for employee compensation captures only the compensation of payroll employees, the labor income share increases when the compensation measure is adjusted

6: Autor et al. (2017)
7: Jovanovic and Rousseau (2005)
8: Harrison (2002)
9: IMF (2017)

for the self-employed. Similarly, the labor share would reflect conditions more accurately if it were adjusted for depreciation, since depreciation cannot be consumed and therefore must attributed to either capital or labor. Accounting only for payroll employees' compensation and depreciation would likely fail to properly reflect structural changes within the economy, especially considering the growing weight of information, communications, and digital capital, which depreciates faster than the other types of capital.[10]

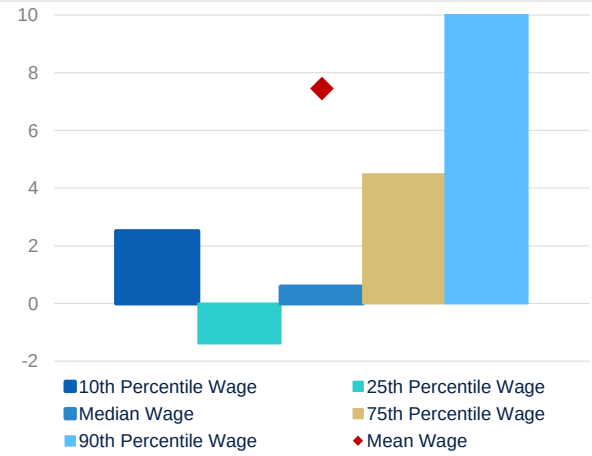
**Wage growth distribution:** The increase in real wage growth inequality and residual inequality is closely related to the upsurge of capital-embodied ICT. Overall, technological advancements and, subsequently, educational attainment have rewarded high-skilled workers. Meanwhile, globalization, trade, and automation have put downward pressure on low-skilled workers' earnings and have resulted in job losses for the middle-skill occupations. ICT has also made skills in non-routine cognitive activities highly valuable and has elevated the premium on jobs that require problem solving, creativity, coordination of tasks, and abstract thought. Thus, residual inequality that rewards the unmeasured skills of high social and cognitive intelligence, superior natural talent, faster adaptability, the ability to innovate, and good ability to cope with the uncertainty of rapidly changing technology, has increased.

**Figure 9.** Mean Real Income Growth Received by Each Quintile and Top 5 Percent of Families (%)




Source: CPS & BBVA Research

**Figure 10.** All Occupations, 2001 to 2017 Annual Real Wage Growth (%)




Source: CPS & BBVA Research

Studies also find evidence that low-skilled immigration and institutional constraints such as weak collective bargaining power and the erosion of the real value of the minimum wage are significant factors behind low real wage growth for those in the bottom of the distribution. Empirical analysis has additionally identified a rise in establishment inequality, namely that pay differences between different establishments employing people in the same occupation have also been a major source of inequality. In the case of smaller firms, wage growth inequality is found between businesses, while for larger firms the inequality rise is within companies. The study examining wage growth at leading tech/telecom firms and leading

10: Karabarbounis and Neiman (2014)

industrial firms found that real wages are higher and wage growth is faster in the tech/telecom sector. Additionally, the tech/telecom sector rewards middle-skill occupations with significantly higher wages.

## Policy Implications

Technological change is not a rationalization of all the causes of muted real wage growth. However, it is the driving force behind the structural shifts that have resulted in low real wage growth in the U.S. and in other advanced economies. The evidence supports the assertion that technological advancements are uneven. Each new episode of GPT is coupled with an initial period of structural economic shifts, low productivity, and a lower living standard for certain subgroups of the population, but spurs higher growth and prosperity in the future. The current penetration of ICT and digitization is not expected to be any different. Many economists agree that it is institutions that lag behind in matching the demand for new skills and attributes of workers with the adequate supply. Thus, the rise of unequal wage growth is the consequence of a slowing rate of accumulation of human capital.[11]

A policy action that could be effective at remedying this situation is the promotion of education reforms that give unskilled workers the opportunity to raise their skills premium. These policies combined with others that encourage innovation and entrepreneurship can help developed nations compete in an increasingly globalized world. The literature on strengthening reemployment in the U.S. has suggested several policy changes, such as 1) allow claiming of unemployment benefits while receiving entrepreneurial training and assistance in setting up a business; 2) supporting the unemployed while they are in temporary positions and internships that might lead to full-time jobs; and 3) providing partial benefits to the unemployed who have accepted part-time jobs.[12] Land-use policies that restrict labor movement to high productivity areas as well as occupational licensing policies that restrict new entrants into the field affect both long-term and short-term real wage growth. Studies on U.S. occupational licensing found that licensing has significant effects on wage determination, benefits, and employment, while also imposing a net cost on society with a slight improvement in safety, health, and service quality.[13]

Adjusting the minimum wage for inflation would change inequality outcomes for those at the lower end of the wage distribution and would increase median real wage growth. Evidence shows that wage growth in the bottom decile was strongest in states that legislated minimum wage increases. Additionally, wage growth was higher both in states with legislated increases and in states with indexed increases.[14]

11: Acemoglu and Autor (2012)
12: Kugler (2015)
13: Kleiner (2015)
14: Gould (2016)

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