

Rural Migration News

Blog 229

JULY 2021

Covid Will Accelerate Automation

The covid pandemic encouraged many service firms to substitute technology for people to limit people-to-people contacts, such as using order-taking apps in restaurants. Many of the new technologies proved to be successful, which may reduce employment in hotels and restaurants over time as wages rise and employers have difficulty recruiting and retaining hotel clerks and restaurant staff.

A new wave of automation could increase productivity and inequality, especially if the low-skill workers who filled service jobs before the pandemic are displaced and cannot find new jobs. This means that some workers who were considered essential during the pandemic in 2020 may wind up jobless or in jobs that pay less if automation allows employers to replaced them with machines and apps.

Service sector innovations that accelerated during the pandemic include apps and voice-recognition devices to order food in restaurants, self-checkout kiosks in supermarkets, and keyless entry in hotels. Driverless forklifts are spreading in warehouses, and rising minimum wages have renewed efforts to automate farm and food processing jobs.

Covid

Occupations can be classified in many ways, including by the ease with which they can be automated, the potential for people-to-people interactions to transmit covid, and the number of employees who could be affected if automation displaces workers. The five occupations with over a million workers and at least (1) a 50 percent chance of being automated and (2) a 50 percent chance of transmitting covid include retail

sales persons, secretaries, cashiers, stock clerks, and personal care aids.

By contrast, five occupations with over a million workers and less potential for automation and transmitting covid include occupations that involve workers who work alone or in small groups, such as truck drivers, grounds maintenance workers, and auditors.

Inequality

Since 1960, the real wages of men and women with graduate degrees rose faster than the wages of workers with less education.

The major reason for differential wage growth by years of schooling is skill-biased technological change, meaning that the demand for highly educated workers rose while the demand for less educated workers declined. As a result, workers who were employed in industries that were shedding jobs such as manufacturing, and workers who were employed in occupations whose jobs could be automated such as clerks, had slower wage growth since 1980 than workers in other industries and occupations.

During the 2008-09 recession, employment fell and unemployment rose. Low interest rates prompted many firms to increase their productivity and profits by substituting capital for labor where possible. During the recovery between 2010 and 2019, firms with the fastest productivity growth such as IT and

5 Large Occupations have a High Potential for Automation and Transmitting Covid

| Five Largest High-Risk Occupations | Probability of Automation (%) | People Contact (%) | Employment in 2020 |
|---|-------------------------------|--------------------|--------------------|
| Retail salesperson | 0.533 | 0.574 | 3,160,827 |
| Secretaries and administrative assistants | 0.589 | 0.529 | 3,024,309 |
| Cashiers | 0.724 | 0.611 | 2,979,325 |
| Stock clerks and order fillers | 0.658 | 0.591 | 1,544,194 |
| Personal care aides | 0.547 | 0.620 | 1,255,453 |

5 Large Occupations have a Lower Potential for Automation and Transmitting Covid

| Five Largest Low-Risk Occupations | Probability of Automation (%) | People Contact (%) | Employment in 2020 |
|--|-------------------------------|--------------------|--------------------|
| Driver/sales workers and truck drivers | 0.489 | 0.275 | 3,279,329 |
| Accountants and auditors | 0.402 | 0.453 | 1,864,126 |
| Post-secondary teachers | 0.151 | 0.473 | 1,366,250 |
| Sales representatives, wholesale and manufacturing | 0.412 | 0.382 | 1,302,196 |
| Grounds maintenance workers | 0.480 | 0.255 | 1,245,202 |

high-tech manufacturing had slow or no employment growth, while firms with where labor productivity fell such as transport, construction, and hospitality had the fastest employment growth.

Robots

Industrial robots are most common in auto and electronics manufacturing. Most of the world's robots are in China, but robot density or the number of robots per 1,000 employees is highest in Korea, followed Singapore and Taiwan.

The number of robots per 1,000 employees was lower in agriculture and construction in 2014 than in manufacturing. Slovenia had the

highest number of robots per 1,000 employees in agriculture, 1.6, while the US had 0.1 robots per 1,000 employees in agriculture.

Covid speeded the installation of robots in 2020-21. During previous pandemics, most of the jobs eliminated by robots did not return, which contributed to rising income inequality. Low-skilled workers who could not work remotely were deemed essential during most of 2020, and some may be displaced by automation in the recovery.

Mexico

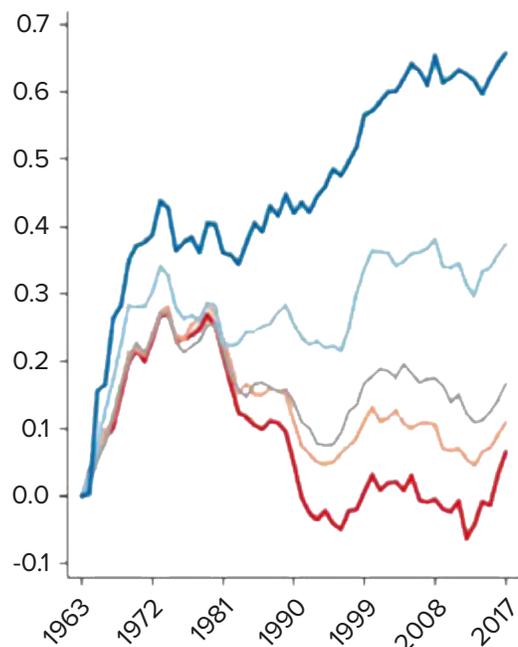
Most analyses of the risks of displacement due to automation focus on industrial countries, but many jobs

in middle-income countries such as Mexico are also at risk. The Banco de Mexico reviewed employment data for the period 2005-17 and concluded that two-thirds of Mexicans are employed in occupations that have a high potential for automation, including jobs in agriculture, hospitality, and manufacturing.

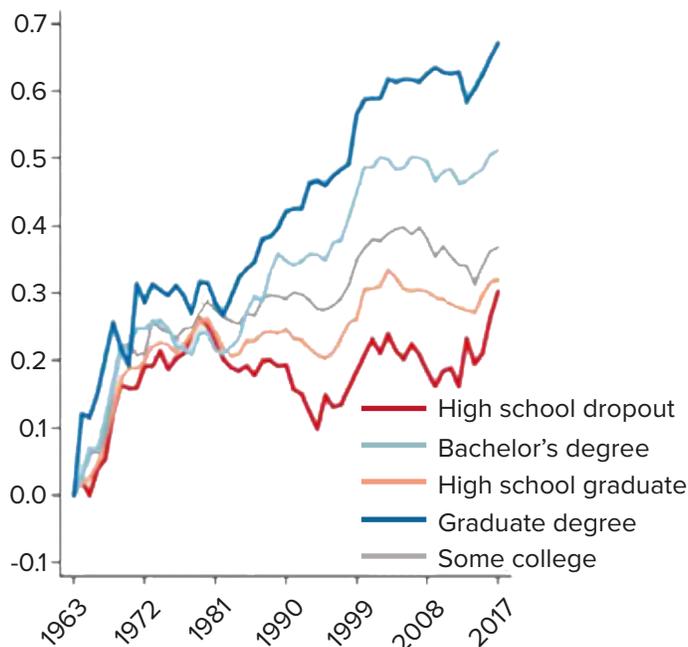
Workers with little education fill many of the jobs in occupations with the highest share of jobs that could be automated. For example, over 80 percent of the jobs held by workers without a secondary school education could be automated, twice the 40 percent share of jobs held by those with higher education.

The Real Wages of Men and Women Who Did Not Complete High School (Red) Rose Slowest Since 1960

Panel A. Men

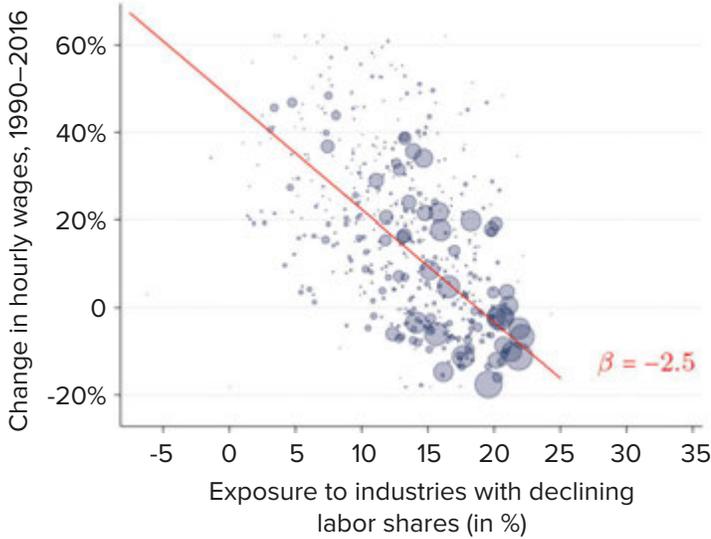


Panel B. Women

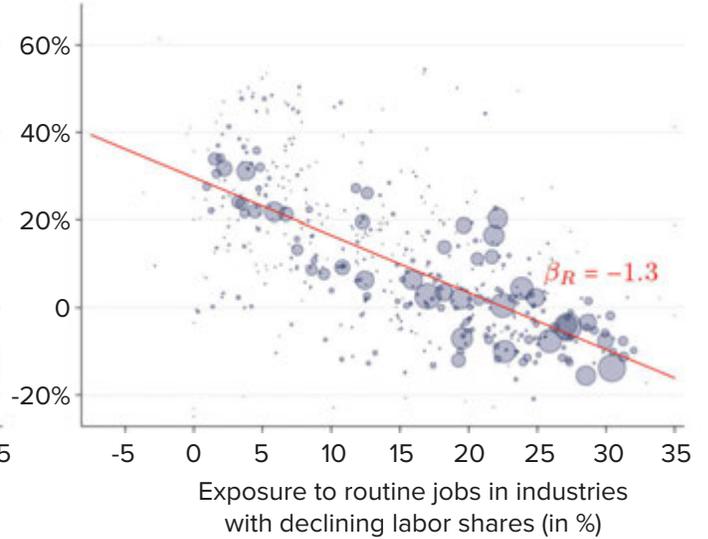


Workers in Industries and Occupations with Declining Employment and Routine Work Experienced the Slowest Wage Growth

A. Role of specialization across industries

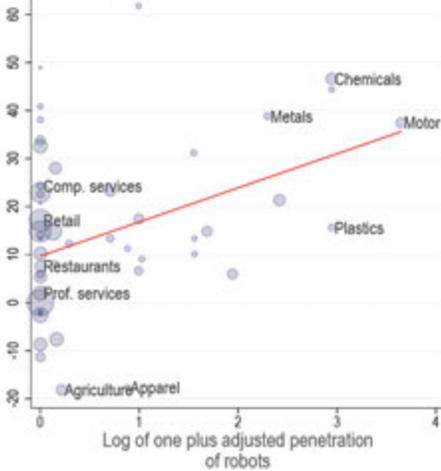


B. Accounting for relative specialization in routine jobs

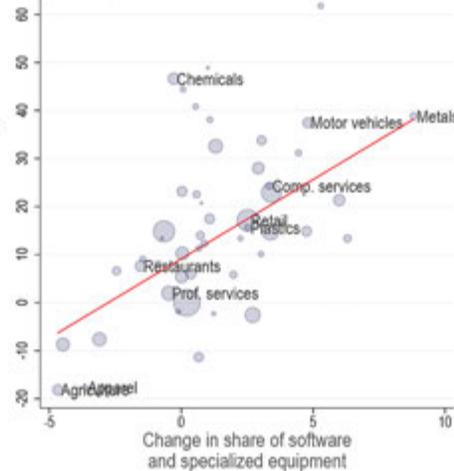


Replacing Workers with Robots, Software, and Automation was Most Common in Auto Manufacturing and Least Likely in Agriculture and Apparel

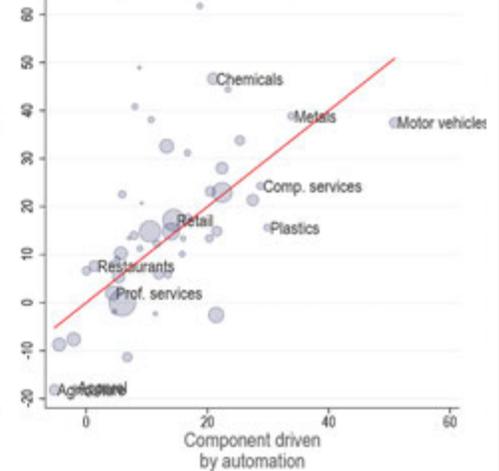
A. Industry task displacement (%), 1987-2016



B. Industry task displacement (%), 1987-2016

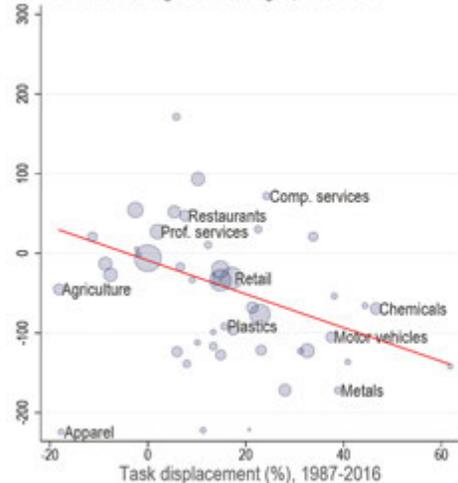


C. Industry task displacement (%), 1987-2016

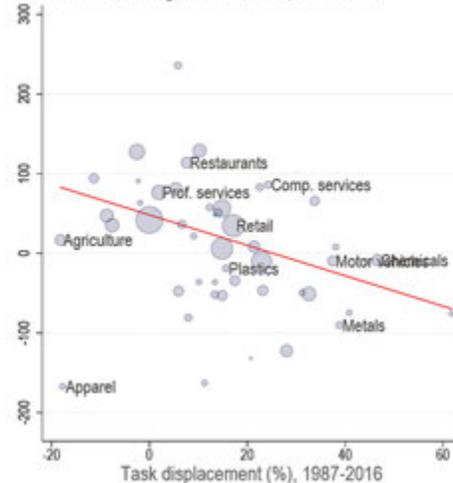


There was Little Change in Wages, Hours, or Employment in U.S. Agriculture, 1980-2016

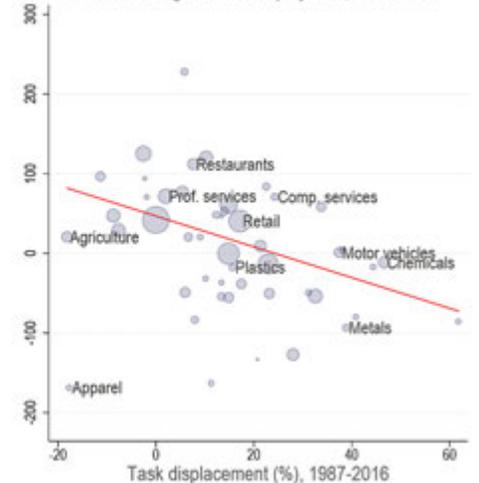
A. Percent change routine wages, 1980-2016



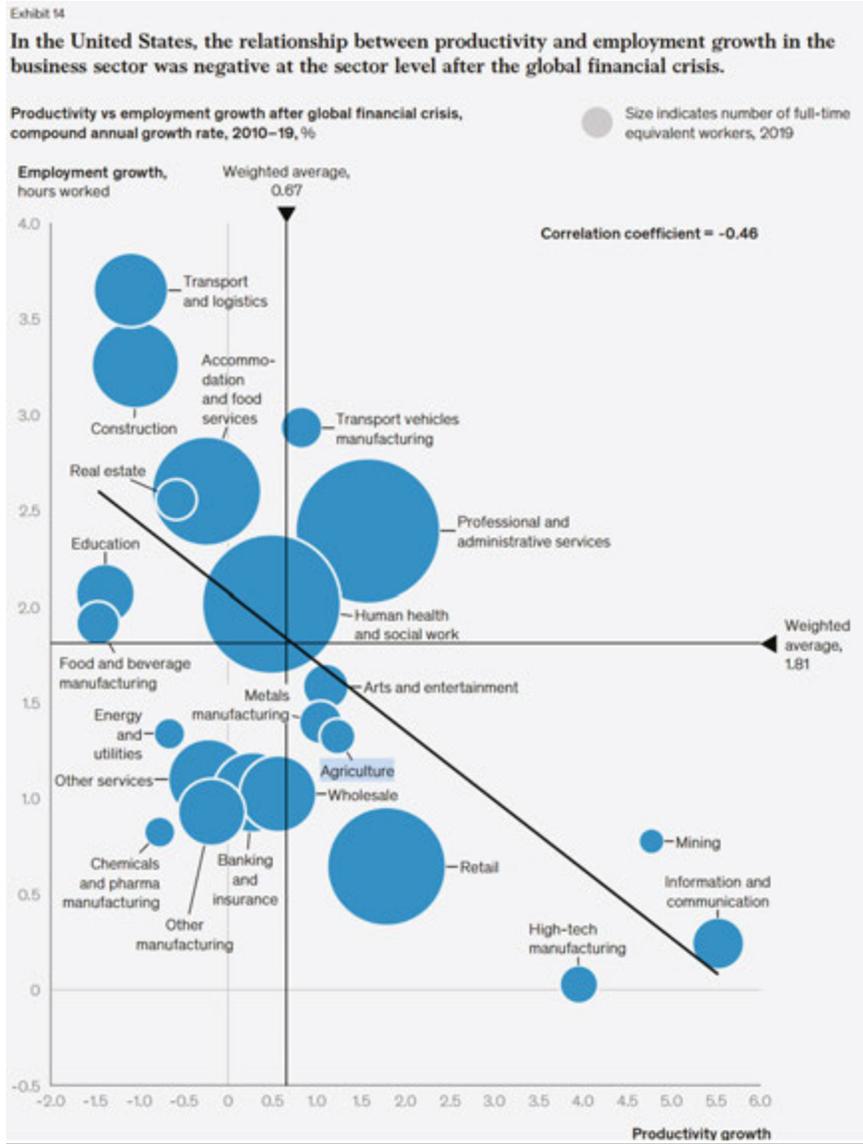
B. Percent change routine hours, 1980-2016



C. Percent change routine employment, 1980-2016



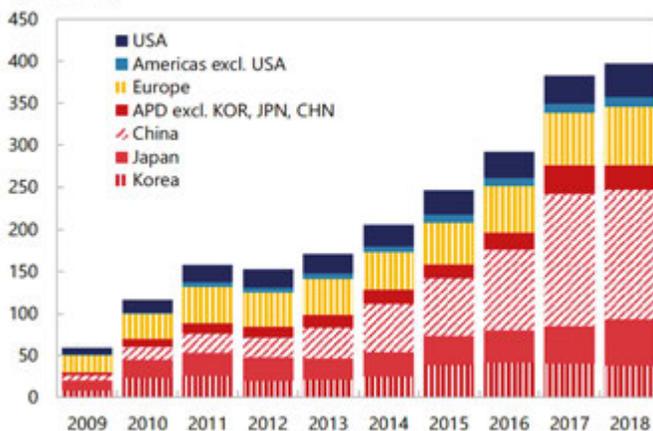
Agriculture had Slightly Higher-Than-Average Productivity Growth and Slower-Than-Average Employment Growth Between 2010 and 2019



China Has the Most Industrial Robots, and Korea the Most per 1,000 Employees

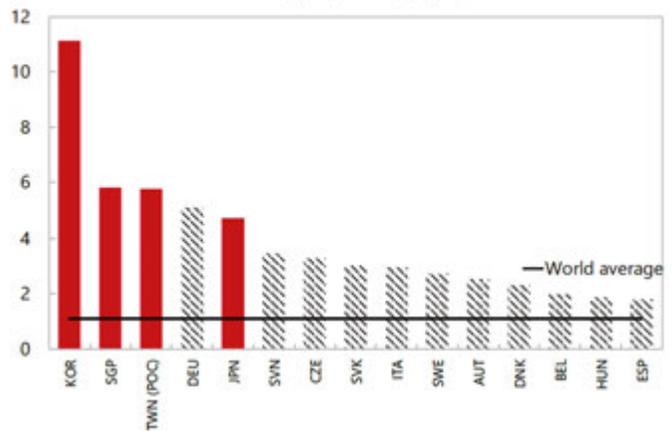
Annual New Robot Installations

(Thousands)



Robot Density, 2018

(Number of industrial robot stock, per 1,000 employees)



Source: International Federation of Robotics, International Labor Organization

Auto Manufacturing had the Highest Number of Robots per 1,000 Employees in 2014

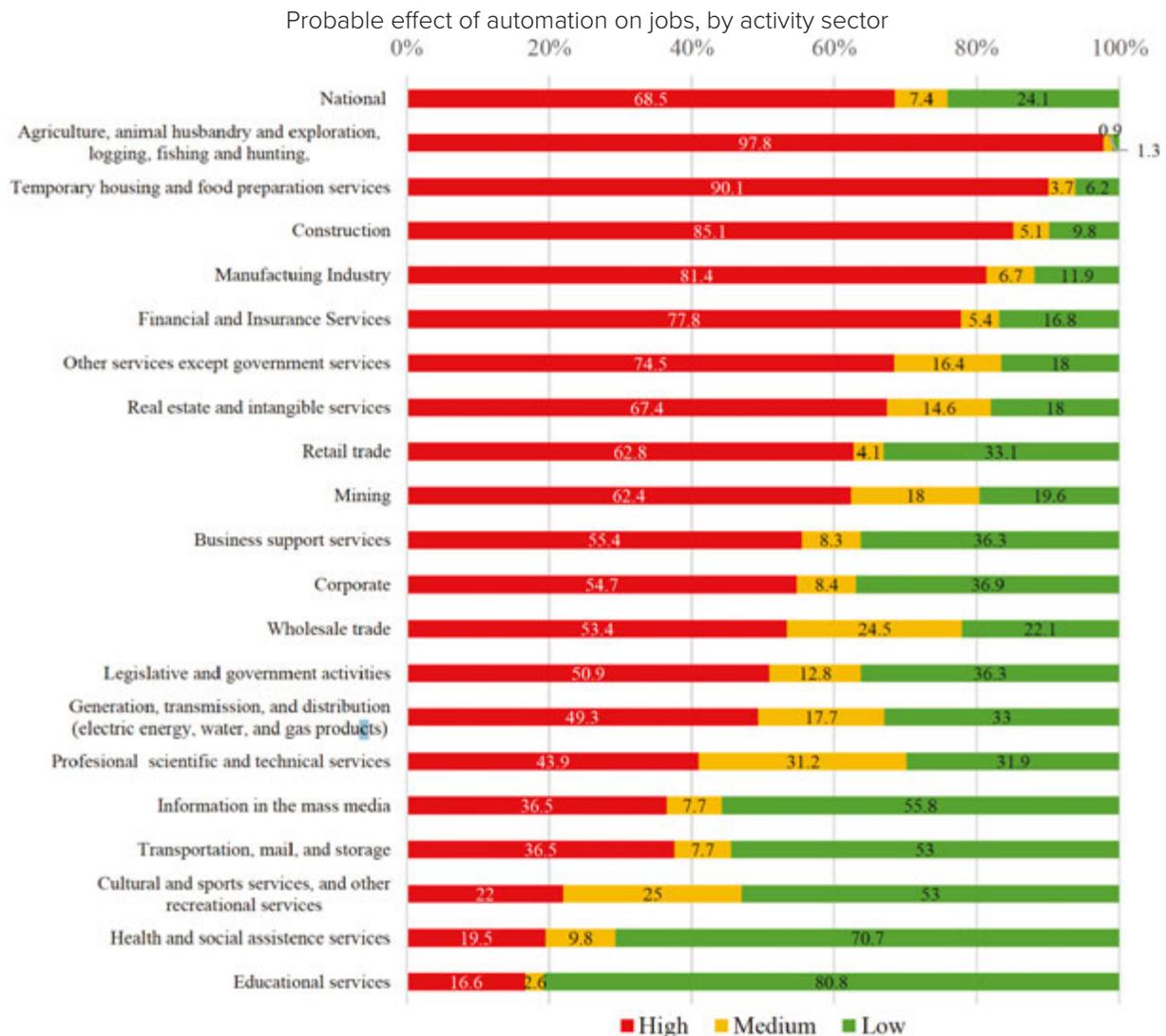
| | All industries | Breakdown by industry | | | | | | Breakdown within the manufacturing industry | | | | | | | |
|-----------|----------------|-----------------------|--------------|-----------|--------|--------|---------------|---|------------|---------|-------|------|-------|-------|---------|
| | | Agriculture | Construction | Education | Energy | Mining | Manufacturing | Auto | Electrical | Plastic | Metal | Food | Glass | Paper | Textile |
| KOR | 10.1 | 0.2 | 0.0 | 0.2 | 0.1 | 1.6 | 46.5 | 192.6 | 112.8 | 21.1 | 6.3 | 3.0 | 2.6 | 0.3 | 0.1 |
| JPN | 5.5 | 0.4 | 0.2 | 0.2 | 0.2 | 0.1 | 32.7 | 140.0 | 52.8 | 29.4 | 11.9 | 3.8 | 3.9 | 1.9 | 0.1 |
| TWN (POC) | 5.2 | | | 0.1 | 0.5 | 0.3 | 9.4 | 25.6 | 23.3 | 6.3 | 2.3 | 0.9 | 0.2 | 0.1 | 1.1 |
| DEU | 4.6 | 0.2 | 0.1 | 0.8 | 0.1 | 0.1 | 21.1 | 108.7 | 9.5 | 20.2 | 9.6 | 7.5 | 10.2 | 1.7 | 1.6 |
| ITA | 3.3 | 0.1 | 0.2 | 0.1 | 0.1 | 0.0 | 14.5 | 106.3 | 5.8 | 25.0 | 13.5 | 13.1 | 7.3 | 1.8 | 0.6 |
| SVN | 2.4 | 1.6 | 0.5 | 0.4 | | | 8.9 | 58.2 | 4.5 | 10.2 | 4.9 | 4.8 | 1.5 | 0.1 | 0.1 |
| USA | 1.5 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 14.3 | 116.3 | 21.7 | 10.2 | 6.0 | 5.2 | 0.7 | 0.3 | 0.2 |
| CAN | 0.5 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 4.0 | 38.5 | 2.0 | 2.3 | 1.3 | 2.8 | 0.2 | 0.1 | |
| MEX | 0.4 | | 0.0 | 0.0 | | 0.0 | 2.2 | 14.9 | 0.8 | 2.6 | 1.2 | 0.1 | 0.1 | 0.0 | |

Source: International Federation of Robotics, the World Input-Output Database (WIOD), Socio-Economic Accounts.

Note: The table shows the robot density as of 2014 for three economies that had the highest robot density in each region.

98% of the Jobs in Mexican Agriculture Were at Risk of Automation in 2018

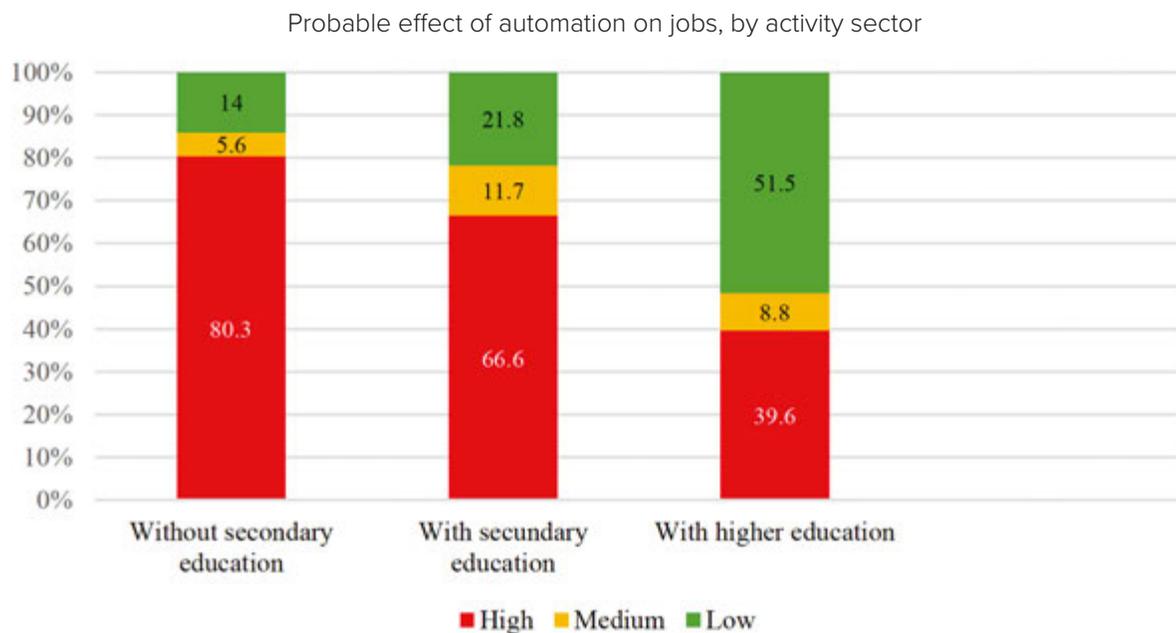
Risk of Automation for Occupations in Mexico, 2018



Source: Banco de México, 2018

80% of the Jobs Held by Mexican Workers with Less than a Secondary Education Could be Automated

Risk of Automation for Occupations by Education Level in Mexico



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