Wage Against the Machine

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The trauma from the Great Recession has faded for most workers. However, paycheques are still rising only modestly in developed nations (*Chart 1*), held back by weak labour productivity, declining unionization, low inflation expectations, and globalization. As well, retiring workers are being replaced by younger, lower-paid workers, while intense retail competition is holding back prices and a company's ability to raise pay.

Even in the U.S., where qualified workers are in short supply, labour costs remain well behaved. It's unlikely that insecurities from the Great Recession are still weighing, given high levels of consumer confidence. However, **automation could be a longer-lasting influence on worker anxieties and wages**. If so, wages could remain low for a while, restraining inflation and interest rates.

By all accounts, the **U.S. labour market is near full employment**. Several measures of joblessness are at multi-decade lows (*Chart 2*), while short-term unemployment is the lowest in half a century. More than half of the 16 indicators in our measure of labour market slack are "tighter" than normal. Slower hiring suggests companies are struggling to find even low-skill workers to fill a record number of openings (*Chart 3*), as noted in the Fed's Beige Book.

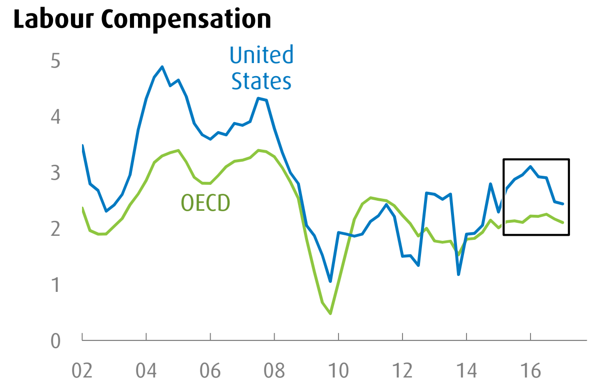
Despite shortages, workers aren't getting paid much more than before. After rising smartly in 2015, hourly compensation per hour has barely kept pace with inflation. If labour scarcity was pressuring wages, one would expect to see larger increases in states with low jobless rates. But that's not the case (*Chart 4*).[1] In fact, Colorado and North Dakota have some of the lowest jobless rates and slowest wage gains in the country. Sample size on an industry basis is too small to make statistical inferences, but there appears to be no correlation between earnings growth and jobless rates or job openings.

Of course, wages could still lift off. The national jobless rate was 4.3% or less on two previous occasions in the past half century—from 1965 to 1970, and from 1999 to 2001. In both cases, unit labour costs accelerated—by nearly 6 ppts in the 1960s and 2 ppts in the tech boom—while core inflation rose. What's different this time, however, is that **new automation is working its way up and down the skills' chain**, threatening a wider range of jobs than in the past, including many non-routine positions.

[1] The relationship is also insignificant if we regress wage growth on the difference between the current jobless rate and its long-run average.

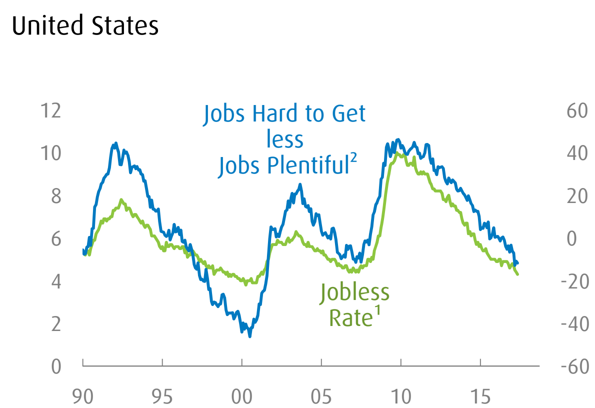
Chart 1
Comp Lacks Pomp

(4-qtr m.a. : y/y % chng)



Sources: BMO Economics, Haver Analytics

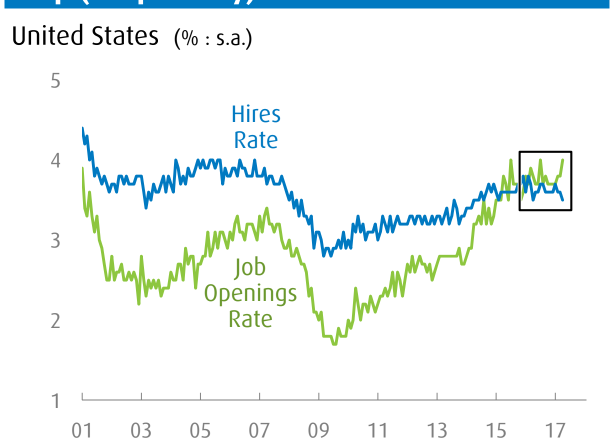
Chart 2
Easy Job Pickings



[1] (lhs : % : s.a.) [2] (rhs : ppts : s.a.)

Sources: BMO Economics, Haver Analytics, Conference Board

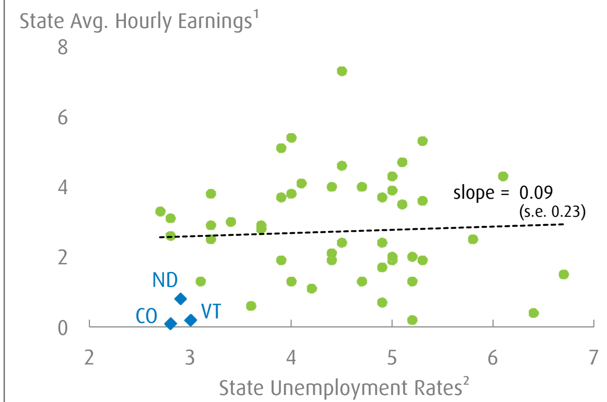
Chart 3
Help (Desperately) Wanted



Sources: BMO Economics, Haver Analytics

The Role of Advanced Automation in Depressing Wages

Chart 4
Scattered Relationship



[1] April 2017 (12-mnth avg. : y/y % chng) [2] 2017 Q1 (%)
Sources: BMO Economics, Haver Analytics

Much has been written about the role of automation in displacing workers. Less well understood is the impact on wages. Yet, **automation is advancing so fast and across so many industries today that workers' anxiety is likely increasing**. Advances in robotics are reducing manufacturing jobs, while automated checkout machines and self-serve ordering kiosks are threatening more retail positions. Insecurity stemming from the proliferation of advanced automation is likely dissuading workers from demanding raises. American workers are probably less likely to be replaced by humans than by machines or algorithms. Although automation tends to boost productivity and wages, this might not be the case when workers are worried about losing their job to a computer.

The OECD thinks technology rather than globalization is the root cause of job insecurity.[2] **Automation is largely responsible for the hollowing-out of middle-skill positions**. From 1995 to 2015, the share of middle-skill jobs in OECD nations fell by nearly 10 ppts, largely to the benefit of high-skill workers. McKinsey says that nearly half (45%) of work-related activities could be performed by current technology.[3] Another study finds 47% of American jobs are at high risk of losing out to automation in the next decade or two.[4] At high risk are workers in transportation, office support, administration, accounting, retail and manufacturing. Drivers of taxis and delivery vehicles will be increasingly threatened by ride-hailing services and self-driving vehicles. The growing use of robots for pre-fabrication will displace more construction jobs. Automation will accelerate the shift from high-paying manufacturing jobs to lower-paying service jobs.

In most occupations, automation can still do less than half of what humans do. Lawyers still need to prepare and prosecute cases, even if more of their research can be performed by artificial intelligence. McKinsey says that more jobs will be *"partially automated before fully automated"*. However, **about 60% of jobs could have 30% or more of their tasks automated**. Knowing that much of what you do can be done by computer likely dissuades many workers from demanding raises.

The defining feature of a job at risk of automation is repetition. For two decades, there has been no net increase in the number of routine manual or cognitive jobs, compared with steady growth in non-routine positions.[5] Relatively safe occupations (for the moment at least) are those that require creativity, flexibility and judgement (e.g., architects, managers and judges) or involve caregiving and human interaction. No

[2] OECD. http://www.oecd.org/employment/jobs-gap-closes-but-recovery-remains-uneven.htm

[3] *A Future That Works: Automation, Employment, and Productivity*. McKinsey and Company. January 2017. http://www.mckinsey.com/global-themes/digital-disruption/harnessing-automation-for-a-future-that-works

[4] Frey, Carl B. and Michael A. Osborne. *The Future of Employment: How Susceptible are Jobs to Computization?* September 17, 2013. http://www.oxfordmartin.ox.ac.uk/downloads/academic/The_Future_of_Employment.pdf

[5] Maximiliano Dvorkin. *Jobs Involving Routine Tasks Aren't Growing*. January 4, 2016. https://www.stlouisfed.org/on-the-economy/2016/january/jobs-involving-routine-tasks-arent-growing

surprise that over half of the 30 fastest-growing jobs in the next seven years will involve caregiving.[6]

Today, automation is no longer confined to displacing positions that involve routine procedures. Even cognitive non-routine tasks are at risk. Artificial intelligence can examine x-rays to diagnose diseases, recognize investment patterns to customize portfolios, and mine “big data” to write analytical reports, thereby doing tasks performed by radiologists, financial planners and journalists (and, gulp, even economists!). Robots equipped with vision sensors to accumulate and process reams of data can perform an increasing range of manual and service jobs.

As prices fall and performance improves, the benefits of automation will outweigh the costs, accelerating usage. One study projects the cost of an industrial robotics system will fall from around $28 per hour today to less than $20 in 2020, which is below the average worker’s wage.[7] This will increase the share of manufacturing tasks performed by robots globally from around 10% to around 25% by 2025.

The positions most vulnerable to automation tend to be low paying. McKinsey finds a strong adverse relationship between wages and automation potential.[8] Frey and Osborne also find that occupations most at risk from automation pay the least. Another study that looked at U.S. job and wage data estimates that each new robot per 1000 workers reduces wages by 0.25% to 0.5%.[9]

As noted before, many factors other than automation are restraining wages. Indeed, pay increases remain modest even in industries that are less technology-intensive, such as construction and resources. However, **the adverse impact on wages could increase as more tasks are automated**. As well, worker shortages may actually encourage U.S. companies to invest more in technology. A recent Roundtable CEO Confidence survey showed stronger capital spending intentions but slower hiring plans, suggesting this shift is already underway.

Robots and artificial intelligence won’t repeal the Phillips’ curve. Inflation is largely a monetary phenomenon—wage costs will rise if worker shortages worsen and the Fed keeps policy loose. However, **the upswing in wages (and inflation) could be muted if automation anxiety spreads to more people worried about losing their job, or parts of their job, to robots**. While companies may be content for now to retain some workers who could be replaced by machines—many customers still prefer a friendly face—automation is getting cheaper, better and more customer-friendly. Longer-run, the payoff from increased automation will be higher productivity and better wages for high-skill workers. For others, high anxiety and low wages may be the new norm.

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6 Bureau of Labor Statistics. https://www.bls.gov/emp/ep_table_103.htm

7 Sirkin, Harold L., Zinser, Michael and Justin Ryan Rose. September 2015. The Robotics Revolution: The Next Great Leap in Manufacturing. The Boston Consulting Group. https://www.automationsmaland.se/dokument/BCG_The_Robotics_Revolution_Sep_2015.pdf

8 Chui, Michael; Manyika, James and Mehdi Miremadi. *Four Fundamentals of Workplace Automation*. McKinsey and Company. November 2015.

9 Acemoglu, Daron and Pascual Restrepo. Robots and Jobs: Evidence from US Labor Markets. March 17, 2017. https://economics.mit.edu/files/12763