2021: A Price Oddity

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> *"This mission is too important for me to allow you to jeopardize it"*
> —HAL 9000 to Dave in *2001: A Space Odyssey*
>
> *"I would want to see a need for further rate increases, and for me a big part of that would be inflation"*
> —Federal Reserve Chair Powell, January 30, 2019

When even the Fed Chair questions the need to lift interest rates further, despite the lowest jobless rate in nearly half a century, you know something odd is happening with inflation. That something is largely due to the restraining effect of automation and digital technologies. Advanced automation is raising business efficiencies, suppressing wage demands of workers anxious about displacement,[1] and lowering the cost of information and communications gear (*Chart 1*). In fact, **automation has the potential to reduce inflation on a wide number of fronts**.[2]

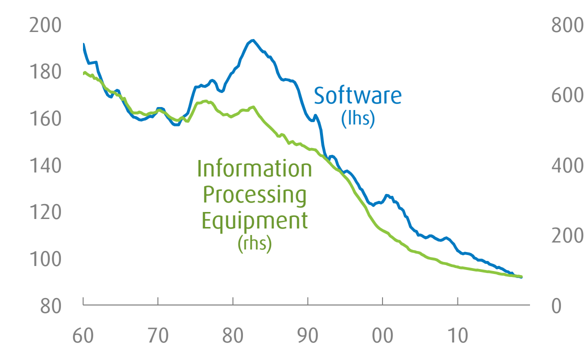
Robots are routinely used in factories to cut costs. World-wide sales of industrial robots jumped 30% to over 381,000 units in 2017.[3] The average number per 100 factory workers rose 15% to 0.9. South Korea led the way with 7.1 robots per 100 workers followed by Singapore (6.6) and Germany (3.2), while the U.S. and Canada placed seventh and thirteenth. Although robots account for a small share of productive capacity, their use is growing and will accelerate as they get cheaper and more useful. Today, "smart manufacturing" uses robots equipped with sensors, 3D printing and artificial intelligence (AI) to streamline the factory process, from supply chains to fabrication to quality control. Sensors are reducing downtime arising from equipment failure and parts shortages, while giving robots increased mobility. Robotic arms are approaching the versatility of a human hand.

Automation is also lowering retail prices. By automating almost every facet of its massive distribution centres, Amazon uses just one minute of human labour (and falling) after a product is ordered to get it onto a delivery truck. Using robots that can carry up to 750 pounds and AI to choose the correct package size, goods are quickly sourced, boxed and delivered. The largest of its 24 fulfillment centres in North America can process one million orders a day, giving a sense of the magnitude of savings. Using an advanced logistics system, U.K. online grocery store Ocado can deliver groceries at about the same

Chart 1
Always On Sale

United States (2012 = 100)

Private Non-res. Investment Chain Price Index



Sources: BMO Economics, Haver Analytics

1 June 16, 2017 *Focus Feature* "Wage Against the Machine". https://economics.bmocapitalmarkets.com/economics/focus/20170616/feature.pdf

2 However, there is likely still an inflection point in the economy where joblessness becomes so low that price pressures emerge. We currently believe this point is around 3.5% in the U.S. and 5.5% in Canada, though it could be lower.

3 International Federation of Robots. "Executive Summary World Robotics 2018 Industrial Robots" https://ifr.org/downloads/press2018/Executive_Summary_WR_2018_Industrial_Robots.pdf

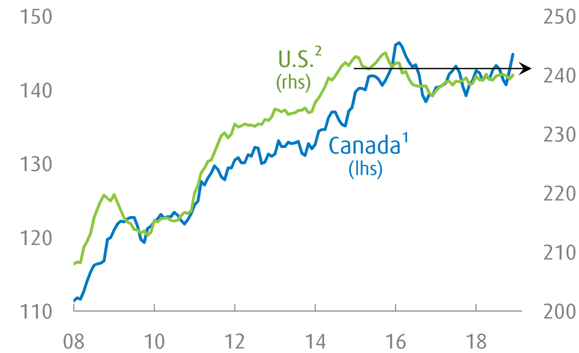
cost as provided in a store. Technological advances in growing and processing food are one reason groceries, on average, cost little more today than three years ago (*Chart 2*). The ultimate goal of retailers is to store and process physical goods about as efficiently as digital data, providing faster service at lower cost.

The next major source of cost savings from automation is delivery. Just as the internet transformed the distribution of financial services and digital entertainment, advanced robots, self-driven vehicles and AI will revolutionize the transportation of physical goods, cutting costs in the process. In coming decades, robots will load goods onto self-driven trucks and drones, while AI-driven apps will mine data on traffic, weather conditions and road closures to calculate the optimal delivery route.[4] In fact, drones may even deliver hot coffee as you walk to work (don't laugh, IBM has a patent on it!). The aim is to deliver products super-fast, say within an hour, dealing a further blow to bricks-and-mortar stores—few of which will be inclined to hike prices.

The **use of advanced automation to cut costs is extensive**. AI-driven conversational skills will allow kiosks to better interact with people. Enhanced vision will allow robots to recognize obstacles (like people) and work safely around employees and customers. Walmart plans to roll out AI-driven robots to clean its floors. More retailers will use robots to roam aisles and scan shelves for real-time inventory monitoring. AI can now recognize images, objects and faces better than humans. As a result, farmers can apply pesticides directly on weeds instead of crops, reducing the amount used (and ingested by people). Kiosks using facial recognition technology will check guests into hotels and greet customers in stores. AI will one day replace almost all customer service (no more repeating the same gripe to a parade of representatives). Real-time language translation will facilitate business travel. As automation performs more non-routine tasks, companies will potentially gain further leverage in controlling wages, keeping a lid on roughly 70% of operating costs.

Chart 2
On A Diet

CPI for Food Purchased from Stores

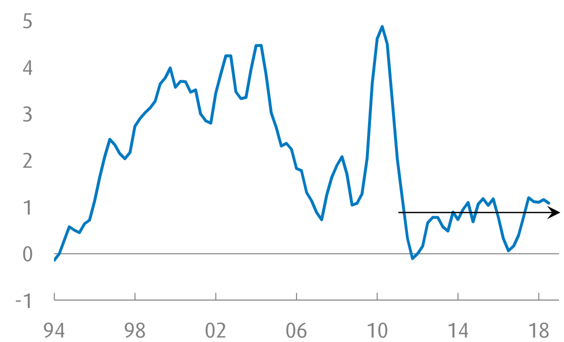


[1] 2002 = 100 [2] 1982-84 = 100
Sources: BMO Economics, Haver Analytics

Chart 3
Where's The Payoff?

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

Business Sector Labour Productivity



Sources: BMO Economics, Haver Analytics

Technology is relentless in fostering competition. Workers vie with robots, bricks-and-mortar stores contend with online sellers, hotels compete with Airbnb landlords, and taxi drivers go toe-to-toe with Uber drivers. The end result is that more companies and workers are reluctant to seek higher prices for their wares. Wages are being held back for all but a small group of workers developing and operating advanced automation and AI, or those using the technology to become more efficient. This, in part, explains the downward lurch in labour's share of income.[5]

To be sure, **automation hasn't done much for productivity this decade** (*Chart 3*). That's because it hasn't made large inroads outside of manufacturing, in sectors such

[4] Google Maps and Waze are already highly proficient at mapping out routes.

[5] U.S. labour compensation averaged 56.8% of nominal output in the past decade to 2018Q3, compared with the previous post-war norm of 62.8%.

as health care, education, housing and labour-intensive services (think restaurants, hotels and nursing homes). Consequently, the share of robots to workers remains small, held back by their high cost, lack of skilled operators and safety concerns. Automation may even be depressing aggregate productivity growth by displacing some highly efficient workers and pushing them into lower productivity (and lower paying) services, while creating relatively few very-high productivity positions. Furthermore, companies are inclined to retain staff as backup for machines that can't perform all tasks and are prone to failure, or simply because many customers still prefer a human touch. However, given rapid advances in robotic vision, mobility and dexterity, it's likely a **matter of time before some productivity payoff emerges**. AI is even trying to give robots the ability to express empathy (or at least fake sincerity).

Bottom Line: By enhancing competition, suppressing wages and lowering costs, advanced automation is clamping down on inflation from many angles. As robots multiply in the workplace, machine learning gets smarter, and digital technology rolls out to more sectors, the dampening effect on inflation will intensify, reinforcing low interest rates. The internet and digital technologies have conditioned people to want things faster and cheaper, forcing companies to automate or die—essentially creating a virtuous cycle for consumers, and inflation.

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